UNIVERSITY OF SOUTHAMPTON

THE BEHAVIOUR OF CHILDREN WITH SPECIAL NEEDS: EFFECTS OF ANIMAL-ASSISTED ACTIVITIES

by Jennifer Alison Limond

Thesis submitted for the Degree of

Doctor of Philosophy

School of Biological Sciences

September 1998

UNIVERSITY OF SOUTHAMPTON

ABSTRACT

FACULTY OF SCIENCE

SCHOOL OF BIOLOGICAL SCIENCES

Doctor of Philosophy

THE BEHAVIOUR OF CHILDREN WITH SPECIAL NEEDS: EFFECTS OF ANIMAL-ASSISTED ACTIVITIES

by Jennifer Alison Limond

The effects of animal-assisted activities (AAA) on the behaviour of children and young adults with special needs have been recorded, and compared with the effects of similar activities that did not involve a live animal. With the exception of one study of children with Cerebral Palsy, all participants attended special schools, residential centres or day centres for those with severe learning disabilities, and several had been more specifically diagnosed as also suffering from autism or Down's syndrome. Several experimental designs were employed in order to establish the value of different methods of AAA and to assess possible influences of methodology on the detection of both general and individual-specific effects.

In the first study, interactive behaviours displayed during AAA were found to be qualitatively and quantitatively different when compared with other activities directed by the same adult. Specifically, the real dog increased appropriate responses and initiations about itself and reduced levels of ignoring the adult that was guiding activities compared to an imitation (toy) dog of similar appearance. In a second study, cooperative behaviour during educational tasks was enhanced through dog involvement compared to standard educational tools, and the level of dog involvement was thought to be a factor in differences between activities. High levels of dog involvement were also found to encourage children with Cerebral Palsy to perform physical exercises, but the use of the dog as a reward was less effective.

Five single-case research studies supported the findings of the first two studies, and provided additional information describing idiosyncratic reactions to AAA. Specific behaviours, identified as needing to be encouraged or reduced prior to the study were to a large extent successfully targeted through individually designed programmes. Some individuals appeared to benefit more than others; additionally withdrawal of dog sessions was identified as a potential source of stress for the participants. Cooperative and appropriate behaviour was enhanced for all participants and some problem behaviours (where apparent) were reduced. General effects of cooperation and responding to the adults directing the activities, were shown through increases in physical and/or communicative responses.

CONTENTS

CHAPTER 3 - STUDIES 1 & 1a

CHAPTER 4 - STUDY 2

CHAPTER 5 - STUDY 3

ACKNOWLEDGEMENTS

This research would not have been possible without the help and support of many people, whom I gratefully acknowledge:

All the children and young adults that participated in the studies, their parents and guardians and staff at their schools and residential centres. Many thanks also to Joanne Pope and Chip, Val Uden and Merry for their time and skills with the children.

Dr John Bradshaw for his supervision and endless patience. Dr Tony Brown for his clinical supervision and practical advice. Magnus Cormack for his invaluable contributions both practical and theoretical. Dr Richard Hastings for his comments and suggestions. Dr Chris Hardie for her support and encouragement.

Members of the AzI and staff at the University of Southampton who have helped with countless queries and requests ranging from the simple to the bizarre.

Thanks also to all my family and friends who have unfailingly offered moral support and encouragement.

CONFIDENTIALITY

The names of all individuals involved in the studies described in this thesis have been changed in order to maintain confidentiality. In addition, schools, residential and day centres in the UK where studies were carried out are not mentioned by name in order to protect the privacy of staff and children/young adults.

Procedures outlined in Chapter 6 received ethics approval from the Southampton and South West Hampshire Health Authority: 'South and West Local Research Ethics Committee'.

ABBREVIATIONS

AAA	Animal-assisted Activities
ANOVA	Analysis of Variance
ART	Aligned Rank Transformation
CP	Cerebral Palsy
LD	Learning Disabilities
PAT	Pets as Therapy
PFP	Pet-facilitated Psychotherapy
RT	Rank Transformation
SLD	Severe Learning Disabilities

CHAPTER 1

INTRODUCTION

INTRODUCTION

OUTLINE OF THE THESIS

In this thesis I aim to examine the effects that animal-assisted activities involving specially trained dogs can have on the behaviour of children with special needs. The first Chapter introduces the field of human-animal interactions with particular reference to the physiological, psychological and social impact on humans of interactions with domesticated animals. Research and general information from observations of pet ownership and animal-assisted activities (AAA) for people with special needs is presented for the three main stages of the life cycle, namely childhood, adulthood and old age. This broad range is discussed in order to provide a full picture of the methods and outcomes that are reported in this nascent research field. Theoretical frameworks, recommendations and cautions for the practice of AAA are then briefly discussed. Finally, the aims of each project detailed in this thesis are presented.

The second Chapter introduces the population being studied, providing information about children with special needs. Diagnostic criteria and definitions are detailed, and common difficulties associated with special needs are presented. This is followed by a discussion of aims and procedures for interventions with this population. The remainder of this chapter discusses issues relating to the choice of experimental designs and data collection methods and describes the experimental procedures that were utilized in the studies carried out. Subsequent chapters describe the aims, methods and results of each study with a brief discussion of the findings. Chapter 3 describes a pilot study that investigated the range of behaviours that children with special needs might exhibit during animal-assisted activities, and compared children's behaviour with a real dog and an imitation dog. A collaborative study in the Czech Republic that employed similar methods is then described. The fourth Chapter details a study that examined the effects of animal-assisted activities on different educational tasks, for children working in groups. The study described in Chapter 5 examined the effects that a dog might have on the performance of physical exercises for children with Cerebral Palsy. Chapter 6 describes a series of five single-case experiments, examining the effects of individually tailored animal-assisted activity programmes. The final chapter discusses the findings of all the studies from this thesis in context with each other, the experimental procedures literature, and the human-animal interactions literature.

HUMAN-COMPANION ANIMAL INTERACTIONS - PSYCHOLOGICAL, SOCIAL AND PHYSIOLOGICAL EFFECTS ON PEOPLE

Interactions between humans and animals have a long and varied history; recent mitochondrial DNA analysis suggests that dogs may have been domesticated as long as 135,000 years ago (Vilà *et al.*, 1997). Recently, researchers have started investigating the potential benefits of such a long-standing relationship between humans and other animals other than the purely utilitarian. This introduction aims to provide a brief history of the area and then to examine this field with a view to assessing the physiological, psychological and social influences impact on humans of interactions with animals.

A Brief History of Companion Animals in Human Society

Archaeological evidence indicates that dogs were kept as companions at least 12,000 years ago (Davis and Valla, 1978), and Robinson (1995) suggests that pet-keeping is actually a precursor of the domestication of animals for the purposes of food and transport. However, it is not until the time of the Ancient Egyptians that we have documented evidence and illustrations of the roles that domesticated animals played in early human societies. In Ancient Egypt, animals were objects of worship, symbolism and protection (e.g. Armour, 1986). Attitudes towards and practices involving companion animals are culturally dependent, and historical information indicates dramatic changes in these attitudes over time (e.g. Serpell and Paul, 1994). Cats and dogs have, over the centuries, been revered, feared or respected, often depending on the religious beliefs of the time. In Ancient Greece, the annual festival for the goddess Diana included the crowning of hunting dogs (Frazer, 1987), while priests in Ancient Rome were prohibited from touching or even naming a dog or goat. In Europe, during the Middle Ages, cats were burnt on bonfires to guard against sickness and witchcraft (Frazer, 1987). In contrast, King Charles II, of England (1660-1685), was renowned for his affection and devotion towards his pet spaniels. Further reports of positive human-animal interactions through history are provided by anthropologists and early explorers who documented affectionate relationships between members of tribal societies and their pets. These reports come from many parts of the world, dating back to the 16th century, and clearly describe close companionable relationships between human and animal (Serpell, 1996). Evidence for this long-standing companionship between people and pets is discussed by Serpell and Paul (1994) who report that the majority of hunting societies keep pets that are named and cared for like children; they are often suckled alongside human infants, protected from danger and when they die may receive a ritual burial.

In addition to the roles described above, dogs have at various times been credited with healing powers. Homer, in 900 BC, described the divine healing power of the physician Asklepios, which involved sacred dogs licking patients and thereby curing ailments (Burch *et al.*, 1995). This belief in the medical assistance that dogs could provide is documented as lasting well into the Christian era, and doctors in the sixteenth century prescribed lap dogs to alleviate illness, often accompanied by the belief that the dog would absorb the disease (Serpell, 1996).

Psychological benefits were also attributed to close contact with pet dogs and Burch *et al.* (1995) describe the ancient practice of people carrying a dog with them if they felt they were in danger of going insane. One of the first uses of animals in a therapeutic capacity is reported as part of a residential programme in Gheel, Belgium during the 9th century, where people with disabilities cared for and interacted with a variety of domestic animals (Bustad and Hines, 1984). Some centuries later, the York Retreat was established in 1790 for psychiatric patients; it was far ahead of its time in many ways, and followed protocols similar to those seen in modern institutions, using positive methods and natural environments to encourage patient rehabilitation. Animals were an important aspect of the York Retreat, where the patients were taught animal husbandry skills and cared for both small and large domestic animals. Improvements in patients' behaviour were attributed to their caring for the animals (Levinson, 1965 from Jones, 1955). Further instances of companion animals featuring in therapeutic environments (with people suffering from illness, physical injury or psychological trauma) during the 19th and 20th centuries are provided by Burch *et al.* (1995).

AN INTRODUCTION TO EVIDENCE OF THE IMPACT OF COMPANION ANIMALS ON BIOLOGICAL, PSYCHOLOGICAL AND SOCIAL HEALTH IN HUMANS

Literature searches scanning publications from the turn of the century to the present day, using CD-Rom, Med-Line, BIDS, Psychological Abstracts, The Interactions Bibliography, hand-searches and cross-referencing produced only three papers on human-animal interactions in the first half of this century. In the second half of the 20th century, however, an increasing number of papers concerning human-animal interactions and their effects on human health were found. These papers are found in various specialist journals in the fields of medicine, zoology, psychology, veterinary medicine and social work. Reports are also seen in popular magazines and newspapers describing potential benefits of pet ownership and animal-assisted therapy programmes (e.g. Vines, 1993; Culliton, 1987; Hay, 1996).

In 1903 Bucke qualitatively analysed more than 1200 children's essays on their 'thoughts, reactions and feelings towards pet dogs'. He ascribes the children's acquisition of positive emotions (such as cheerfulness, sympathy, politeness and gentleness), knowledge of nature and a greater interest in their fellows and humanity, to their interactions with pet dogs. The sociologist Bossard (1944) also proposed a number of psychological benefits to dog owners, based on case-studies and observations. Bossard suggested that the dog acts as an appropriate outlet for affection and attention, something that he considered therapeutically significant in a society that was increasing in conventionality and impersonality. Bossard proposed additional roles for the family pet dog (e.g. as a model of the normality of physical processes and as something that can be dominated to the advantage of the owner's mental health) and suggested that dogs can enhance children's empathy, self-esteem and communication skills. The third paper from the first half of this century was by Lehman in 1927 (see Cusack, 1988) who compared (children's) attitudes towards cats and dogs.

In the early 1960s the child psychiatrist Boris Levinson highlighted the psychological impact that interactions with pets could have on children and adults. Over the years Levinson (e.g. 1962, 1964, 1965, 1967, 1968 (a & b), 1969, 1970, 1971, 1972, 1978, 1980, 1982 and 1984) described his observations of children's interactions with dogs and proposed theoretical frameworks for the child-pet relationship, generating hypotheses that could be examined scientifically (Serpell, 1996). In the 1970s the Corsons and colleagues (e.g. 1975, 1977, 1978, 1980) became the 'pioneers' of the evaluation of psychological and social effects of interactions with animals. They worked mainly with hospitalized psychiatric patients and monitored the impact of 'pet-facilitated psychotherapy' on their clients, reporting that dogs acted as catalyzing socializing links on the patient ward. Since then there has been a growing body of literature concerning the social, psychological and biological factors on the human side of human-animal interactions. This literature is reviewed in the remainder of this introduction to human-animal interactions.

The field of human-animal interactions is still a very young discipline, despite early documentation and more than 20 years of research. Mallon (1992) carried out an extensive review of this literature and found "relatively few substantive, quantitative studies" and " an abundance of... case studies... with no formal research design and no controls" (pp54-55). There have been repeated calls for good scientific research to support the use of pets in the therapeutic environment (e.g. Siegel, 1993; Mallon, 1992; Beck and Katcher, 1984), and some rigorous studies have been reported (e.g. Baun *et al.*, 1991; Mader *et al.*, 1989; Redefer and Goodman, 1989).

The majority of the research studies I will describe focus on interactions with cats and dogs and have been carried out in Western countries where these are the most widely seen companion animals. This will not be an exhaustive review and the majority of the anecdotal reports have been omitted (many examples can be found in Cusack,1988), although some anecdotal evidence is referred to in order to give a picture of the potential benefits of human-animal interactions, particularly in areas that have few studies to guide future research. Work focusing on therapeutic horseback riding has not been included due to the different environment that is necessary in order to provide such activities. Most riding programmes require individuals to leave their normal environment and visit a horse-riding centre, making it difficult to compare with AAA that are carried out in a familiar environment (such as a nursing home, school or residential centre). Animal-assisted programmes in prisons have also been omitted from this review.

For the purposes of this chapter, the evidence pertaining to the psychological, social and biological effects of interactions with animals is divided into two broad categories: i) pet owners, and ii) people with special needs. These two categories are then sub-divided according to the age group of the individuals involved. Many of the studies focus on a particular group of people, e.g. elderly pet owners or adult psychiatric patients. It was considered appropriate to review the literature according to these groupings as, for example, an elderly person who has had many experiences of pets will have different preconceived ideas and needs and could therefore react very differently to an animal compared to a young child who is still exploring and learning about their environment. Unfortunately none of the categories described above has a cohesive, structured body of research literature. Therefore research from all areas is briefly discussed in order to give a broad picture of the current state of the research literature. It is not clear at this stage how the effects found in one category might generalise to another but it is likely that the findings from different areas will have some relevance to each other in terms of both methodologies and outcomes.

Pet Ownership

The most prevalent human-companion animal interactions are those seen between pets and their owners. Historically, despite periods of antipathy, domestic animals have often taken on the role of companion to the people that they live with. Today, companion animals are numerous in societies all over the world. In the UK, 51% of households are reported as keeping at least one pet, 26% of which had a dog and 21% had cats (Anon, 1995). Many individuals and families in Western countries keep companion animals indoors as part of their household. Reports indicate that as many

as 87% (Cain, 1983) or even 99% (Voith, 1985) of pet owners consider their cat or dog to be a member of the family. Research into the area has examined some of the possible physiological, psychological and social effects that this relationship has on pet owners of all ages. At different stages of the life cycle the emphasis of the relationship and therefore the likely additional benefits and drawbacks may be quite different. However, the theme which has probably received the most general interest and publicity has been the possible effects of pet-keeping on physiological, particularly cardiovascular, health of adults, and this area will therefore be evaluated in detail before considering lifestage-specific effects.

Pet ownership and cardiovascular health

One of the first studies, and perhaps most influential, to examine the relationship between cardiovascular health and pet ownership (Friedmann et al., 1980) appeared to indicate that the presence of a pet in the home was a good predictor of one-year survival following a heart attack. Moreover, this effect was apparent for pets other than dogs, which suggested that the mere presence of a pet, rather than simply a need to exercise it, might confer some protection from subsequent cardiovascular incidents. The conclusions of this study were challenged by Wright and Moore (1982), and while Friedmann and Katcher (1982) were able to respond effectively to several of their criticisms, they did not adequately address the apparent confounding of age of subject and pet ownership in their original study. The statistical significance of pet ownership depended upon whether it was entered into the model predicting survival before age of subject (when it was highly significant) or after age (when it was not significant): (unnumbered Table at top left of page 309 of Friedmann et al., 1980). An alternative, and perhaps more parsimonious, interpretation of their data is that their pet owners tended to be younger than their non-owners, and were therefore more likely to survive for one year following a heart attack. In a follow-up study of a larger sample (Friedmann and Thomas, 1995) in which age of human subject was included in the predictive model (but the relationship between age and ownership was again not specifically reported), only dog ownership was associated with improved one-year survival after a myocardial infarction. Cat ownership was, if anything, associated with a decreased probability of survival. Neither of these studies rules out the possibility that the only beneficial effect of pet ownership on long-term cardiovascular health is the increased exercise associated with dog ownership (Serpell, 1991); however, even this link has recently been cast into doubt by a study conducted at Greenwich University, suggesting that walking with a dog (as compared to walking without a dog) has little effect on cardiovascular health (Anon, 1998).

If pet ownership in some way protects against heart disease, as the Friedmann model purports to suggest, it should be possible to detect its effects on biochemical and physiological risk factors such as plasma cholesterol and blood pressure. In a large-scale study in Australia, Anderson et al. (1992) detected lower systolic blood pressure, plasma triglycerides and cholesterol in male pet owners, but not, except for one measure in one age group, in women. Dog owners and owners of other pets were similar, suggesting that the exercise associated with dog ownership was not a significant factor. However, Anderson et al. pointed out that cause (pet) and effect (better cardiovascular health) could not be concluded from their data. In common with most other studies, the pet-owning group were self-selected, and it was entirely possible that the decision not to own a pet (in the "control" group) had been associated with some lifestyle-related risk factor not identified by the experimenters (although they were able tentatively to eliminate diet, smoking and socioeconomic status as potential confounding variables).

The search for mechanisms which might underpin any effect of interactions with pets on cardiovascular health has focussed on their potential as moderators of autonomic stressors. Friedmann et al. (1983) designed a paradigm in which subjects were asked to rest, then read aloud (the stressor), while their blood pressure was measured; each subject did this twice, with a dog present on one occasion; half the subjects received the dog condition first, and the other half the no-dog condition. In this study, a domestic rather than laboratory setting was used, and the dog was "friendly" but unfamiliar to the subjects (children, between 9 and 16 years old). No effect on heart rate was detected, but the tabulated data indicates that in the first session the subjects with the dog present had significantly lower blood pressure than did the subjects with no dog present (however, Grossberg et al., 1988, report that there were "proofreading errors" in this data). The stressor did cause increases in blood pressure, but these were unaffected by the presence or absence of the dog.

This paradigm has formed the basis, with modifications, for several subsequent studies. A clear-cut modification of the response to a stressor was demonstrated by Allen et al. (1991) in a study conducted partly in the subjects' own homes; the presence of the subject's pet dog reduced blood pressure, skin conductance and heart rate during the stressor (a serial subtraction task), whereas the presence of a close friend of the same gender increased all of these parameters. However, since all the subjects were females who were "very devoted to their pets", it is possible that those allocated to the control condition found the enforced separation from their dog, in their own home, stressful in itself, i.e. the true baseline may have been produced by the group allowed to have their dog present. In general, results obtained from this protocol seem to be very sensitive to small changes in the

method; for example, no beneficial effects were detected by Grossberg et al. (1988) using male subjects' own dogs in a laboratory setting, or by Straatman et al (1997) using an unfamiliar dog with male subjects in a laboratory setting. Allen (1997) has continued to report reductions in blood pressure associated with the presence or ownership of animals, but these studies have yet to be published in full.

Overall, the difficulties encountered in making robust measurements of the beneficial effects of pets on cardiovascular health suggest that such effects, even if real, are ephemeral and therefore unlikely to have any major effect on the health of pet owners as a population. However, all of the studies described are handicapped by the intrinsic nature of pet ownership. Comparisons between pet-owning and non-owning groups are inevitably compromised by the fact that the pet owners not only have pets, they have at some time in the past decided to acquire a pet, whereas many of the non-owners may have made an equally careful decision not to. This suggests differences between the two groups which were already in existence before the pet itself appeared. For example, Kidd and Kidd (1989) found that 88% of adult pet owners had kept pets as children, while only 28% of those not keeping pets had animals during childhood.

Paradigms which introduce a pet dog to human subjects allow for comparisons with circumstances when no pet is present, but only test a limited range of the attributes that make up a "pet". Such dogs are animated, may have features which induce nurturant responses (see Archer, 1997), and may conicidentally resemble the subject's own pet (if any), but the subjects are unlikely to be given the time to develop a relationship with the dog, thus omitting a feature of pet-keeping which may be key to the acquisition of health benefits. Longer-term interventions which provide companion animals raise ethical issues, are expensive, and accordingly few studies of this kind (e.g. Mugford and M'Comisky, 1975) have been performed. Moreover, no adequate equivalent for the placebo treatment used in drug trials has yet been devised, and adequate controls are difficult to select.

In one of the few studies to examine human health before and after the acquisition of a pet, thereby using subjects as their own controls rather than relying on a self-selected pet-owner group, Serpell (1991) found improvements in reported minor health problems and General Health Questionnaire scores up to 10 months after the acquisition of a pet, although after 6 months the effect was more uniform in dog owners than in cat owners. This study points to improvements in perceived well-being rather than physiological health, but its methodology could conceivably be applied to a study of cardiovascular health. A "novelty" effect of pet ownership cannot be ruled out, for which

control group(s) with equivalent changes in lifestyle would be required. An extension of this study failed to replicate many of its findings (C. York, personal communication).

Pet Ownership and Psychological Health of Adults

Adults comprise the largest and probably most diverse group of pet owners. The age group itself includes people between the ages of 18 and 65 years, and covers several stages of the human life cycle.

Serpell (1991 - described above) examined psychological and general health variables in adults before and after acquiring a pet cat or dog. Both the cat and dog owners showed a decrease in minor health problems in the first month and this was maintained for the full ten months of the study for the dog owners. Psychological variables (measured using the 30-item General Health Questionnaire) also showed positive changes over the first six months and this was again maintained in dog owners for ten months. Dog owners also showed increased levels of exercise and self-esteem. Hart (1995) describes the work of a PhD student (Chouinard, 1991) who reported studies indicating higher achievement scores and healthier self-ratings amongst adult pet-owners compared to those not keeping pets. In contrast to these positive findings, Stallones *et al.* (1990) did not find an overall relationship between pet ownership, attachment to the pet and self-reported illness behaviour. Some specific effects that were apparent were seen as having negative implications and young adults that were strongly attached to their pets were thought to be at risk of having less human support and therefore being at risk from the physical and emotional problems associated with low levels of social support. A positive correlation was also found between emotional distress and pet attachment. These findings suggest that there is a possibility of detrimental levels of attachment between pets and their owners and highlights some potentially negative aspects of pet ownership during adulthood. However as the authors point out this was a cross-sectional survey and direction of causation could not be identified.

The area is further complicated by studies investigating psychological differences between pet owners and non-owners. Pet owners have been found to gain higher scores on tests of empathy and interpersonal trust, but not self-esteem (Hyde *et al.*, 1983). A study by Loyer-Carlson (1992) reported that pet-ownership per se did not affect perceived quality of life, but that liking the animal was positively correlated with quality of life scores. Cameron and Mattson (1972) suggest that "pet owners are less psychologically healthy than non-owners" (p286) due to their findings that pet

owners preferred pets to people, felt less regard from others and obtained lower scores on an ego-strength scale.

One study that indicates both the positive and negative aspects of pet-ownership is that by McCulloch (1981) who worked with medically ill, depressed outpatients. He found that owning a pet was beneficial in helping the patients cope with their illness and depression. The pets were thought to improve morale and made their owners feel needed and more secure. However, some patients reported negative aspects of their pet's presence, such as worrying about the pet's care if their illness worsened, about the pet being a nuisance and feeling too ill to care whether the pet was there or not. McCulloch recognises the potential benefits of pet presence, but is cautious about pet ownership being recommended for this type of patient, stressing that it can only ever be considered an adjunct to other therapies. He recommends a number of precautions such as matching the pets and people, being aware of increased vulnerability to the loss of a pet, discussing previous relationships with pets and identifying situations that are inappropriate for pets.

Further indication of negative components of the relationship between pet and owner is provided by Simon (1983) who carried out a qualitative investigation which suggested that relationships with pets can encourage maladaptive behaviour that is detrimental to the health and well-being of the pet owner. For example, Simon reported that people might develop a fantasy life that revolves around a pet, in an attempt to resolve other problems and therefore avoiding directly tackling the problem. He also found that a pet could be used as a "narcissistic extension in which satisfaction of the pet is substituted for more adaptive function of one's self" (p240). Inappropriate or detrimental relationships can form between a pet and its owner.

The "Social Lubrication" Hypothesis

One of the first investigations into the effects of pets on psychological health was carried out by Mugford and M'Comisky in 1975. They administered questionnaires to pensioners living alone, before and after giving them either caged birds, a pot plant or no intervention. The questionnaires examined attitudes towards other people and themselves in relation to physical and psychological health and their environment. The authors concluded that in all cases the bird had become "an object for empathy and communication in its own right, but it also had become a 'social lubricant' - a focal point for communication with friends, family and neighbours who came to visit" (p63). Unfortunately the small sample size made statistical comparison between groups difficult and no

definite conclusions could be reached, but the idea that pets can facilitate interactions between people, thereby increasing social networks and, through this, less isolation and an enhanced sense of well-being, was addressed in several subsequent studies.

Most of these have demonstrated that social contacts in public places increase when people are with animals. Taking a pet dog for a walk (Rogers *et al.*, 1993) or sitting in the park with a small animal (Hunt *et al.*, 1992) elicited higher frequencies of positive social contacts from passers-by compared to being without an animal and doing other things. The majority of these contacts were recorded as focusing on the animal that was present, supporting Mugford and M'Comisky's (1975) suggestion that an animal can provide a focal point for communication.

Pet Ownership and the Elderly

Elderly members of our society are often characterised as suffering from a reduction in social contacts, due to retirement, bereavement and reduced mobility. The issue of social interactions and their impact on health is often the focus of attention when examining the effects of pet ownership on the elderly.

Loss of a spouse is a major life event that is more likely to occur in later life, and social isolation may be a consequence that further increases vulnerability to depression (Hart, 1995). Siegel (1993) reports on a study (Akiyama, 1986/7) that showed that women who had been recently widowed showed fewer physical and psychological symptoms of bereavement if they owned a pet. Further evidence for the positive biopsychosocial effects of pet ownership amongst suburban, community-dwelling elderly people is given by McBride *et al.* (1995). Their pilot study indicated lower levels of depression and feelings of loneliness amongst pet owners (compared to people without pets) and general health was significantly better in pet owners and/or those who had a strong social support network. However, Garrity *et al.* (1989) found recently bereaved elderly that owned pets were likely to show lower levels of depression only **if** they had minimal social support. Overall, Garrity *et al.* found that effects on depression (irrespective of life events) were only apparent in this elderly group if the owners were strongly attached to their pets. These studies suggest that additional social support may be a complicating factor when considering the benefits of pet ownership amongst the elderly, as well as indicating that attachment to the pet concerned may also influence reported effects.

Further studies demonstrate the complexity of the human-pet relationship amongst elderly pet owners, with a particular emphasis on the issue of attachment to the pet. Siegel (1993) found that elderly pet owners, in particular dog owners (who were more attached to their pet) visited their doctor less often than people without pets. Ory and Goldberg (1983) found that elderly women with a high income **and** a strong attachment to their pet derived positive psychological benefits, while a low income combined with pet ownership resulted in lower scores on general happiness than women without pets. The authors concluded that financial constraints and levels of attachment affected the benefits that could be derived from pet ownership. In contrast, Miller and Lago (1990) specifically examined levels of attachment to pets and demonstrated no impact on either physical or psychological health in a group of elderly women. Unfortunately it was not clear whether the group studied constituted a diverse range of 'attachment levels' and a comparison with a similar group that did not own pets was not included. It would appear from these studies that many factors need to be further examined in this area.

The relationship between elderly people and their pets is obviously a complex one and factors such as social support and attachment to the pet need to be considered. In addition the stressful aspects of pet keeping (such as financial expenses and quality of pet-care, particularly if the owner requires periods of hospitalisation) may be of more concern in an elderly population. Some elderly people have reported that they no longer keep pets due to the associated problems such as a pet being "too much of a tie" (Nicholson and Goody, 1994). These potential drawbacks to pet-keeping are an important aspect of the relationship between the elderly and their pets, and comprise another factor that needs to be addressed in order to adequately develop this area of research. However, many of the older members of our communities keep pets and the current evidence suggests that pet ownership can have positive aspects for the elderly in terms of enhanced social contacts, and positive consequences with respect to their experience of psychological symptoms.

Pet Ownership and Children

Pet ownership appears to be most common among families with school-age children (Salmon and Salmon, 1983; Messent and Horsfield, 1985). This is perhaps due to the fact that many parents believe pet ownership helps children develop character and become more responsible and sociable (Endenburg and Baarda, 1995) as well as providing companionship, teaching them the facts of life and to be kind to animals (Salmon and Salmon, 1983). Pet ownership during childhood is not in the direct control of the children themselves, rather it is a result of their parents' or family's attitudes

towards companion animals. These parental attitudes may also relate to other aspects of parenting, thereby confounding any inferences that can be made about the effects of family pets on children. Despite this, researchers have suggested that family pets can affect both socio-emotional and cognitive development (e.g. Robin and ten Bensel, 1985). The family system as a whole is also thought to be affected , and Cox (1993) reports that family adaptability and cohesion are positively correlated with the family's attachment to their pets. Acquisition of a pet is also thought to increase the amount of time family members spend together and to increase family happiness (Cain, 1985). This research area, although confounded by the influences of all the family members, can shed some light on areas that are possibly affected by regular interaction with a familiar pet.

It is not known when children first recognise animals as animate. Determining the development of children's abilities to make distinctions between animate and inanimate is a research field in itself, and as such only a brief summary will be provided here. Richards and Siegler (1986) used unfamiliar objects in order to investigate children's understanding of the attributes of life, rather than drawing on children's learnt knowledge that animals and plants are alive and that x is, for example an animal. These authors found that for all children's age groups (4-11 years) movement was the most commonly cited attribute of living things, and it was only as children became older that other characteristics (e.g. eating, breathing) were provided. Richards and Siegler (1986) discuss the fact that motion is not a category that is highly correlated with life (e.g. cars move, plants do not), and investigating this further they found that children as young as 5 years of age were able to utilize different aspects of movement to make judgements about whether an object was likely to be alive or not. Bullock (1985) provides evidence that young children do not make consistent judgements about objects being alive just because they move, and suggest that the 3 year old children showed "clear evidence of distinguishing objects according to animate qualities, although they were not consistent at this task nor as accurate as the older children" (p224). Massey and Gelman (1988) found that 3 and 4 year old children were successfully able to identify whether unfamiliar animate versus inanimate objects (presented as photographs) would be able to go up or down a hill by themselves (attributing animacy), with the exception of 3 year olds' ratings of nonmammalian animals where the children gave explanations indicating that "bugs...were too little to negotiate so big a hill" (p311). Gelman et al (1995) argue that it is not possible to distinguish between animacy and inanimacy purely on the basis of motion, due to the ambiguity of the cues involved. This ambiguity "is resolved with respect to choices of causes about objects and their motions, given a set of conditions" (p182). This idea is further supported by the work of Gelman and Gottfried (1996) who found that

3 and 4 year olds were more likely to attribute animals' movement, rather than artifacts' movement, as self-movement.

It appears that from the age of three, children are able to make a number of distinctions about the animacy of unfamiliar objects. It also seems likely that in the case of familiar objects animacy is more easily attributed, through the use of additional knowledge, such as information provided by others and personal experience. Unfortunately, the studies described rely largely on methodologies requiring verbal skills (e.g. asking "is this alive?"; Bullock, 1985), and this is likely to explain why the youngest children in this research were 3 years old, rather than younger. However, Gelman et al (1995) describe the abilities of infants (from 3 months) being able to causally interpret motion paths. Such evidence makes it difficult to determine the age at which children are able to distinguish between animate and inanimate objects when they move, but suggests the skill may develop very early. Kidd and Kidd (1987) found that children between the ages of 12 and 30 months showed significantly more 'proximity-seeking' and 'contact-promoting' behaviours towards family dogs and cats than towards mechanical toy imitations that moved and made appropriate noises. Unfortunately this does not demonstrate whether these responses were due to the child having a distinct relationship with the pet, or were the result of familiarity, but they do suggest that children at that age could recognise the pet as a distinct entity.

Other research in the area tends to focus on children who are 5 years or older, when direct responses to questions can be obtained, and on socio-emotional concepts that appear during development. Since self-reporting is unlikely to be of value in the population to be investigated in this thesis, these methods will not be described in detail, although they can be valuable. For example, in one detailed study of 7- and 10-year-olds in California, Bryant (1985) addressed the extent to which pets functioned as sources of social support alongside peers, parents, grandparents and other adults. Data was gathered on sources of support through a semi-structured interview conducted while the child was accompanied on a walk around his or her neighbourhood, aimed at eliciting cues and reminders. Despite the informal nature of this approach, test-retest reliability was extremely high for most sources of support, including the number of pets classed as "special friends", and the number of intimate talks conducted with pets. Females cited more pets as "special friends" (1.9) than did males (1.6), and this also increased with age (7-year-olds, 1.5, 10-year-olds 1.9). The overall mean for intimate talks with pets, 0.22 SD±0.68, indicates that most children reported none, although the mean for females was significantly higher than the mean for males. The psychological well-being of the subjects was assessed via eleven standardised measures, two of which, empathy and attitudes to

competitiveness, produced significant regressions on the number of intimate talks with pets. However, the regressions with empathy were difficult to interpret, since they were (a) only significant for males, very few of whom can have reported any such talks, and (b) in opposing directions for the two age groups - positive for 10-year-olds, negative for 7-year-olds. Children from large families (only) had less competitive attitudes the more they reported intimate talks with pets; this result appears statistically more robust, and is interpreted by Bryant as compensation for a less intimate relationship with their parents than may be possible in small families. However, as with all such correlational studies, care has to be exercised that causes and effects are only assigned tentatively.

Other studies relying on children's self-reports suggest that pet ownership enhances self-esteem (e.g. Covert *et al.*, 1985; Bergesen, 1989 in Endenburg and Baarda, 1995) and self-concept (Davis, 1987). From the children's point of view, Bryant (1990) found that school children considered affection to be one of the main pleasures of pet ownership. Investigating children's perception of their pets, Davis and Juhasz (1995) asked children (10-12 years) to rate descriptive statements concerning their pets. These children appeared to view their pet as a friendly companion, making them feel less lonely and providing an empathic and complementary friendship. Guttman *et al.* (1983) found that this goes further, as social group interaction was seen to be superior amongst 11-16 year old pet owners (and former pet owners), and pet-owning boys showed greater non-verbal communication abilities than boys without pets (girls were generally better at this skill and equally good irrespective of pet ownership).

It has been suggested that the extent of a child's attachment to the family pet may affect the variables that have been discussed. Davis (1987) describes positive associations between affective relationships ("empathic and supportive understanding" (p94)) with the pet dog and perceived self-concept, i.e. it is a good quality relationship that encourages a positive self-concept. Melson and Peet (1988, in Endenburg and Baarda, 1995) found that attachment to a pet was related to positive emotional functioning; Poresky and Hendrix (1990) suggest that it is the quality of interactions with a pet that influences developmental characteristics such as empathy, cooperation and intellectual functioning, with a strong bond correlating positively with these measures. Poresky (1996) provides further evidence for the relationship between children's attachment to a pet and empathy towards their peers.

Another factor that might influence children's responses and development in relation to pet ownership is how they are perceived by others. Mader *et al.* (1989) observed that physically disabled children with service dogs, compared to children without dogs, received more social acknowledgements from familiar peers and unknown strangers, a finding which the authors note has been found among adults with disabilities and able-bodied people (e.g. Messent, 1983).

The literature provides information and research demonstrating the positive aspects of pet ownership during childhood, but there is a very limited contribution concerning problems and costs that might be also be associated. Davis and Juhasz (1995) report two studies that indicate negative outcomes of pet ownership for children, but it should be noted that these studies were not published in full. The first, Serpell (1986), was presented at a conference, and indicates that young pet owners saw themselves as less socially competent and having fewer satisfactory friendships than children without pets. The second, an unpublished dissertation (Bekker, 1986) found that 14-19 year old pet owners reported significantly greater loneliness than their peers without pets. In addition, Bryant (1990) found that a number of school children had negative experiences with pet ownership. These included distress due to pet death or rehoming; distress associated with care, needs and nurturing of the pet; being treated unfairly by the pet or by parents because of the pet; and worry about pet safety.

There is always the possibility that a child-pet relationship may be detrimental to the child and/or the pet. Van Leeuwen (1981), a child psychiatrist, suggests that there are three main areas for concern - unfavourable attachments, fear and cruelty. He also points out that parents have a very important role to play in promoting a healthy relationship between children and pets. Unfortunately very little research pertaining to the functioning of family systems that include pets as members of the family is available, but it seems appropriate, given Cox's (1993) findings reported earlier, to bear in mind the whole family system when considering the effects that pets can have on children.

Overall, it seems that pets can have a positive impact on child development. The guidance of adults to ensure and encourage appropriate interactions may be important but has not been investigated scientifically. As with the pet ownership literature relating to adults and the elderly, attachment to pets is introduced as a factor that possibly mediates the psychological and social effects of human-animal interactions. The issue of social support and its bearing on childhood relationships with pets has not been researched in detail, but this may be the result of children being members of families, often having siblings and generally having regular contact with peers during the school day. Overall

the research in this area indicates that interactions with pets can enhance and promote positive social and emotional development during childhood.

General Discussion of the Pet Ownership Literature

One of the main problems associated with research investigating the effects of pet ownership is that it is not possible to carry out experiments: It is not possible to randomly assign people to groups that either do or do not acquire a pet. People obtain pets of their own accord, for their own reasons and cannot be forced to obtain a pet or interact with one over a long period of time. Therefore all the research in this area is constrained by the fact that certain people choose to be pet owners, and as a result causal relationships between physiological or psychological effects and people's interactions with their own pets are difficult to determine. The issue of 'personality traits' determining whether someone will own a pet or not has been briefly examined. Guttman (1981) suggests that it is not a general attitude to pets themselves that determines whether someone will keep pets, but largely an individual's needs. For example, those without pets feel that a pet impairs freedom and increases the danger of vermin and disease, while pet owners report that the pet gives them a feeling of being needed and providing companionship. In contrast, Friedmann *et al.* (1984) report that there are no personality differences between people that do and do not own pets. Obviously this is another area that requires more detailed research. To date, investigation of possible personality traits has not been fully incorporated into studies researching the effects of pet ownership. Albert and Bulcroft (1988) found that there are sociodemographic differences between pet owners and people who do not keep pets, for example, widows, empty-nesters, families with infants and families with very low incomes are less likely to keep pets. All of these factors could conceivably affect health. It would be helpful in shedding some light on the issue of whether it is pet ownership that is producing the effects described, or whether it is the case that the type of person that will show these patterns will also be more likely to choose to own a pet.

Pets and People with Special Needs

It is not just pet owners that have regular contact with companion animals. As stated earlier, the other broad research area forming the basis of this review has targeted individuals with special needs. There are now many institutions that have pets in residence, including farm animals, dogs, cats, rabbits, guinea pigs and birds, or pets that are brought in as visitors, usually dogs, though other species are also used. The literature reporting on the effects of pets in these situations largely

consists of anecdotes and case reports. Despite a lack of systematic research, there is an increasing number of programmes that involve pets in the care and therapy of people with special needs. Programmes are carried out in schools, psychiatric units, hospitals, hospices, nursing homes, prisons, residential and respite centres as well as outpatient programmes (e.g. horse riding or interactions with dolphins). These programmes are developed for individuals with physical handicaps, learning disabilities, psychiatric problems and communication or social needs (Boucher and Will, 1992). Levinson (1968a) found that out of 121 residential schools for children with special needs, 41% permitted the children to own pets and residential pets were primarily used as educational aids. Levinson (1972) also found that 16% of clinical psychologists surveyed in New York used pets in therapy, 39% were familiar with this use of pets and 51% had recommended pets to patients as home companions. Training manuals and guidelines for setting up AAA are available, but these are mainly based on the opinions and personal experiences of those that have already developed programmes (e.g. Pfau, 1990; Delta Society, 1992). Australian researchers Blackshaw and Crowley (1991) gathered information on institutions in Queensland that utilized pets and found that out of 103, 68.6% had resident pets but only 11.8% had 'pet therapy programs'. They concluded that the concept of pet therapy was both poorly defined and misunderstood, as respondents often did not understand what such programmes might involve or what the aims could be. This suggests that further research and dissemination of the methods and findings of such research is required in order to standardize the definitions, aims and techniques of AAA and to fully utilize animals that are currently resident in these institutions. Unfortunately the research field is not developing as rapidly as might be expected. Barba (1995) reviewed the literature from 1988-1993 and identified only three research studies "involving animals as therapeutic interventions" (p13). Two of these involved an elderly subject sample and one involved adult psychiatric patients.

There are a number of terms that have been coined to describe the involvement of animals in the lives of people with special needs. This animal involvement has included many different situations (e.g. leisure time vs. psychotherapy sessions) and types of animals (e.g. small pets vs. farm animals). The terms used have slightly different connotations and this is probably due to the variety of situations and animals. The following terms are commonly seen in the literature: Pet/Animal Facilitated Therapy; Pet/Animal Assisted Therapy; Pet/Animal Assisted Activities; Human-Companion Animal Therapy; Pet Facilitated Psychotherapy. In this review all these terms may be referred to, if specified by the authors of papers being discussed. However, apart from this and for the remainder of this thesis the term 'animal-assisted activities' (AAA) will be used to describe the involvement of animals in programmes for people with special needs. This includes programmes

and studies that have therapeutic aims, such as increasing desirable behaviours and decreasing maladaptive behaviours, in environments that may or may not include a qualified clinician. A definition of 'animal-facilitated therapy' provided by Boucher and Will (1992), covers the range of activities that might involve animals: "It is the use of animals to assist in the care, rehabilitation and treatment of a variety of human conditions, including physical and emotional problems. Animals are co-therapists not cure alls" (p11).

Animals are often incorporated as permanent members of residential centres for people with special needs. As described earlier this is not a recent phenomenon and was documented as long ago as the 9th century. The involvement of residents with these animals can range from total responsibility for the pet's care, to occasional interaction, to no contact at all. Many residential pets are available for interaction purely as a part of the surrounding environment, for example, fish tanks, caged birds, small mammals (such as hamsters), cats and dogs, with cursory supervision by members of staff. However, guided therapy programmes involving residential pets and focusing on the acquisition and development of specific skills are reported, particularly for children. Examples include Green Chimneys Farm, USA (e.g. Mallon, 1994a and b; Ross *et al.*, 1983), Bittersweet Farms, USA (Kay, 1990), and The Fortune Centre, UK (Dampney, 1988). There are also many programmes that involve pets visiting people with special needs. Often these visits are just for the purposes of social interaction, but are increasingly focusing on specific skills or behaviours such as when a therapist brings in their own pet in the hope of eliciting certain responses. Visiting pets are usually dogs, probably because they are of a suitable size and easily trained, controlled and transported. Research investigating the effects of interactions between pets and people with special needs have mainly been conducted in situations where the pet has been brought in as a visitor.

As well as differences in terminology and in the use of residential or visiting animals, AAA programmes have also differed in terms of the therapeutic approach taken. Brickel (1986) categorised 'pet-facilitated therapy' into three different spheres - milieu therapy (therapy through enhancing the normal environment), psychotherapy and physical rehabilitation, with the most common being milieu therapy. As Brickel points out that the three often overlap as there are no clearly defined boundaries. All three categories provide information about the influence of human-animal interactions on people with special needs.

Despite the fundamental differences in terminology, therapeutic approaches and in the use of residential or visiting animals, the research carried out tends to focus on the behaviour of the

individuals involved. This review aims to highlight the possible effects of all types of AAA for the different age groups already identified within the human-animal interactions literature: the elderly, adults and children.

Animal-Assisted Activities and the Elderly with Special Needs

The predominant emphasis of the reports and studies investigating elderly people's interactions with animals is on social interaction. Many of the articles refer to the fact that animals act as 'social facilitators' (e.g. Corson *et al.*, 1977), 'social lubricants' (e.g. Odendaal, 1990) or 'social catalysts' (e.g. Levinson, 1972) breaking the pattern of isolation, loneliness and apathy for nursing home residents (e.g. Brickel, 1981; Barnett and Quigley, 1984; de Tilly, 1991). Dramatic case reports are cited, such as people talking for the first time in several decades (Brickel, 1985). Fortunately, there are several studies that use established scientific methods in order to demonstrate more generally how human-animal interactions can affect the elderly with special needs.

A controlled study by Fick (1992) found significantly more verbal interactions when a dog was involved in group therapy at a nursing home, but other social behaviours (non-attentive behaviour, attentive and non-attentive listening and non-verbal interactions) were not significantly affected. Other controlled studies that have investigated the effects of pet visits on institutionalized elderly have demonstrated increased levels of social interactions between patients, and between patients and staff, for psychiatric patients (e.g. Haughie *et al.*, 1992) and Alzheimer's patients (e.g. Beyersdorfer and Birkenhauer, 1990; Kongable *et al.*, 1989). Kongable *et al.* (1989) describe positive effects, overall, from their study, but they also note that two patients displayed negative behaviours towards the dog and would therefore be considered as inappropriate candidates for AAA. This finding and that of Fick's (1992) which shows only one aspect of social interaction being affected by AAA highlights the importance of individual differences within this population and for this type of intervention. Studying a specific group within the elderly population, Brickel (1984) worked with nursing home residents that were diagnosed as suffering from depression. He compared conventional psychotherapy with animal-assisted psychotherapy and a control group, and found that depression was reduced in both treatment groups with the pet group having an additional benefit of doubling the frequency of social interactions during sessions.

Qualitative examination of interactions during AAA for elderly people has also been examined. Savishinsky (1985) describes an anthropological investigation into the effects of pets visiting elderly

nursing home residents, and details five aspects of communication during sessions that involve a pet: i) triggering memories and reminiscences relating to animals; ii) discussing bereavement (of both pets and humans); iii) highlighting and counteracting the decline of domesticity that people go through in institutions; iv) exploring ties to pets and family members; v) helping interaction with visiting relatives. This report suggests that increases in social behaviour during animal-assisted sessions may be directly related to the desire or need to discuss things that are easier to broach when a pet is present. Literature pertaining to pet ownership and the elderly suggests that pets act as a focal point for communications (i.e. the animal is the subject of the interaction). Savishinsky's evidence, however, suggests that visiting pets also stimulate interactions that focus on other things.

The majority of the research focusing on elderly people with special needs has involved short-term studies. However, a long-term study by Winkler *et al.* (1989) showed that initial increases in social interactions were not maintained over a twenty-two week period. This suggests that reported effects of AAA with the elderly may be the result of a novelty effect.

The studies described in this section have focused on whether the introduction of a pet affects behaviour, what has not been demonstrated is whether another similar stimulus would produce similar effects, for example, would a soft, cuddly toy provide similar responses. McCulloch (1983) describes an unpublished study by Hendy that demonstrates different responses to live and stuffed pets that were presented to nursing home residents. The elderly residents smiled more and were more alert when the real pets were introduced. These differences suggest that there is an intrinsic quality of the animals' animation that elicits the responses described.

Overall, the literature focusing on the elderly with special needs provides strong evidence for a positive social influence of AAA, in terms of increasing the quality and quantity of social interactions. It seems that the majority of those studied obtained benefits from an animal's presence, although there is also evidence that the effects may be short-lived and that not everyone is suitable for inclusion in AAA programmes.

Animal-Assisted Activities and Adults with Special Needs

There are different populations of adults that have special needs, for example adults with learning and/or physical disabilities. In the area of AAA the literature focuses on adults with mental health problems. Institutionalized patients with chronic psychiatric problems are usually targeted for

research, rather than those with 'milder' or acute problems who are treated on an outpatient basis. Despite the work of the Corsons and their colleagues (e.g. Corson and Corson, 1978, 1980; Corson *et al.*, 1977) initiating the evaluation of pet-facilitated psychotherapy (PFP) with adult psychiatric patients, research involving adults with special needs appears to be relatively sparse. However, the studies that have been reported tend to follow established scientific methodology and provide complementary findings that support one another.

Corson *et al.* (1977) worked with fifty withdrawn, self-centred and uncommunicative psychiatric patients who had failed to respond to traditional treatment methods. Forty-seven of these patients were reported as showing improvements in their behaviour and emotional well-being after PFP was initiated, while the three remaining patients refused to have any contact with the dogs. For those that did accept the involvement of the dogs, positive social interactions were increased and these also generalised to interactions between patients and between patients and staff. Unfortunately, an experimental design was not implemented for this project and there were no control groups. However, treatment evaluation was carried out by experienced clinicians and previous failure to respond to other therapies served, to some extent, as a control. Draper *et al.* (1990) also observed withdrawn and uncommunicative psychiatric patients during therapy sessions, both before and after a dog was introduced to each session. The main purpose of the study was to develop data collection methods for this type of intervention, but the dog's involvement was found to elicit positive responses from all patients, increasing interaction with the therapist. It was stressed by the authors that the therapist's influence was essential to the success of the animal's involvement.

Two studies used matched control groups and compared PFP with traditional psychotherapy. Beck *et al.* (1986) found that the presence of caged birds in the room where group psychotherapy was being conducted resulted in greater rates of attendance, more frequent participation during sessions and reduced levels of hostility. Thompson *et al.* (1983) found that patients with intermediate levels of impairment (measured using a standardized assessment tool: Physical and Mental Impairment of Function Evaluation) showed significant improvements in functioning after PFP, as compared to traditional therapy. However, those individuals with severe or mild levels of impairment did not differ in their responses to PFP and traditional approaches.

Francis *et al.* (1985) carried out activity sessions, rather than psychotherapy sessions, with adult psychiatric patients at a residential home and measured a large number of variables using standardized tests. One group of residents interacted with puppies and their handlers, while another

group served as a control. Those adults that were involved in the animal sessions showed improvements in social interaction, psychosocial function, life satisfaction, mental function, level of depression, social competence and psychological well-being.

Much of the research involving adults with special needs is focused on psychotherapy techniques and the resulting evidence suggests that pets can assist in the facilitation of social interactions both during and outside sessions. As with the work with elderly patients, there is some evidence to suggest that this is not a universal finding, and that some patients will not accept the introduction of pets and others will not show improvements. However, the majority of the patients are reported to respond positively, with no reports of negative responses. These research studies suggest that the social interactions that are facilitated are not restricted to the therapy sessions and are not purely focused on the animals. In addition, other factors such as depression might also be improved through interaction with pets. Altogether these findings paint a positive picture both in terms of research approaches in the field and potential uses of AAA for adults with special needs.

Animal-Assisted Activities and Children with Special Needs

Out of all the groups discussed in this review, it is children with special needs that most commonly feature in papers describing the benefits of human-animal interactions. The clinical observations of Boris Levinson from the early 1960s were the first of many. Clinicians and other professionals working with children have confirmed Levinson's reports and suggested additional positive effects. These reports are based on clinical observations, not scientific research and therefore they must be considered with caution. However they do demonstrate the increasing number of professionals working with children who believe that there is theoretical and practical value in the introduction of animals into the different environments in which they work with special needs children.

Levinson (1972) described his experiences of a dog facilitating interaction between disturbed children and himself (the therapist). He considered the pet's involvement to be helpful for the child to explore certain feelings such as helplessness, dependence and the need for nurturance and support. It also provided opportunities to consider the meaning of friendship, love and responsibility, as well as the problems of protection and domination. In much the same vein, Gonski (1985) states that the "presence of the dogs in the casework relationship enables the child to initially begin to trust in a safer, non-judgemental object prior to placing their confidence in the worker or other significant adult" (p98).

Levinson (1969) recommends the use of animals with the young, the nonverbal, the inhibited, the autistic, the withdrawn, the culturally and the socially disadvantaged. Many of the reports of benefits refer to children with these specific special needs, particularly communication and social problems. However, George (1988) suggests that other children will also benefit, a suggestion that is supported by the research pertaining to pet ownership, where the majority of children are thought to derive benefits from interactions with pets, and again it is social interactions that are the main focus of attention.

Further clinical observations and anecdotal evidence suggest that interactions with pets can increase communication (e.g. Condoret, 1983; Gonski, 1985), help overcome severe speech problems (Hill, in Cusack, 1988) and encourage non-verbal gestures that can improve social skills amongst children with communication problems (Salomon and Comeau, 1984). In addition children are thought to be better able to discuss family problems (George, 1988), are more relaxed (Levinson, 1969), cooperative (Peacock, in George, 1988) and attentive (Condoret, 1983) during sessions which include an animal. As a result of such 'evidence', comments similar to that of Judith Star (director of the American Humane Education Society, see Cusack, 1988) are regularly seen: "There is no doubt that children and many adults learn more readily when animal subjects are involved" (p98). Unfortunately, this declaration is not supported by any systematic research evidence.

The literature searches carried out produced only two articles that followed objective and scientific approaches to assess the effects that animals may have on children with special needs. Unfortunately one of these (Nathanson, 1989) involved dolphins, which are not usually considered as either domesticated or as pets. However, the aim of this study was to test the hypothesis that "using animals to increase attention to stimuli should result in increased learning" (p234). A single-case research design was employed (where both experimental and control conditions were repeated regularly for each child) to investigate speech production and memory over a six month period. Different word boards were used in treatment and control conditions to elicit responses. Baseline and control sessions were held in a classroom and involved the teacher showing the child a word board. If a correct response was given they were rewarded by the teacher (e.g. with a hug or praise). Treatment sessions with the dolphins involved the dolphin retrieving the word board from the pool and if the child responded correctly they were rewarded by being allowed to interact with the dolphin. Data was collected from video recordings of all sessions. The number of correct responses during treatment (i.e. dolphin) sessions always exceeded comparable baseline sessions. Although this finding is of value in that it shows that the children were more likely to respond (and respond

accurately) during the dolphin sessions, it does not test the hypothesis stated: it cannot be determined whether the words were actually learnt more efficiently during those sessions or whether the children would just respond more often. In addition, the researchers did not investigate the possible effects of the outdoor/water environment of dolphin sessions compared to the indoor, classroom environment of control sessions. Therefore the results from this study, although optimistic about the benefits of AAA, should be interpreted cautiously.

A pilot study where a dog was introduced to children with autism was carried out by Redefer and Goodman (1989), in an environment similar to those described in the rest of the literature i.e. one familiar to the individuals involved, with the difference between conditions simply being whether the animal was present or not. Redefer and Goodman observed social behaviour before, during and after 'pet-facilitated therapy'. Twelve subjects received individual sessions, following a baseline-treatment-baseline-follow up design. The eighteen treatment sessions were arranged progressively, taking the expected behaviour of the subjects into account, such that three-way interaction between the subject, the dog and the therapist should increase from the first to the last session. Several features of this study indicate that its results may be more reliable than others in the general field of animal-human interactions. For example, sessions were video-recorded and then observed by seven individuals in order to establish inter-observer reliability. The follow-up sessions, one month after the second baseline, was conducted by a different therapist to check for generalisation of any benefits observed. Preliminary statistics were carried out to check for the validity of pooling sessions within a phase, and between subjects. Potential sources of error (use of the researcher as both therapist and coder, limited therapeutic time, etc.) were made explicit. Generally, this study is a useful model for other investigations of AAA.

Redefer and Goodman found that when the dog was introduced there was a significant increase in social interactions and a decrease in isolation. These changes were maintained throughout the treatment sessions. However, the second baseline and follow-up sessions indicated a gradual decline in these benefits, suggesting a lack of generalization also found in many other intervantions with autistic children. Over the course of the treatment sessions interaction with the therapist increased while interaction with the dog decreased; this was guided by the therapist as part of the protocol, and indicates that the children were responding appropriately to this guidance. The authors stress the role of the therapist as crucial to the outcome of pet-facilitated therapy and emphasised that the dog is only an adjunct.

Overall, the literature pertaining to children with special needs and AAA indicates that interaction with animals can elicit improvements in social behaviour and as a result learning may also be enhanced. There is evidence that these positive changes in behaviour may only occur in the short-term and not generalise to other situations, but negative changes in behaviour have not been reported in this literature. At this stage, there is too little scientific research to recommend the use of AAA for children with special needs, but that which has been done, combined with numerous clinical reports, suggests that the area does warrant further objective investigation.

Animal-assisted activities and children without special needs

Due to the lack of research investigating the effects of AAA for children with special needs, it is worthwhile to examine the studies focusing on children that are not necessarily pet owners and do not have with special needs. This research helps to establish the range of reactions that might be expected in such a heterogeneous group. In comparison to the research investigating 'normal' adults reactions to pets, the physiological effects of pets on children has not apparently been a main focus of research attention. However, Friedmann *et al.* (1983) followed a similar controlled procedure for children as that used with adults (Friedmann *et al.*, 1980). They found that the presence of a friendly but unfamiliar dog resulted in lower blood pressure and heart rate in children when resting and reading aloud. In another study, looking at social behaviour, Nielsen and Delude (1989) introduced toy and live animals (of different species) to young children (2-6 years old) and observed their behaviour during sessions which were directed by the children rather than the staff. Despite the lack of statistical significance (perhaps due to the small sample size of an average of 31 children) the live animals were considered to be more effective in obtaining the children's interest and elicited more social initiations by the children. The dog was seen as the most popular animal, receiving a lot of interest and intimacy from the children.

These two studies suggest, in agreement with George (1988), that children that do not have special needs could also benefit from interactions with visiting pets and provide additional evidence of the positive effects of AAA for children.

General Discussion of the Pets and People with Special Needs Literature

Common themes throughout the literature on AAA for people with special needs are the positive effects of animals on social behaviour; increases in social interactions between peers and between

peers and staff are reported in all age groups. Several authors refer to the importance of the therapist and how they guide sessions and utilize the animal, and the animal is often referred to as a co-therapist or adjunct. However, it is the animal that is considered to act as a social facilitator, eliciting behaviour that can then be directed and encouraged by the therapist. Very few negative behaviours are reported, although a lack of effect has been noted for a number of individuals, suggesting that identifying individual differences in response to AAA would be an important part of implementing a programme that involves animals. The lack of reported negative findings may be the result of research designs that have not included the recording of negative or inappropriate behaviours, or it may be that subjects have been carefully selected as likely to respond positively. For adults and the elderly, most would be able to refuse to attend sessions (and this has been reported, e.g. Corson *et al.*, 1977) and for children, parental consent would be required and a parent is unlikely to give permission if they think their child might be distressed by the activities. However, as McCulloch (1983) points out "There is no systematic compilation of pet-therapy failures, but there are vague references to what might go wrong" (p422). This is obviously an issue that needs to be addressed in order to provide a balanced and successful approach to AAA.

The two controlled studies that involved children with special needs make two different but important contributions to the literature, in addition to the identification of changes in social behaviour. The first (Nathanson, 1989) examined behaviours that might be secondary to improved social interaction - responses to educational material that was unrelated to the animal present and learning of that material. The second study (Redefer and Goodman, 1989) considered the generalisation of behavioural effects after animal-assisted sessions had been withdrawn. Both of these issues have important implications for developing the use of AAA.

There are a number of studies that use well-controlled experimental designs and demonstrate significant effects similar to those described in case reports. These studies are useful for suggesting which methods can be replicated and developed in future research. There are also some studies that can be criticized for their use of inappropriate methods and analysis. Further research is obviously required in order to develop the field of AAA and provide a sound scientific base for both researchers and practitioners working with individuals that have special needs. Development of the field requires detailed examination of behaviours, both positive and negative, that can be affected by AAA and individual differences that might produce differential effects. Evidence concerning the different types of situations, activities and individual characteristics that affect interactions with

companion animals would allow therapists and care workers to focus their use of AAA to the greatest advantage.

Having discussed the areas of biological, psychological and social impact of human-animal interaction and the potential value of scientifically examining AAA with special needs populations, it is important to note further theoretical and practical considerations involved in implementing AAA programmes.

Additional Considerations for Implementing Animal-Assisted Activity Programmes

Theoretical Frameworks

Two authors are prominent in the literature for proposing theoretical frameworks to explain outcomes of animal-assisted therapies, and these have also contributed to the development of research into human-animal interactions in general. Levinson (e.g. 1972), a child psychoanalytic psychotherapist (see Chapter 2 for a brief overview of psychoanalytic psychotherapy theory and practice) describes the importance of animals in man's development and civilization and how animals are prolifically symbolised in human culture, through art and folk tales, with folklore often representing "many animals as human ego ideals" (Levinson, 1978; p1031). Levinson proposes that man has an innate need to be connected to the animal kingdom, with people now suffering as they have progressively become alienated from their natural environment. From his psychoanalytic perspective Levinson (1972) describes the role of animals in helping children achieve their 'developmental goals', taking on roles such as objects of fantasy and imaginary companions. Subsequently, animals may play an important part in areas such as the development of a sense of identity through the child's handling of a pet, and "achieving independence". He proposes that personality development is affected if significant animal companionship is lacking (Levinson, 1978).

Levinson (1984) suggests that psychotherapy is effective if it has the comfort of touch and/or human or animal companionship, and that "effective therapies are based on the principles that form the foundation of human/companion-animal therapy".. which has "two characteristics: (a) touch and (b) attachment-formation, which later evolves into a need for animal companionship and finally culminates in the capacity for satisfactory human companionship" (p132). Levinson suggests that humans have an innate need from birth for 'touch stimulation' which gives pleasure as well as relief from anxiety, describing physiological responses to soft contact that evoke feelings of security and

being loved. He suggests that animals provide this type of physical contact. Levinson continues by describing the development of human and animal companionship being initiated by 'attachment' behaviour, that 'attachment' is essential before companionship.

Levinson (1984) specifically states that 'human/companion-animal therapy' is not intended to be a separate school of psychotherapy, but that a companion animal can act as a therapeutic adjunct or a catalytic agent for change, or, in terms of pet ownership, can even be the sole therapist. The role of psychoanalytic theoretical perspectives appear to come into play for all these aspects. Parallels can be seen in the literature describing such interventions as art, music and play therapy (see Chapter 2). Levinson (1980) describes the therapist's ability to understand children through their play with a companion animal, following the same theoretical and practical approaches as psychoanalytic play therapy. However, it should be noted that Levinson (1965) points out that there are differences between pet therapy and play therapy: toys "do not really elicit love from the child because they cannot respond or share his feelings with him" whereas the "interaction between a child and his pet is psychodynamically very complex.....the way a child handles his pet is much more expressive and revealing of his problem and his attitude toward the world than his fingerpaintings or his play with puppets" (p695-696).

In summary, Levinson's psychoanalytic approach to human/companion-animal therapy regards the animals as being symbolically important, providing 'comfort contact', eliciting attachment behaviour and providing emotional support. The human-animal interactions literature regularly contains comments referring to the natural reassurance and emotional impact of pets, although a psychoanalytic approach is not usually referred to specifically. In much the same way, psychoanalytic perspectives are apparent in the literature pertaining to interventions for children with learning disabilities (see Chapter 2).

Brickel (1982) proposed an alternative theoretical approach to explain the beneficial effects of animal-assisted psychotherapy. This theory describes a reduction in emotional discomfort "explained through the competing-response theory of extinction via attention shifts" (p71). In simpler terms this means that the pet attracts attention away from the anxiety-generating stimulus (e.g. the psychotherapist) thereby allowing exposure to this stimulus while reducing avoidance behaviours. Repetition of this process, with no ill-effects being produced, can then result in a loss of anxiety in that situation. As described by Davis (1985) this can be considered as a behaviour modification approach (see Chapter 2 for an overview of behavioural theory and practice). In 1985

Brickel expanded on his original theoretical explanation and put forward a behavioural perspective (through classical, operant and observational learning) where people are taught to love animals. Maintenance of this love is related to social role theory where positive roles and behaviour involving animals are both expected and approved of by others (see Netting *et al.*, 1987). Brickel disputes the psychoanalytic viewpoint of an innate attraction of people to animals and describes how fear can be learnt just as easily as attraction. Brickel stresses the family's role in positively reinforcing appropriate interaction with animals. However, he only briefly covers the possible intrinsic reinforcers of interacting with a pet. Warmth, comfort and reassurance might serve as positive reinforcers, while alleviation of loneliness might act as a negative reinforcer.

At this stage, the field of human-animal interactions still lacks sound evidence of the effects that are consistently produced through AAA, which hampers the development and evaluation of theoretical perspectives. However, theoretical approaches can be helpful in developing and implementing interventions and should not be disregarded. The studies described in this thesis attempt to provide a starting point for the clarification of the possible effects of AAA on children's behaviour rather than fit the findings to a theoretical framework.

Recommendations and Cautions

The research already discussed has illustrated the possible advantages that people might derive from AAA. It is also important to consider the associated practicalities, recommendations and cautions that have been noted by clinicians and researchers that have worked in this field. Both human and animal welfare issues are vital to the satisfactory development of AAA programmes.

Human Health

Zoonotic diseases spread by animals are often feared by staff at institutions where animals visit. The most common worries in this respect are rabies, ringworm and external parasites (Waltner-Toews, 1993), but as this author says, "few concerns were based on actual experience" (p549). Many misperceptions about zoonotic diseases were also reported. Thorough veterinary check-ups before the animal is introduced to patients and at regular intervals once visits are established are recommended as a preventative measure alongside accurate communication between staff and researchers. In addition, allergies, phobias, dislike of animals and immunosupressed individuals can

be identified in order to exclude them from AAA or so that precautions can be taken prior to sessions (Carmack and Fila, 1989).

Injuries, bites and scratches caused by animals are also frequently mentioned in the literature (e.g. Wilkes *et al.*, 1989; Cass, 1981; Fitzgerald, 1986) but the possibility of such events can be reduced through appropriate training, animal selection and staff supervision (Howell-Newman and Goldman, 1993). These latter authors also recommend the inclusion of insurance policies to provide cover in the event of any accidents.

Many authors recommend the appropriate selection of animals - matching the pet and the person (e.g. Howell-Newman and Goldman, 1993; McCulloch, 1983), and ensuring that an animal does not substitute input from other people (Howell-Newman and Goldman, 1993). Unfortunately, there is no research that demonstrates the appropriateness of different pet-person matches and this procedure must currently be a case of common sense and trial-and-error. One author (Loney, 1971) discusses dog characteristics that should be considered when selecting 'canine therapists' but again this is not based on scientific enquiry. Further information about the suitability of different breeds and species for different situations and requirements is necessary to provide appropriate guidelines. Other recommendations include teaching patients to wash their hands after contact with animals (Carmack and Fila, 1989), obtaining consent from guardians if appropriate (Kaufmann, 1992), and being aware of the potential hazards of a pet being a nuisance, e.g. barking or patients becoming dependent on the pet (Cass, 1981).

Animal Welfare

The main concern for the animals' welfare is injury due to mishandling by patients (e.g. McCulloch, 1983; Howell-Newman and Goldman, 1993; Cass, 1981). Obviously, this should be avoided, and animal handlers who are also trained in working with people with special needs would be better able to prevent this outcome than people that are either human or animal specialists but not both. Daniel *et al.* (1987) suggest that therapists working with pets should attend courses in applied animal behaviour. In addition, teaching the individuals receiving AAA how to interact appropriately with animals is an integral part of any such programme and is valuable both for sessions and unexpected meetings with animals in other environments. The animal handlers involved in these programmes should be constantly aware of the potential injury to an animal and ready to diffuse the situation as efficiently as possible.

Injury is not the only issue when considering the welfare of animals in AAA. Iannuzzi and Rowan (1991), although concluding that animal-assisted programmes have a relatively limited impact on the animals, consider some animal welfare problems associated with visiting programmes with dogs. These dogs are usually certified by a therapy dog charity and therefore insurance and basic standards for suitability to visitation programmes have already been established. However, remaining welfare issues include limited access to water and high temperatures in many institutions, a combination of which could lead to exhaustion. General agreement from individuals contacted resulted in guidelines suggesting that visits should not last more than one hour, with no more than three visits per week. A pilot study by Somerville (1997) tends to support this restriction; she found that tail-wagging had significantly decreased and panting had significantly increased within 1 hour hospital visits by AAA dogs. This supports the suggestion that animals may suffer from heat stress and tiredness during therapy visits. Longer visits would increase the likelihood of such patterns and therefore would not be recommended.

Ryder (1973) is keen to stress "that the emotional needs of the pet are equally as important as those of the patient. Nor will a pet that is unhappy and mistreated make a good therapist. Pets must have stable environments and not be passed around as psychiatric tools" (p667). Ryder apologises for his anthropomorphism but the stressors that an animal might face during AAA should be carefully monitored in order to maintain appropriate interactions and minimize inappropriate ones.

All the factors described in this introduction, relating to the positive and negative effects of human-animal interactions on human physiological, psychological and social systems, to potential problems, and to human and animal welfare need to be considered when designing studies and programmes for AAA. The specific needs of all individuals involved should be evaluated before any such intervention is implemented, and monitored thereafter.

CHAPTER 2

PARTICIPANTS, INTERVETIONS AND EXPERIMENTAL PROCEDURES

PARTICIPANTS, INTERVENTIONS AND EXPERIMENTAL PROCEDURES

PARTICIPANTS - CHILDREN WITH SPECIAL NEEDS

The samples used in this research consisted entirely of children with special needs, mainly those with severe learning disabilities (SLD). It is important to understand the skills and impairments found within this population, and the following introduction details definitional and diagnostic criteria, brief aetiological information and a discussion of common difficulties encountered among children with disabilities. This sets the scene for coverage of some of the common aims of educational and therapeutic interventions in this area, so that AAA for children with special needs can be understood within this context.

'Special needs' is a generic term covering a wide range of disabilities, including specific diagnoses such as Down's syndrome or Cerebral Palsy as well as more diverse categories such as learning disabilities. In many cases of learning disabilities (LD), multiple-diagnoses are made and associated problems, such as physical and sensory impairments, will be identified.

Other terms are also used to describe LD depending on the country and current attitudes. Terms commonly encountered include mental retardation, mental handicap, developmental delay/disabilities, intellectual disabilities/impairment and learning difficulties. Currently in the UK the standard term is learning disabilities and this category is sub-divided into levels of impairment, 'mild or moderate', 'severe' and 'profound & multiple'. Prevalence is reported as 30/1000, 3/1000 and 0.5/1000 respectively (Fraser and Green, 1991). In addition there is a category of specific learning disabilities which refers to a disability with just one sphere of skills, for example dyslexia.

DEFINITIONS AND DIAGNOSTIC CRITERIA FOR SEVERE LEARNING DISABILITIES

The Diagnostic and Statistical Manual of Mental Disorders, 4th edition (DSM-IV; American Psychiatric Association, 1994), used in both the US and UK, and the International Classification of Diseases - part 10: Classification of Mental and Behavioural Disorders (ICD-10; World Health Organization, 1993), used in the UK and Europe, detail criteria used by health professionals when assessing and diagnosing individuals thought to have special needs.

DSM-IV: During the early childhood years, they acquire little or no communicative speech. During the school-age period, they may learn to talk and can be trained in elementary self-care skills. They profit to only a limited extent from instruction in pre-academic subjects, such as familiarity with the alphabet and simple counting, but can master skills such as learning sight reading of some 'survival' words. IQ level 20-25 to 35-40.

ICD-10: There should be a reduced level of intellectual functioning resulting in diminished ability to adapt to the daily demands of the normal social environment. Slow development of comprehension and use of language, with eventual achievement limited. Achievement of self-care and motor skills is also retarded, and some individuals need supervision throughout life. Educational programmes can provide opportunities for them to develop their limited potential and to acquire some basic skills. IQ is usually in the range of 20 to 34 (mental age 3 to under 6 years).

In order to diagnose learning disabilities, intellectual functioning must be significantly subaverage **and** adaptive functioning must be impaired to some extent (e.g. in communication, self-care, social/interpersonal skills, leisure or health)

AETIOLOGIES OF SEVERE LEARNING DISABILITIES

The aetiology of severe learning disabilities (SLD) may be intrinsic (e.g. genetic or metabolic abnormalities) or extrinsic (e.g. infections, accidents). The causes may be easily identified (e.g. Down's syndrome or post-accident) or classed as idiopathic (where no known cause can be identified). Despite the many different causes for SLD, assessment and care are based on the abilities and functioning of each individual. Therefore children who are considered to have SLD will usually attend special schools for children who are similar in terms of social and academic skills. For the purposes of this research, attendance at a SLD school was used as one criterion for admission to the sample.

All the children that participated in the studies described in this thesis had been assessed as having SLD with or without additional problems, with the exception of the study involving children with Cerebral Palsy (see later section in this chapter for details of this condition). The first study involves children with Down's syndrome and associated SLD. Children with Down's syndrome were selected as a homogenous group, with the same aetiology. It is estimated that these children make up 30% of the SLD population (Nicholson and Alberman, 1992). Subsequent studies did not distinguish

between different aetiologies within the SLD category, but included representatives (when stated) from a small but distinct group of children that attend schools for children with SLD that are additionally diagnosed as autistic. These children usually have additional behaviour problems and unusual social interaction patterns (this is discussed later in this chapter).

Problems and Impairments Commonly Encountered among Children with Severe Learning Disabilities

The diagnostic criteria detailed above give a general indication of the problems encountered by individuals with SLD. It is helpful when considering education and intervention strategies to examine the underlying difficulties that might be associated with low IQ and adaptive skills. In practical terms a substantially subaverage IQ and impaired adaptive skills will affect learning and interaction. Schools for children with SLD follow the first stages of the National Curriculum, but the emphasis is on developing communication, social and self-help skills, practical problem-solving and leisure pursuits (Fraser and Green, 1991).

Problems with attention are commonly reported for people with SLD (e.g. Krupski, 1980; Hulme and Mackenzie, 1992; Oldfield and Adams, 1990). Unfortunately, the definition of 'attention' is surrounded by controversy (Krupski, 1980). However, examination of the literature, including information from teachers, carers and other non-researchers, suggests that the term is commonly defined, in the context of education and general interventions, as concentration on a task or object, including distractibility away from this. For the purposes of this thesis this definition of attention will be used unless otherwise stated.

Hulme and Mackenzie (1992) refer to a number of studies, describing these attention problems in terms of difficulties "attending to the relevant aspect of a discrimination, a shorter span of attention (time spent concentrating on one object or task), and greater distractibility than in normal subjects" (p14). As Krupski (1980) points out there is a self-evident relationship between attention and learning and both these processes are therefore an important aspect of education. The studies reviewed by Krupski largely demonstrate that handicapped youngsters show lower performance on tasks that require attention, compared to a non-handicapped group. However, Krakow and Kopp (1983) suggest that attention to and engagement in play activities is quite similar between groups of Down's syndrome, learning disabled and normal groups of children, although there were lower levels of simultaneous monitoring and time spent unoccupied in the Down's and LD groups. This finding

warrants caution when predicting attention problems in children with SLD, but does not discount the probability that differences will be found either in qualitative or quantitative terms.

Children with SLD, by way of definition, always have difficulties with learning and social competence (Clements, 1987). In 1975 Lorna Wing designed The Children's Handicaps, Behaviour and Skills (HBS) schedule, in order to systematically record the skills and impairments of severely learning disabled children. Since the development of the HBS schedule, reliability has been demonstrated in the UK (Wing and Gould, 1978). It has also been developed and adapted for use in other countries (e.g. Bernsen, 1981; Ort and Liepmann, 1981). Wing's (1981) epidemiological study illustrates the range of impairments that are associated with SLD. She identified mobility handicaps (both gross and fine movements), visuospatial problems and receptive and/or expressive speech problems. In addition, social impairments were found in the majority of the sample. Children with social impairments were categorised into three main areas:

i) Children that were 'aloof'. These would not interact with others at all, except occasionally to gain simple needs. These aloof children also showed behaviour problems such as temper tantrums, hitting and screaming.

ii) Children that were 'passive'. These would accept approaches from others but would not initiate any interaction.

iii) Children that showed "peculiar one-sided approaches to others, approaches that were not adapted to the responses of the person approached"(p34).

Common impairments in severely learning disabled children are in the areas of attention and social interaction, both of which are undoubtedly linked to learning. It is therefore important to consider both attention and social behaviours as fundamental aspects of assessing an intervention or education programme. In order to develop skills it is important to engage an individual's attention and involve them in activities (Oldfield and Adams, 1990).

AUTISM

Two children involved in the studies described in Chapter 6 were diagnosed as suffering from SLD and autism. Autism is classed as a pervasive developmental disorder (DSM-IV and ICD-10 classifications) and learning disabilities are commonly associated with the disorder. Approximately 75% of individuals with autism suffer from mental retardation (DSM-IV and ICD-10). The incidence of autism, as diagnosed by health professionals, is estimated at 1-2/1000 children (Frith,

1993). In addition to the problems associated with a learning disability, children with autism also show a lack of 'joint attention', which can be defined as pointing to share an interest in an object, and following another's gaze (Dissanayake and Crossley, 1989; Baron-Cohen *et al.*, 1996; Frith, 1993), pretend play (Baron-Cohen *et al.*, 1996) and interpreting another person's feelings or intentions (Frith, 1993). It is also common for children with autism to ignore other people's attempts to communicate or encourage them to join in an activity (Frith, 1993). Establishing interactions with autistic children is typically very difficult, they make few attempts to initiate communication and also ignore others' communication attempts (Richer, 1980). Powell and Jordan (1993) report that individuals with autism will use more non-verbal ways to establish contact (e.g. touching, smelling, tasting) and suggest that these are comparatively free from social complexities , being "merely a product of perceptual interest which is uncontaminated by any social awareness" (Powell and Jordan, 1993, p27). However, there is some evidence that children with autism will show similar frequencies of initiations directed towards adults, when compared with learning disabled children, but it is the quality of the initiations that is different (Hauck *et al.*, 1995). Children with autism were seen to initiate routine greeting behaviours while their learning disabled peers would give information and imitate adults. It is clear that children with SLD and autism will suffer from similar problems to those that are diagnosed as SLD alone, but there will be additional differences in behaviour in quantitative and/or qualitative terms.

CEREBRAL PALSY

The study described in Chapter 5 involved a group of children with Cerebral Palsy, who attended a day centre that employed Conductive Education techniques to encourage physical development. Cerebral palsy is "mainly a dysfunction of tone, posture and movement secondary to brain abnormality or damage" (Wilsdon, 1992; p407) and its estimated prevalence is 2/1000 births. It is not a curable disorder but it is possible for movement patterns to change through development and with the assistance of therapy and interventions. The most common treatment is occupational therapy which is ideally started at a very young age, facilitating correct posture, assessing and developing motor functions as well as perceptual and behavioural problems. Children and adults with cerebral palsy do not usually have any associated learning disabilities. One approach that was specifically developed for children with Cerebral Palsy is Conductive Education (also known as the Petö System), which was developed by Andras Petö in Budapest. Conductive education has become increasingly popular in the UK since the 1970s. It involves teaching children with Cerebral Palsy to learn how to move appropriately, using verbal and physical prompts and guidance. It is considered

as a holistic educational approach (for details of conductive education and its use in the UK see Russell and Cotton, 1994).

INTERVENTIONS

Within the field of learning disabilities (LD) there is quite considerable debate as to the maintaining and causal factors contributing to problem behaviours and difficulties in learning new skills. In addition to these difficulties it is now becoming accepted that there is the increased likelihood of psychological problems also being experienced, although there is little evaluative data on their prevalence (e.g. Szymanski, 1994). However, two studies that targeted whole populations in a given geographical area suggest that in both children with LD (9-11 years; Rutter et al., 1970) and adults with LD (Gostason, 1985) between 30 and 55% may experience psychological problems, while for controls (IQ>70) up to 8% show such difficulties.

In general, the main focus of interventions for children with SLD seems not to be on psychological problems *per se*, but on difficult and disruptive behaviour, and developing social and cognitive skills that will assist in adaptive functioning. It can be considered that "the goal of intervention should be to develop whatever skills the individual possesses to the highest level possible" (Dockrell and McShane, 1992; p173). Taken in its broadest sense, this interpretation includes reducing maladaptive behaviours and developing basic skills that can then be built on. It is important to remember that it is integration into the surrounding social environment that is often an ultimate goal for those working with severely learning disabled children and developing appropriate behavioural repertoires increases the chances of achieving this integration (Malone and Langone, 1994).

"Surveys of research literature find that intervention is not a primary topic" (Kavale, 1990; p3) with twice as many articles focusing on the characteristics of LD, compared to intervention outcome. Investigation into the theoretical basis of interventions is seemingly more limited than outcome data. "Even within the context of evaluation, intervention 'research' in LD has been contentious. Little agreement has emerged about the value of an intervention, much less insight into how or why it works" (Kavale, 1990; p6). This sentiment is partially echoed by Beale (1995) who states that "at this stage in our collective understanding of learning disabilities, our major interest must be in evaluation of the outcome of intervention procedures, we want to know what works, not how it works or why" (p271). The current literature appears to follow this pattern, with the majority of reports describing case studies and some experimental data on various interventions, with only brief

mention of the rationale and assumptions behind interventions and little investigation into their validity.

There are three prominent theoretical standpoints in terms of intervention research that are referred to by researchers working with individuals with LD: behavioural, cognitive-behavioural and psychoanalytic. These will be considered in turn before addressing specific types of intervention that elaborate on these approaches or have their own distinct rationale.

Behavioural Approaches

Behavioural approaches, rooted in learning theory, are concerned with how people acquire particular behaviours and behaviour patterns, and with identifying the rules which govern the frequency and intensity of complex behavioural output. The principles of learning theory, identified and systematised by physiologists studying reflexive behaviour (e.g. Pavlov) and early behavioural psychologists (e.g. Watson, Guthrie, Hull and Skinner), distinguish broadly between emitted (operant) acts and elicited (respondent) acts. Elicited acts are classified on the basis of the stimulus that elicits them. They may be reflexive and unconditioned, such as salivating in response to food being presented, or conditioned , such as salivating elicited by the sound of a bell (paired repeatedly with food presentation; e.g. Pavlov's dogs). This process which produces a respondent or elicited behaviour that is not a reflex is described as classical or Pavlovian conditioning, and is used to explain such phenomena as the development of phobias and learned fear responses (e.g. Watson and Rayner, 1920). Emitted acts, however, are classified on the basis of their effect on the social or physical environment. Their effect on the environment serves to reciprocally strengthen (reinforce) or weaken (punish) the behaviour or pattern of behaviours. This process either increases or decreases the probability of that behaviour/pattern occurring again and is known as operant or instrumental conditioning. "The root principle of operant conditioning is that *behaviour is a function of its consequences*" (Sheldon, 1995; p62).

A vast amount of research built up in the first half of this century investigating the differential effects on behaviour of fixed, variable or delayed schedules of reinforcement, of extinction schedules on previously positively or negatively reinforced behaviours, of primary and secondary reinforcers as well as skills such as discrimination and generalisation (which an organism must possess before learning can take place). (For a detailed account, see Rachlin, 1991). Early attempts to apply this behavioural technology to clinical populations (e.g. systematic desensitisation, Wolpe, 1958; token

economies, Allyon and Azrin, 1968) produced some marked successes, but also drew much criticism (see, for example, Rosenhan and Seligman, 1989). The growing popularity of cognitive psychology and approaches stemming from this led to general dissatisfaction with an approach that 'ignored' internal, mental events. The effective components of behavioural interventions were questioned - for example, was it learning theory that effected changes or was it effects of staff ratios or morale (Fonagy and Higgit, 1984). Serious ethical concerns were also raised, particularly with respect to aversive techniques.

Although many of these criticisms were justified at the time, behavioural approaches have developed and continue to be widely applied with adults and children with LD (e.g. Herbert, 1991; Remington, 1991), following the theoretical perspective that people can develop problem behaviours as a result of their environment and these behaviours can be affected and new skills learnt through modification of the environment. There are a variety of possible reasons for the continuing use of behavioural approaches with people with LD:

- Applying therapeutic techniques derived from other psychological models (i.e. those which focus on internal, unobservable events such as thoughts, feelings or ego-states) are often thought to require individuals who can be approached through talking-based therapies (although, this has recently been disputed by some practitioners e.g. Sinason, 1992). The vast majority of severely and even moderately learning disabled clients have a combination of verbal, motivational and insight deficits which compromise approaches which rely on these channels. This means that behavioural techniques are considered to be the only option available.
- Being concerned only with observable behaviour, applied behaviour analysis (ABA) practice is an objective and auditable mode, bringing benefits in the form of increased openness and accountability as well as ensuring a more evidence-based approach to client care.
- Aversive techniques (shown experimentally to be less effective than reinforcement programmes (LaVigna and Donnellan, 1986; Rachlin, 1991) are now seen as unnecessary, unethical, dehumanising and "contrary to the positive and constructive thrust of behavioural psychology" (LaVigna and Donnellan, 1986; pxiii). An array of non-aversive strategies have been developed and researched which can be used with even profoundly learning disabled clients to teach new skills, develop and shape partially learned skills, alter the reinforcement environment and assess and manipulate the discriminative stimulus and other antecedents of behaviours being targeted (LaVigna and Donnellan, 1986).

- There is now a much better understanding of Skinner's (1938) claim that to change behaviour requires knowledge not only of the form of that behaviour but also of the context in which it occurs, in terms of setting events, and controlling antecedents and consequences (Horner et al., 1993). It has also been highlighted, through functional assessments that "some forms of maladaptive behaviour may serve a social control, or communicative function" (Remington, 1991; p17). Modern ABA methods are almost unrecognisable as the descendants of early behaviour modification programmes. Current best practice avoids narrow decelerative procedures targeting individual behaviours (which often proceeded without any attempt to provide replacement behaviours) in favour of comprehensive behavioural support packages. These typically involve ecological and setting event manipulation, immediate antecedent event control, skills training interventions and consequence manipulations. The basic philosophy behind comprehensive behavioural support is that behaviour change occurs *in the context of* a rich lifestyle, rather than being a prerequisite for such a lifestyle (Anderson et al., 1993)

Techniques that may be referred to when describing behavioural approaches include reinforcement (increasing a behaviour or behaviour pattern), punishment (reducing a behaviour/pattern), shaping (developing a behaviour that is already present), fading (reducing intensity of reinforcement as a behaviour is maintained), and modelling (social imitation; e.g. Sheldon, 1995).

It is clear that behavioural approaches have developed considerably since their early days. The literature supporting their use is extensive - a cursory look at a randomly chosen volume of the Journal of Applied Behavior Analysis (JABA) will show that ABA technologies have proven to be extremely versatile and reliable - reducing individual problem behaviours, teaching and maintaining alternative adaptive behaviours, developing functional daily living skills and complex social skills, as well as addressing issues such as generalisation and long-term maintenance of gains. One lasting criticism, aimed particularly at journals such as JABA, is the preponderance of single-case and small sample designs. This a very common difficulty for research involving people with rare or idiosyncratic difficulties (e.g. Kazdin, 1982). However, single-case research designs provide more acceptable evidence, than say, purely descriptive case studies which involve no attempt to control variables and compare different conditions. It should be noted that single-case designs provide information which grouped designs cannot provide - that is, aggregated data cannot reliably be generalised to specific individuals, which profoundly limits the applicability of group findings within a population as heterogeneous as those with LD (Brown, 1998). The one difficulty with the single-

case emphasis of most learning disabilities research is that there is likely to be a strong tendency against publishing negative research findings - a problem which remains to be addressed.

Cognitive and Cognitive-Behavioural Approaches

Cognitive-behavioural approaches largely stem from Beck's model of cognitive therapy of depression (Beck et al., 1979). Beck's model, formulated on the basis of clinical observations, proposes that early experiences lead to the development of dysfunctional schemata in vulnerable individuals. When these attitudes are activated by 'matching environmental events', this triggers systematic logical errors in interpreting experiences and negative cognitions about the self, the world and the future. These negative cognitions are expressed externally in behaviour and affect. Beck's cognitive therapy has been adapted both theoretically and in practice for a broad range of emotional disorders (e.g. Hawton et al, 1989)

Cognitive therapy aims to "correct conscious thoughts and to make them more rational by the collection of information, intellectual analysis, persuasion and encouragement, and behavioural changes" (Rachman, 1997). Beck et al (1979) describe a 'reciprocal interaction model' that incorporates how behaviour can exacerbate, for example, depression. Faulty cognitions lead to behavioural responses and negative affect, which reinforce the cognitive processes resulting in a vicious cycle involving cognitions, behaviour and affect, all impacting on one another to maintain and strengthen the depressive episode. As a result Beck's description of cognitive therapy, developed in conjunction with his cognitive model, describes the importance of not only changing cognitive processes but also addressing behaviour (Beck et al, 1979). Therapists have reported successful treatment outcomes when combining cognitive therapy with behavioural approaches (Rachman, 1997).

In the current literature it can be difficult to distinguish between the use of the terms 'cognitive therapy' and 'cognitive-behaviour therapy' (CBT). Allen (1996; p168) writes "the term 'cognitive-behaviour therapy' makes explicit reference to the fact that techniques derived from behaviour therapy are usually included in the treatment protocol. This should be seen as reflecting a form of technical rather than theoretical eclecticism (i.e. that although behavioural techniques are recognized as effective, the mechanisms by which they achieve change are understood in terms of cognitive constructs and models)".

Within the field of learning disabilities, intervention focusing on psychological problems largely utilise concepts from CBT (e.g. Kroese et al, 1997; Bouras, 1994) and psychoanalytic psychotherapy (e.g. Sinason, 1992; Bouras, 1994). This is a relatively recent area of enquiry and research focusing on the effectiveness of non-behavioural psychotherapies for people with LD is limited. As described by Dagnan and Chadwick (1997) "there is little work other than a small number of case studies describing the use of this approach [CBT] with people with learning disabilities" (p111). In support of this, Clegg (1996) provides a bibliography of key references for psychotherapy in LD which includes six 'reviews and case studies' papers and only two 'evaluation' papers. The cases reported, however, do suggest that short- and long-term gains can be achieved using cognitive and cognitive-behavioural approaches in such areas as depression (e.g. Lindsay, et al, 1993; Dagnan and Chadwick, 1997), anxiety (e.g. Lindsay et al, 1997), anger-management (e.g. Benson, 1994; Benson et al., 1986) and social skills training (e.g. Loumidis and Hill, 1997). At this stage the literature predominantly concerns adults and there is very little mention of work involving children with LD with psychological problems.

Cognitive-behavioural approaches for children with LD tend to target specific skills such as improving handwriting and spelling accuracy (Kendall and Panichelli-Mindel, 1995). Social skills interventions are also employed. These utilise behavioural techniques such as social reinforcement, modelling, sequencing skills and practice (e.g. Sheppard, 1989; Lindsay and Michie, 1991), and cognitive techniques such as coaching, role-play and problem-solving (e.g. Conte et al, 1995). Studies that have involved cognitive-behavioural social skills training have demonstrated that adolescents with LD made gains in conversational skills (e.g. Downing, 1987) and maintained these gains at five month follow-up (Bradlyn et al, 1983). The major difficulty in these areas has been in demonstrating generalisation of these skills to situations other than those they were learnt in. However, the use of in-vivo skills training, i.e. training in real-life settings, for adults with LD has been shown to successfully develop appropriate and useful skills in real-life settings (e.g. Michie et al., 1998). Wiener and Harris (1997) worked with children with LD and compared coaching and social problem-solving social skills training with a no-treatment control group and observed 'modest gains' in social skills and decreases in problem behaviours for one of two experimental groups. Conte et al (1995) found that children with LD would learn appropriate responses to situations such as being called names or laughed at by others. In contrast to their expectations, they did not find any impact on social acceptance, although the control group showed a significant decline while the experimental group remained constant. This suggests the possibility that although gains are not clearly seen, lack of intervention results in a deterioration of social skills. Differences between the

two groups were put down to group dynamics, highlighting the variable effectiveness of programmes such as this. Forness and Kavale (1996) carried out a meta-analysis of fifty-three studies investigating social skills interventions for children with LD, suggesting that such deficits are highly resistant to treatment. They found a mean effects size of .211, suggesting that peer and staff perceptions of children's social skills is not, on the whole, greatly improved.

Psychoanalytic Approaches

Psychoanalytic theories have developed from the work of Freud and can be viewed, in contrast to experimental psychology, focusing on the individual (emphasising irrational mental contents) and interpreting personal meaning. Freud published his work over a period of forty years and as such "a summary of the theory is clearly no simple matter" (Kline, 1984; p10). However, Kline (1984) attempts to do just this and describes aspects of psychosexual development in psychoanalytic theory (including the oedipus complex and the castration complex). In addition the emphasis on unconscious mental processes as determinants of behaviour are described i.e. mental processes that are inaccessible to the individual and mostly occur within the id. The id, the ego and the superego are described as the tripartite division of the mind and are critical to psychoanalytic understanding. Processes of the id are called primary process thinking and concern the satisfaction of desires. The ego relates mainly to conscious reasoning or learning of appropriate behaviour (based on "the reality principle or secondary process thinking"; p17). The superego "is largely unconscious and is roughly equivalent to the conscience. It is concerned with the moral aspect of mental processes, feelings of right and wrong" (p18). This outline provides an extremely brief overview of some of the core aspects of psychoanalytic functioning, and certainly does not describe many of the aspects of psychoanalytic theory that might be encountered. However, it is intended to provide an introductory basis on which to present alternative interventions which are based on psychoanalytic theories. The goal of psychoanalytic therapy is the resolution of unconscious conflict (Roth and Fonagy, 1996). Malan (1979) describes the need to consider the main forces in conflict within an individual, between the individual and their environment, both now and in the past, with current factors echoing themes or situations from the past and thereby triggering the current problem. Present life situations can be considered along with infantile object relationships (i.e. the individual's internalisation of what happened) and the (transference) relationship with the therapist (Hishelwood, 1991).

Psychoanalytic psychotherapy in learning disabilities is a recent but expanding area, marked by the publication of a text (Sinason, 1992) describing the application of this approach to children and

adults with LD. Sinason puts forward the hypothesis that learning disabilities (the primary handicap) may be made worse by defensive exaggerations (the secondary handicap; see also Stokes and Sinason, 1992) Treatment, as a result, focuses on the analytic interpretation of behaviour and communication, allowing an individual to confront these difficulties and thereby promoting personal development.

Psychodynamic psychotherapy is similar to CBT in terms of the predominance of case reports suggesting positive outcomes working with individuals with LD and psychological problems (e.g. Sinason, 1992; Hollins et al, 1994). In contrast to CBT, however, there is rather more literature (case studies) concerning the psychoanalytic interpretation of the behaviour of children with LD e.g. behaviour interacting with an adult therapist (e.g. Sinason, 1992) and during play (e..g Baum, 1994). Beail and Warden (1996) address the difficulty that most data in this area is purely "descriptive and anecdotal" and carried out assessments of treatment for ten clients with moderate and severe LD. They used a standardised measure to monitor symptom levels of hostility, obsessive compulsive, phobic anxiety, depression and somatisation. The mean scores pre-and post-treatment for measures of these symptoms showed significant reduction in symptomatology and were maintained at follow up, while measures of self-esteem were also seen to increase. Although this research involved only adults and was not an experimental study, it is worth reporting as a step towards systematic observation of the effects of psychoanalytic psychotherapy as opposed to subjective observations from individual therapists.

Alternative Interventions

Alternative interventions such as music therapy, art therapy, play therapy, dance and movement therapy have all been reported as providing successful outcomes for children with LD. In many cases though the literature is quite limited. Searches using the PsycLIT (CD-Rom) and BIDS produced only a handful of papers published on the theoretical basis, rationale and evaluation of these approaches, within the last thirty years. However, hand searches revealed a number of books relating to these interventions, offering recommendations for practice and techniques, some theoretical basis for the interventions and case studies illustrating the success of such methods. These interventions will be addressed in turn.

Activity-based intervention

Losardo and Bricker (1994) used a single-case design to compare activity-based intervention with direct instruction for acquiring object names. These approaches were chosen as they were considered to "anchor the continuum of curricular approaches for young children with disabilities and...they are widely used in early intervention programmes" (p745). The direct instruction method was based on principles of operant conditioning and stimulus-response association in relation to skill acquisition. The activity-based intervention is a naturalistic approach that applies behaviour learning techniques but is also described as following a 'transactional perspective' which emphasizes the bidirectionality of effects between children and their environment. It appears that the main conceptual difference is that the activity-based intervention relies on the activities that the children choose to do themselves and the therapist then working on these, whereas the direct instruction approach was highly structured by the therapist from the start. The outcomes of this study were inconclusive and the authors suggested that both approaches could be useful. The only other article that could be located, describes a type of activity therapy in a group psychiatric setting, which included children with learning disabilities (Lev, 1983). The emphasis for this work was cognitive and descriptions of the group discussions are provided. It seems that the use of activity therapies for children with LD is still to be formulated and investigated.

Art Therapy

Creative arts therapies, such as art, music, drama and dance therapy are described as opportunities for individuals to express themselves and gain confidence (Seed, 1995). The rationale behind most forms of art therapy appears to be based on psychoanalytic theory. Willoughby-Booth (1991) describes the empathic link that is created by the therapist's perception of an individual's artwork and how this can be utilised to help the person living with a disability. Such work will contribute to the development of self-esteem and effective interactions. Case and Dalley (1992) describe the use of art therapy with children suffering from emotional and behavioural problems and suggest that the methods can be adapted to working with children with LD. Again, they describe a psychoanalytic rationale to the approach, with the tasks allowing exploration and stimulation but also acting as a form of containment for their problems . These authors also acknowledge that on occasion behavioural (operant conditioning) techniques are appropriate when carrying out art therapy with children with LD. Turning this idea around, Miller (1986) describes the use of art as an activity within behaviour modification to benefit problems such as reduced attention span. However, the

principle feature of art therapy is allowing an individual to select their own art materials and produce any marks on the paper or canvas, it is the "freedom to express yourself as you wish" (e.g. Nadeau, 1993) with the therapist perceiving the emotional content of the art and allowing problems to be addressed (Case and Dalley, 1992).

The majority of art therapy research has addressed the issues of art therapy as a profession and case studies addressing clinical practice, using qualitative methodologies for both areas and "with outcome studies absent from the literature" (p6; Gilroy and Lee, 1995). However, two early studies suggest that children with LD can develop certain skills through art therapy. Carter (1979) compared a perceptual motor development intervention with creative arts activities and describes significant gains (within twelve weeks) for the art group, in areas such as visual alertness, communication, spatial relations and word recognition. Silver and Lavin (1977) describe improvements in cognitive skills (concepts of space, order and class) following ten weekly art therapy sessions. More recently Banks et al. (1993) compared the use of directed versus free choice art activities on the social behaviour during sessions of three children with LD. Two of the children demonstrated improved social behaviour during the directed art activities, the third child did not seem to be affected by the intervention. The free choice art activities showed very little effect for all three children. This finding is of great interest, considering that one of the main features of the psychoanalytic art therapy approach is the ability of the individual to choose materials and what to create without direction. Further literature in this area has not been forthcoming, but research is clearly required to clarify the efficacy of art therapy for children with LD.

Play Therapy

Play therapy is largely utilised with children that suffer from psychological difficulties, often those associated with abuse or trauma (e.g. Winkley, 1995; Cattanach, 1995). However it has also been used with children and adults with LD (e.g. Baum, 1994). The theoretical stance is similar to that of art therapy, with a primary focus on psychoanalytic interpretation of play in its various forms (e.g. sandplay, story-telling) representing the child's understanding of the world through non-verbal communication. This approach can be either directive, where the therapist guides the client and provides ongoing interpretation of the play, or it can be non-directive which "puts trust in the process of change which occurs through the provision of a safe play environment" (p256; Baum, 1994). Baum provides case studies supporting the use of non-directive sandplay therapy; one case study is also used to describe how the process of this psychoanalytic approach follows the stages of

ego development: the undifferentiated stage ('animal-vegetative stage'), the conflictual stage ('fighting stage') and the constellation stage ('adaptation to the collective stage'). Play therapy is also described as giving children the opportunity to "form a sense of their own personhood - a sense of themselves as intentional, interactional individuals" (p5; Greenspan, 1992). Another approach to play therapy is described by Berlin (1986) who uses competitive games to increase communication in children with LD. The therapeutic situation is thought to provide opportunities for a child to express feelings of hurt, anger and pleasure, and stems from the original psychoanalytically based play therapy described above. However, the use of competitive games provides the therapist with appropriate occasions to model these feelings (through speech and behaviour). Case studies illustrate the development of communication skills and are described as generalizing to other aspects of play therapy sessions.

As with other psychoanalytic interventions, the literature on play therapy focuses on case studies that describe beneficial effects of the intervention (e.g. Baum, 1994) and the appropriateness of the psychoanalytic models employed (e.g. Cohen and Solnit, 1993), and there are few of either. Smith (1996), discussing interventions for children with autism, suggests that with the lack of research evidence to support such approaches as play therapy the current assumption should be that they are "at best ineffective and at worst harmful" (p52). Further research is essential in order to verify or repudiate such a claim.

Play can also be utilised in behavioural approaches. Kohl and Beckman (1990) studied six children with LD that were paired together in play and were prompted and directed by teachers during these play sessions. All the children increased their frequency and duration of interactions, and these behaviours were seen to generalise to free-play time in the classroom. Malone and Langone (1994) also suggest that encouraging appropriate play with objects may facilitate cognitive growth and social interaction.

Dance and Movement Therapy (DMT)

Dance therapy aims to holistically integrate emotional, spiritual and cognitive components of the self with the environment, based on the "theoretical interdependence between movement and emotion (p249; Ritter and Low, 1996). Dance and movement is considered to be an emotional response that can be beneficial for fine motor control, neurological functioning and circulatory stimulation as well as improving self-image and self-expression (Warren and Coaten, 1993). The use of dance and

movement therapy for children with LD largely focuses on motor skills, and a study comparing dance therapy and a traditional motor programme suggest that dance is significantly superior in affecting these skills (Boswell, 1993). Lasseter et al (1989) report a case that supports this finding and suggests that this can also help improve the way a child feels about him/herself. (p34; Weiner and Helbraun, 1985). Ritter and Low (1996) carried out a meta-analysis of DMT even though the research "has primarily consisted of qualitative and exploratory clinical reports" (p249). They identify two additional studies involving children with LD, one reporting improvement in motor skills (Couper, 1981) and the other (an unpublished dissertation) detecting no significant improvements.

A psychoanalytic rationale can also be applied to DMT in terms of increasing physical awareness and thereby altering infantile psychological processes and developing the "ego's capacity to neutralize and integrate the most unconscious of impulses", Payne (1992) further describes DMT as "a creative, relationship-building experience with the aim of definition of self" (p42). However, she also describes the need to adapt the approach and strategies used to suit different populations and in the case of children with LD, and autism, describes behavioural approaches as the most useful.

Music Therapy

Out of all the therapies discussed here, music therapy appears to be the most widely investigated and reported on, with literature focusing mainly on process and outcome (Gilroy and Lee, 1995). The theoretical rationale, the principal features and assumptions behind music therapy vary greatly and range from music as a therapeutic experience (Seed, 1995) to psychodynamic (e.g. Alvin, 1981), patient-centred or behavioural approaches (e.g. Toolan and Coleman, 1994; Dolan, 1973), with these seemingly dependent on the individual therapist's orientation. Bonny (1997) suggests that "music therapy has attracted little attention to its viability in the healing marketplace due in part to the insistence of pioneers to meld into the psychological theories that were currently acceptable" (p65). She goes on to describe the two main current thoeretical standpoints for music therapy in which an individual is an active participant: the Nordoff-Robbins improvisational method (Creative Music Therapy) which utilises music as a form of communication, with therapist and client interacting musically and building on previous responses (Peters, 1987); and Analytic Music Therapy which explores the unconscious/inner life of individuals, allowing self-exploration and development. The aim of music therapy is not to teach musical skills but to assist in the development of motor skills, social interaction and communication (Oldfield and Adams, 1990;

Bunt, 1994) as well as increasing attention and concentration span, awareness of self and others and reducing self-injurious behaviour (Montague, 1991).

As with many of the interventions described here, papers supporting the use of music therapy largely focus on case studies. Bunt (1994) reports a number of cases with largely positive outcome, although one case is presented where music therapy with a child with special needs was thought to increase his problems with over-excitability. Toolan and Coleman (1994) observed an increase in levels of engagement over ten sessions for two children with LD and autism, although this change was quite small in comparison to that recorded for the adults observed. The authors suggest that long-term therapy would increase the benefits reported. An experimental study was completed by Roskam (1979) who compared music therapy with language development studies. The findings indicated that music therapy resulted in the most improvement but not to a level of statistical significance. However, a controlled study has suggested that music therapy can substantially improve communication behaviour: Edgerton (1994) carried out an ABA single-case research study involving eleven autistic children in an improvisational music therapy group. For all the children steady increases were seen in communicative behaviours, both musical (e.g. a response to the therapist using a drum) and non-musical (e.g. speech production), during the improvisational sessions. The withdrawal of this for one session, replaced with singing and playing specified songs, demonstrated significant drops in communicative responses. However, it is not clear whether there were as many opportunities for communication as in the experimental condition. Despite this, there was clear evidence for consistent increases in communicative behaviour over the ten music therapy sessions. In addition, some evidence was provided for the generalisation of communication skills to the home environment, with parental reports correlating significantly with increases seen in music therapy sessions. Bunt (1994) also describes two studies that she completed comparing creative music therapy with a no music therapy period and individual play. The first study involved eighteen children in matched groups following a repeated measures design, comparing a 12 week period of music therapy with a similar period without music therapy. Significant increases over the twelve weeks in playing time, vocalisation, looking at the instrument and looking at the adult during the music therapy period are reported. In addition Bunt (1994) states that these changes were not apparent in the no music therapy period. Unfortunately the statistical analyses are not presented, although reference to an unpublished thesis is provided. There is no mention of whether alternative objects were given to the children during non-therapy observation times and how this might have affected the findings. The second study, however, compared music therapy with individual play sessions, and a time of no music therapy provided baseline measures. Again details of statistical

information were not provided, but play sessions seemed to encourage the children to look at and play more with the toys than the instruments in music therapy. Music therapy increased vocalisations related to the activity, looking towards the adult and turn-taking while also reducing interruptive behaviour. It is also suggested that these behaviours were seen to generalise to play sessions. Similarities between music and play sessions were also reported in terms of increasing appropriate behaviour as sessions progressed. The studies reported here suggest that there is evidence supporting the use of creative music therapy with children with LD, although statistical details of Bunt's (1994) work would be useful to consolidate the findings reported. Further research of this type would be useful in fully evaluating music therapy and the different approaches to this type of intervention.

As yet the literature relating to music therapy, despite being more prolific than in other areas, does not provide any conclusive arguments either for or against its use. This is perhaps exacerbated by the different approaches described (e.g. Summer, 1997) and developing research to evaluate the different forms of music therapy would provide valuable information for practitioners working in this field.

Effects on Staff Working with Children with LD

When considering the lives of children with learning disabilities it is important to remember that the staff working with them (e.g. carers in residential and respite centres) are an integral part of their environment. Hastings and Remington (1994) suggest that interactions with staff are not always satisfactory and suggest that staff behaviour is often counter-habilitative, with staff spending little time interacting with their clients and interactions being relatively poor. Hastings and Remington appeal for further analysis of staff behaviour. When investigtaing an intervention it may therefore be useful to determine whether it affects staff attitudes and interactions with their clients. For example, it has been suggested that the presence of a pet can be particularly beneficial for staff (Winkler et al., 1989).

This review of the different types of interventions that are described involving children with LD, highlights the fact that behavioural principles and techniques are widely incorporated when working with children with LD. Even when therapies have an alternative primary theoretical basis such as psychoanalysis, behavioural techniques are sometimes recommended (e.g. Case and Dally, 1992).

Even the terms 'art therapy' or 'music therapy' do not relate directly to a theoretical rationale, with some authors describing behavioural approaches and others psychoanalytic approaches. In addition it seems that the use of these alternative approaches is largely driven by faith in their efficacy rather than following research findings or well-defined theoretical concepts. As described earlier, at this stage in the field of interventions for LD (covering all age groups) outcome studies are of primary importance (Beale, 1995), although few research studies are currently published. However, details of theoretical bases and clear rationales behind approaches would allow for the development of more uniformly applied interventions that could be then more easily evaluated and compared.

CONCLUSIONS

Children with severe learning disabilities suffer from reduced levels of intellectual and adaptive functioning. As a result it is commonly found that these children have difficulties attending to objects and activities, and both learning and interaction skills are impaired. Interventions commonly target these areas and focus on increasing behaviours that encourage the development of appropriate interactions. Theoretical bases of interventions appear to be rooted largely in behavioural and psychoanalytic models, with little research investigating these models within specific interventions. Of interest is the apparent overlap within therapy types of these two very distinct theoretical approaches, with psychoanalytic practitioners suggesting the need to use behavioural techniques to manage certain behaviours (e.g. Case and Dalley, 1992). Evidence supporting the use of these interventions is largely provided by case studies describing individual responses to therapy, although some research studies are reported, with mixed results. It would of great value for further research to demonstrate the efficacy of these interventions and address such questions as to the appropriateness of theories employed, providing descriptions of the rationale behind effective approaches and considering the need for long-term programmes and generalisation of skills to other settings.

OVERALL AIMS OF THE STUDIES DESCRIBED IN THIS THESIS

Each study was designed to investigate aspects of dog-assisted activities and the effects that these activities have on the behaviours of children with special needs. In particular, behaviours thare are thought to cause difficulties for such children, for example, attention and social interaction, were focused on. The aim was to identify relevant behaviours that are likely to be elicited, increased or decreased through dog-assisted activities. Different situations and tasks were targeted in order to give a broad picture of the effects of dog-assisted activities. Subsequently, detailed investigations at

an individual level provided information in more depth about how specific behaviours might be affected. It was considered extremely important that any findings supporting the introduction of dog-assisted activities to children with special needs should be accompanied by examination of possible problems. Both positive and negative behaviour that occurred during the sessions were recorded,allowing the examination of both the potential benefits and drawbacks of this type of intervention. Additionally, detailed information about the way in which activities were conducted for these research studies was considered essential for allowing researchers and clinicians to replicate findings while being aware of and limiting any potential problems. Details concerning the rationale behind the progression of aims for each study are presented with each chapter, but individual aims are provided here as guidelines.

STATEMENT OF AIMS FOR EACH STUDY

Chapter 3: Study 1: The effects of a visiting dog on the behaviour of children with Down's syndrome and associated severe learning disabilities (UK)

This study aimed to compare child-adult interactions during activities focusing on a real dog with those focusing on an imitation dog. This was intended to provide information about the range of behaviours that might be seen during such activities while isolating those behavioural effects that might be dependent on the presence of a real animal. In addition it would indicate whether it is just the physical aspects (e.g. soft fur, size, features) of the dog that affect the children's behaviour.

Chapter 3: Study 1a: The effects of special sessions with a residential dog on children with severe learning disabilities (Czech Republic)

This study aimed to replicate the one described in Chapter 3 (a), providing a cross-cultural comparison. In addition this study examined generalisation of effects from animal-assisted activities to skills outside activity sessions i.e. whether behaviour that was elicited during dog-assisted sessions was also seen in the children's general behaviour between sessions.

Chapter 4: Study 2: Evaluation of dog-assisted classroom activities for children with severe learning disabilities

Progressing from the previous studies, this project aimed to investigate the impact of a dog compared with standard educational tools, on different types of activity (social, number skills and writing skills activities), during small-group sessions. The different activities required different levels of dog involvement in order to examine whether this had a differential impact on the same children. This study also assessed the generalisation of effects on academic and daily living skills.

Chapter 5: Study 3: The effects of a visiting dog on the motivation to perform physical exercises, for young children with Cerebral Palsy

This study aimed to investigate the extent to which a dog may affect the performance of children with cerebral palsy during physical exercises. Different levels of dog-involvement were required for the different tasks to assess the possibility of differential effects on performance. Another aim was to consider the implications of staff reactions and assessment of tasks with and without the dog.

Chapter 6: Studies 4a and 4b: Single-case research designs (Young adults with severe learning disabilities, and children with severe learning disabilities and autism)

These single-case studies aimed to target general interaction as well as specific behaviours for different individuals. Detailed examination of the five participants was used to highlight how dog-assisted activities might affect individuals differently and how they could be used to target specific pre-determined behaviours, as well as the more general behaviour patterns examined in earlier studies. In addition staff checklists and rating scales were used to investigate the relationship between these indirect measurement techniques and direct observation.

EXPERIMENTAL PROCEDURES

PARTICIPANTS AND THE EXPERIMENTAL ENVIRONMENT

All participants had been diagnosed as suffering from severe learning disabilities, with some individuals having additional problems such as autism or challenging behaviour. The exception to this is the study described in Chapter 5, which involved children with Cerebral Palsy who were

physically disabled. Altogether 40 individuals were involved in this research. The ages of the participants ranged from 3½ years to 21 years, yet despite this diversity in chronological ages, academic abilities and general functioning were within a limited range. All studies were carried out in an environment that was familiar to the participants, whether this was at school, a residential or respite centre, or at home.

Recording of sessions was done using a camcorder (Sony Video8 Handycam TR420) hand-held or clamped to a shelf, or by setting up a surveillance camera (Panasonic WV-CL502, lens: 3.6mm, 1:1.6) and microphone (PZM, Crown International) connected to a video recorder (Panasonic AG 6010). This recording equipment was set up as unobtrusively as possible and switched on before the children arrived. All equipment was out of the reach of children and no auditory or visual stimuli were generated.

EXPERIMENTAL DESIGN

The choice of an experimental design is very much dependent on the objectives of the research. A repeated measures design is useful for examining effects between different conditions, but it is of little value for investigating skill acquisition or generalisation of effects due to a treatment (where assignment of individuals to different conditions might be more suitable). Repeated measures can also be confounded by the effects of one treatment on another since, for example withdrawing a positive stimulus could elicit negative behaviours that would not normally be seen. However, with an SLD population it is often difficult to match individuals in terms of abilities, in order to assign them to different treatment conditions. In this case a repeated measures design might be the most suitable way to obtain comparisons.

Some degree of controversy surrounds single-case experimental designs. Single-case experiments have often been criticized in the past, but have recently become more popular, particularly in psychology, where researchers are dealing with rare disorders/cases. The field of single-case research design has progressed rapidly and justifications for the use of different designs and statistical analysis have been put forward by various authors (e.g. Kratochwill, 1992; Kazdin, 1982; Kratochwill *et al.*, 1984). As pointed out by Malone and Langone (1994), studies that use group designs provide valuable descriptions of the nature of an activity and of behaviours that commonly occur, but may also "mask individual treatment effects on the specific behaviours of research participants" (Malone and Langone, 1994; p177). Once general effects have been established by

using traditional experimental methods, the single-case experimental approach can then be useful for examining the specific effects of an intervention for different individuals. The development of single-case approaches in recent learning disabilities literature demonstrates their increasing popularity and importance. Much of the research reported uses single-case experimental designs, including the designs of alternating treatments (e.g. Losardo and Bricker, 1994; Dunlap *et al.*, 1995) and multiple-baseline schedules (e.g. Hughes *et al.*, 1996; MacDuff *et al.*, 1993). However, more traditional methods such as repeated measures designs are still important (e.g. Bunt, 1994) particularly for obtaining an impression of the general effects of an intervention. Comparison of groups that receive different treatments (e.g. Blair *et al.*, 1995; Oldfield and Adams, 1990) can provide valuable information about generalisation of skills and behaviours acquired through intervention. Despite the paucity of quality research in the field of animal-assisted activities, the few studies reported use similar methods to those found in the learning disabilities literature. Repeated measures (e.g. Nielsen and Delude, 1989, Kongable *et al.*, 1989; Fick, 1992), two-group designs (e.g. Thompson *et al.*, 1983; Mader *et al.*, 1989) and single-case designs (e.g. Redefer and Goodman, 1989; Nielsen and Delude, 1994; Nathanson, 1989) are all utilized.

Different experimental designs were employed in the studies described in this thesis, as the aims and objectives progressed. The studies described progress from examining general effects (repeated measures, grouping data - see Chapter 3) through two-group design (control vs. experimental) to detailed examination of individuals' responses (single-case ABAB designs - see Chapter 6).

DATA COLLECTION TECHNIQUES

There are a number of data collection methods that can be used to assess people's responses to different situations including observations, interviews, questionnaires, standardized tests and success in acquiring target skills. The suitability of these methods often depends on the responses that are of interest to the investigator and the abilities and motivation of the individuals being studied. When working with individuals that have learning disabilities and/or other special needs, an observational approach is a direct method for ascertaining responses to different situations. Alternative methods such as direct interview can be difficult to administer and interpret, and interviews/questionnaires completed by their staff and carers are susceptible to the subjectivity or bias of the person being questioned. Objective data that can reflect the individual's immediate responses to an event or situation can be generated through direct observation. Supplementary data from interviews with/questionnaires completed by staff and carers can enhance the observational data , as can direct

interview with the individuals involved. Measures such as behavioural checklists have been developed, with varying degrees of reliability established, mainly to assess different behavioural problems (e.g. Einfeld and Tonge, 1995; Freeman *et al.*, 1986; Achenbach and Edelbrock, 1983). Many of these behavioural checklists are based on direct observation and interviews or questionnaires with carers and have been developed to provide time and cost effective methods for rating behaviour problems. However, only a few of them are suitable as tools for assessing short periods of behaviour that can be compared in different situations (e.g. Freeman *et al.*, 1986 - used as a checklist covering 30 minute periods). The majority of research studies involving people with learning disabilities have employed direct observation either by analysing behaviour from video recordings, by having a non-interactive observer present or by a participant observer. Ethological approaches tend to code all variations of a type of behaviour (e.g. all interactions) while other approaches may just record a few specific behaviours or use rating scales.

Owen *et al.* (1994) report on a number of studies that use observational techniques for studying learning disabled populations. There are additional examples both of detailed observations of a range of behaviours (e.g. Bunt, 1994; Dissanayake and Crossley, 1989; Dunlap *et al.*, 1995) and of observations of a few specific behaviours (e.g. MacDuff *et al.*, 1993; Howlin and Rutter, 1987; Losardo and Bricker, 1994). Many studies have also used questionnaires and standardized tests to supplement their findings (Howlin and Rutter, 1987; Hughes *et al.*, 1996). Unfortunately many of these studies have used research by other authors and theoretical models to create limited behaviour categories and rating scales, rather than using broad-based ethological approaches to develop a range of categories that code all behaviours. Blurton-Jones (1972) criticises the use of rating scales for observed behaviour and stresses the value of the broader ethological approach. His criticism is based on the assumption that the dimensions for rating scales are "seldom empirically derived"(p23), and questions their validity. A few studies, however, rely just on checklist data and subjective ratings (e.g. Conte *et al.*, ,1995) or questionnaires evaluating the effectiveness of programmes (e.g. Sheppard, 1989) and these methods are probably less useful than direct observation in providing detailed information about interventions. Research studies investigating animal-assisted activities have mainly used direct observation as a means to assess the impact of the intervention (e.g. Draper *et al.*, 1990; Redefer and Goodman, 1989; Nielsen and Delude, 1989 and 1994; Mader *et al.*, 1989; Kongable *et al.*, 1989; Fick, 1992). Occasionally standardized tests will be the only form of data collection (e.g. Thompson *et al.*, 1983).

The observational techniques employed in the studies described in this thesis follow an ethological approach (e.g. Tinbergen, 1963) in that they attempt to obtain a comprehensive description of behaviour in two situations that differ only in terms of one aspect of the environment (i.e. whether a dog is or is not present) and both environments can be considered to be 'natural' to the children involved despite the possibility that there is some novelty having a dog involved in school activities. Although the ethological approach is rooted in observation of non-linguistic behaviour the coding of language and communication is still possible within an ethological framework (e.g. Archer, 1992). Typically this application of ethology to human behaviour is seen in studies investigating communication between mother and child (Owen *et al.*, 1994). However, as described above, the majority of studies involving learning disabled individuals have adapted this use of direct observation to provide a suitable method for studying behaviour (both communicative and non-communicative) in this population. Behaviour can be coded using standard techniques that can be applied to any observational study (e.g. event, state and/or interval coding, sequential analysis, time sampling), these are selected according to the type of behaviours as well as the individuals and situation being studied. Within psychological research, and the studies described in this thesis, molar observations (e.g. distinguishing between good and bad or appropriate and inappropriate behaviours) are often used, something which is not seen in traditional ethology.

Bunt (1994) refers to the work of ethologists, who both suggest that new disciplines need "extensive periods of direct observation, with the building-up of clear descriptions and systems of classification" (p110; Bunt, 1994). This approach is apparent in the literature pertaining to both learning disabilities and human-animal interactions. However, it has been noted that some research areas that regularly use direct observation lack uniformity in their coding of behaviours and that this is a problem (Malone and Stoneman, 1995).

Issues such as intra- and inter-observer reliability are important for all observational research, and involve repeated measures by one or more observers in order to calculate a degree of concordance or correlation between observations (Robson, 1993). Unfortunately the time-consuming nature of this process, and the need to train suitable observers, can be prohibitive.

The studies described in this thesis all involve observational methods of data collection. In order to code behaviours that occur, ethograms were designed to describe the behaviours observed in each study so that distinct, mutually exclusive categories of behaviour were defined. These ethograms were tested on preliminary data in order to establish suitability to the specific context, and were

subsequently adapted or expanded if necessary. In all cases event (frequency) and state (duration) codings for all behaviours relating to attention and social interaction were the primary categories and continuous recording of all sessions was carried out. This time consuming and labour intensive approach was considered essential for this research in an area that is lacking documented evidence of consistent, reliable and valid methodologies. Targeting specific behaviours would have risked excluding investigation of potential benefits, and problems, that have not already been reported in the research or anecdotal literature. Continuous recording allowed a complete investigation of all behaviours shown during sessions.

Due to the lack of established AAA programmes in the UK, it would not have been possible to sample larger numbers of special needs children receiving such an intervention. Children with SLD are a minority in the general population and receive a comparatively large amount of research attention, and the amount of time and number of children available to new research projects can as a result be limited. It is common in this area for small numbers of subjects to be involved in individual research projects. Additionally, the use of direct observation as a data collection technique was chosen in order to provide a broad picture of the potential effects of AAA on the behaviour of children with special needs; it is a labour-intensive approach that allows detailed investigation of a limited number of subjects. In addition, the number of therapists within any one study was restricted so as to reduce, as far as possible, any confounding variables such as therapist effects. Only one dog was used in any one study, for much the same reason. This, unfortunately, leaves the studies open to criticism as there is always the possibility that different therapists and different dogs will elicit different behavioural effects. However, the issues of different therapists and dogs require research specifically designed to examine such factors once the overall effects of AAA have been more satisfactorily determined.

It is often valuable to utilise more than one data collection technique (e.g. Robson, 1993) to obtain an extensive view of the situation from different perspectives. The studies in this thesis use observation as the main method throughout, but these observations are supplemented by the use of behavioural checklists (used for behaviour both during and outside sessions), semi-structured interviews, standardized assessment tools, staff assessment and checklists of target goal achievement. The purpose of using these additional measures was i) to provide additional information about individuals and the impact of the research studies, and ii) to examine the relationship between direct observation and indirect measures.

All sessions were recorded on video tape and behaviour was observed and coded in real time using The Observer software (version 2.0 or 3.0 for DOS; Noldus Information Technology, 1989 and 1993). Data was collated in The Observer and then exported to Lotus 123 (version 2.2 for DOS or release 5 for Windows; Lotus Development Corporation, 1986 and 1994) for detailed examination.

Statistical Analysis

Statistical analysis was carried out on the data from all studies. Data from Lotus spreadsheets was imported into Statgraphics (version 5.0; STSC Inc., 1988) or SPSS (version 6.1 or 7.0) for Windows (SPSS Inc., 1994 and 1996) for statistical analysis. Considering the different experimental designs and the data produced, the use of different statistical tests was necessary. However, for Analysis of Variance, type III sums of squares were used throughout, since these are most appropriate when missing data is expected and order independence in factorial models is desired, i.e. most appropriate for exploratory analyses (SAS Institute Inc., 1985). Full descriptions of analyses are included in the results section for each study.

As stated earlier, the studies presented in this thesis were designed to investigate the wide range of behaviours that were shown during AAA sessions. This involved statistically testing a large number of variables that were not necessarily independent of one another, and despite the numerous variables analysed in some cases alpha values were not corrected. I acknowledge that much of this statistical analysis does not rigorously adhere to the rules and assumptions of the tests employed. However, my purpose was not to test specific hypotheses (in addition to the null hypothesis) but to produce a descriptive picture of what is occurring during AAA. As a result a picture of clinical significance is described illustrating the behaviour of children with special needs that might be affected through AAA and which could consequently be of value to clinicians and researchers working with these children.

Overall Methodological Aims

The experimental designs and data collection techniques (in addition to direct observation) were chosen on the basis of the aims of each project. In addition some of the advantages and disadvantages of the different methods used could be established. The research field of animal-assisted activities has limited evidence concerning the value of different scientific methodologies and

the studies described in this thesis aim to shed some light on this issue. Table 2.1 provides a summary of overall aims alongside experimental designs and data collection techniques.

Table 2.1 Summary of Experimental Designs, Data Collection Techniques and Overall Aims for Each Project

	Experimental Design and Data Collection Techniques	**Overall Aims**
Chapter 3 Study 1	Simple repeated measures with counter-balanced order of treatment presentation. Observational techniques, (plus staff assessments and IQ tests to measure abilities). Analysis of grouped data.	i) To examine the range of behaviours that occur during dog-assisted activities. ii) To investigate whether an inanimate dog would elicit similar behaviour as a real dog.
Chapter 3 Study 1a	Simple repeated measures with counter-balanced order of treatment presentation, with a control group following the same method, but a different treatment condition. Observational techniques, (plus behaviour tests to measure abilities). Analysis of grouped data.	i) Replication and development of the previous study. ii) Cross-cultural comparison. iii) Assess generalisation of effects
Chapter 4 Study 2	Two group design. Observational techniques, behavioural checklists and IQ tests. Analysis of grouped data.	i) To compare dog-assisted activities with standard educational activities. ii) To examine longitudinal effects.
Chapter 5 Study 3	Single subject research design, frequently alternating presentation of conditions (counter-balanced). Observational techniques, staff assessment checklists. Individuals' data analysed separately.	i) To investigate 'motivation' and 'reward' aspects of involving a dog in physically demanding activities.
Chapter 6 Study 4a	Single subject research design, ABAB (two long phases of each condition, alternated). Observational techniques, staff assessment checklists. Individuals' data analysed separately.	i) To examine the findings of previous studies in a clinical setting, targeting individuals' specific behaviour and needs.
Chapter 6 Study 4b	Single subject research design, frequently alternating presentation of conditions (counter-balanced). Observational techniques, behaviour checklists. Individuals' data analysed separately.	i) To examine the findings of previous studies in a clinical setting, targeting individuals' specific behaviour and needs.

CHAPTER 3

STUDIES 1 & 1a

STUDY 1: THE EFFECTS OF A VISITING DOG ON THE BEHAVIOUR OF CHILDREN WITH DOWN'S SYNDROME AND ASSOCIATED SEVERE LEARNING DISABILITIES

STUDY 1a: DEVELOPMENT AND REPLICATION OF STUDY 1: CROSS-CULTURAL COMPARISON CARRIED OUT IN THE CZECH REPUBLIC

STUDY 1

THE EFFECTS OF A VISITING DOG ON THE BEHAVIOUR OF CHILDREN WITH DOWN'S SYNDROME AND ASSOCIATED SEVERE LEARNING DISABILITIES

INTRODUCTION

The literature discussed in Chapter One illustrated the lack of scientific research investigating the effects of animal-assisted activities (AAA) on children with special needs. As a result there is little evidence concerning which behaviours might be affected by AAA or what methods would most appropriately be utilized when carrying out research. However, the anecdotal reports and the few research studies offer some indication that the benefits most likely to arise from AAA centre on social interactions.

This research study had three main objectives. Firstly, to describe the range of interactive behaviours that are shown by children with severe learning disabilities when interacting with an adult and a dog, in activities that focus on the dog. In order to achieve this ethological methods were employed to categorise and code all the behaviour shown. The second objective was to assess the value of the methods employed and consider their suitability for future research. The third objective was to determine whether a dog could be substituted by a toy imitation of similar appearance. This was considered important to establish whether a soft, cuddly toy could elicit similar behaviours without the practical implications of introducing a real dog to these children. In addition, such an imitation dog could serve as a control, providing similar tactile stimulation as a real dog. It has been suggested by some authors (e.g. Levinson, 1984) that touch is a primary factor in affecting children during AAA.

Children with Down's syndrome at a school for children with severe learning disabilities participated in the study. These children were selected as a homogenous group and their teachers considered that the group tended to show above average levels (within the SLD population) of appropriate social interaction. This group was therefore valuable for demonstrating the breadth of interactive behaviours that could occur during AAA.

METHOD

PARTICIPANTS AND EXPERIMENTERS

Eight children, six girls and two boys, with Down's syndrome and severe learning disabilities participated in this study. Their chronological ages ranged from 7 years 9 months to 10 years 11 months. All the children were attending the same school for children with severe learning disabilities, and were pupils in two ability-matched classes. All the children with Down's syndrome from these two classes were requested to participate in the study. If parental consent was obtained within three weeks of it being requested, then the children were included. The real dog involved was a registered PAT (Pets As Therapy) dog, a neutered male black Labrador retriever, 7 years of age and had received a clean bill of health from a veterinarian shortly before the study. The dog handler was a 26 year old female trained in handling therapy dogs, who had previously taught children to train dogs (and had some limited knowledge of children with special needs). The term 'imitation dog' is used to describe a soft toy of similar size and colour to the real dog. The experimenter was a 24 year old female.

DESIGN

A counterbalanced, repeated measures design was employed, where each child participated in two conditions per session - real, in which the real dog was present, and imitation, in which the imitation dog was present. Each session consisted of an individual spending seven minutes in each condition, one immediately following the other. Half the children were randomly assigned to start their first session with the real dog and the other half with the imitation dog. Thereafter, the order of presentation of the real dog and the imitation dog was alternated between sessions. Experimental sessions were run once a week for six consecutive weeks.

SETTING AND APPARATUS

Sessions were run in a classroom at the children's school, with a low (0.8m high) L-shaped screen restricting the area in use ($4.5m^2$). Sessions were recorded through a wide-angled surveillance camera and microphone connected to a video recorder. Two dogs were used, the real dog and the imitation dog (of similar size, colour and texture). The same accessories were available in both conditions - collar, lead, brush, biscuits and a dog toy. As alternatives to interacting with the dogs,

two toys were also available to the children - a toy truck with moving parts, and a box of pop-up animals.

PROCEDURE

Written consent was obtained from parents/guardians for all children before the study began (see Appendix 1). A familiarisation session guided by the dog handler was run a week before the study began, so that each child could experience the situation without either of the dogs, or any dog accessories being present. This session was recorded on video but no data was extracted. Therefore when the experimental sessions began the only novel stimuli were the real dog and imitation dog and their accessories.

The experimenter brought the children to and from classes and operated video recording equipment. She remained visible but uninvolved during the sessions. The dog handler guided the sessions, following guidelines that were identical for both conditions. The guidelines for sessions graded the activities so that the children were introduced gradually to the test dog and in the final two weeks the children could choose which activities they wanted to do from all those that they had done over the previous four weeks. The activities included naming colours and body parts, throwing the dog's toy, brushing, counting out biscuits to feed to the dog (see Appendix 2 for full details of activity guidelines). The handler behaved as similarly as possible across conditions, but behaved naturally and therefore responded appropriately to the children's behaviour. Questions and requests may therefore have been qualitatively different between sessions due to the child's behaviour, but the same guidelines were being followed.

The experimenter brought the children one at a time from their class to the test area and presented them with the handler and the test dog (real or imitation). The dog accessories and the two alternative toys (truck and pop-up animals) were clearly visible but were not mentioned to the children. After seven minutes the handler would say that the dog was tired and the other dog wanted to come and say "hello", thereby attempting to maintain a natural changeover between conditions that the children could understand and accept. The handler encouraged the children to perform certain activities involving the test dog, for example, by saying "Why don't you stroke the dog?" or "Can you tell me what colour he is?". The children were not forced to do any of these activities and could choose to play with the other toys available and/or ignore the handler. The handler used questions and requests to encourage the children to attend to the test dog, but if the child's interest in

something other than the test dog persisted (using the criterion that three suggestions had failed to switch the child's attention back to the test dog) then the handler would encourage activity involving the object of the child's interest. After each child's sessions, the child was taken back to their class and the real dog was taken outside for water and exercise.

Behavioural Measures

All sessions were recorded on video tape and preliminary observations allowed all behaviours to be categorised and ethograms developed. The behavioural data was then extracted using The Observer (v 2.0) software (Noldus Information Technology, 1989). These behaviours were divided into three main categories, looking, responding and initiating. These categories were then sub-divided on the basis of the objects of the children's looking, responding and initiating (see Figures 3.1 - 3.3). The category 'absent dog' was included as the children were aware that the real dog was in another part of the room during the imitation dog condition. In this situation they would sometimes talk about or try and find the real dog. During real dog sessions the children were probably aware that the imitation dog was in another part of the room, but it was extremely rare for them to take any notice of it. The category 'test dog' refers to the dog that is in the test area for that condition (i.e. real or imitation) and also refers to the activities being encouraged focusing on that dog. Within the initiations category, the children could either directly approach the dog or something else (defined as 'towards' test dog, absent dog or other) or they could approach or talk to the handler about the dog or something else (defined as 'about' test dog, absent dog or other). See Appendix 3 for full details and definitions of the behaviours observed.

Other Measures

Sections of the British Ability Scales (BAS) concerning basic number, vocabulary and comprehension skills were administered to each child to give an indication of developmental abilities and skills (see Appendix 4). The class teachers were asked to rank the children for a range of behaviours (see Appendix 4). These measures were included to examine whether individual skills or impairments might have had an impact on individuals' behaviour during sessions. In addition parents were asked for information concerning the presence of pets at home and the children's contact with other animals (see Appendix 1).

Figure 3.1 Dendrogram to Illustrate the Hierarchical Ethogram Used to Record Looking Behaviours

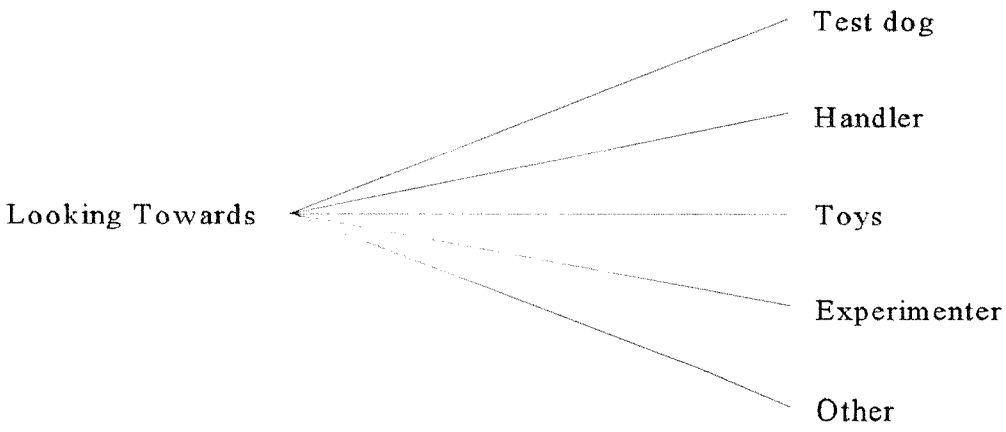


Figure 3.2 Dendrogram to Illustrate the Hierarchical Ethogram Used to Record Responding Behaviours

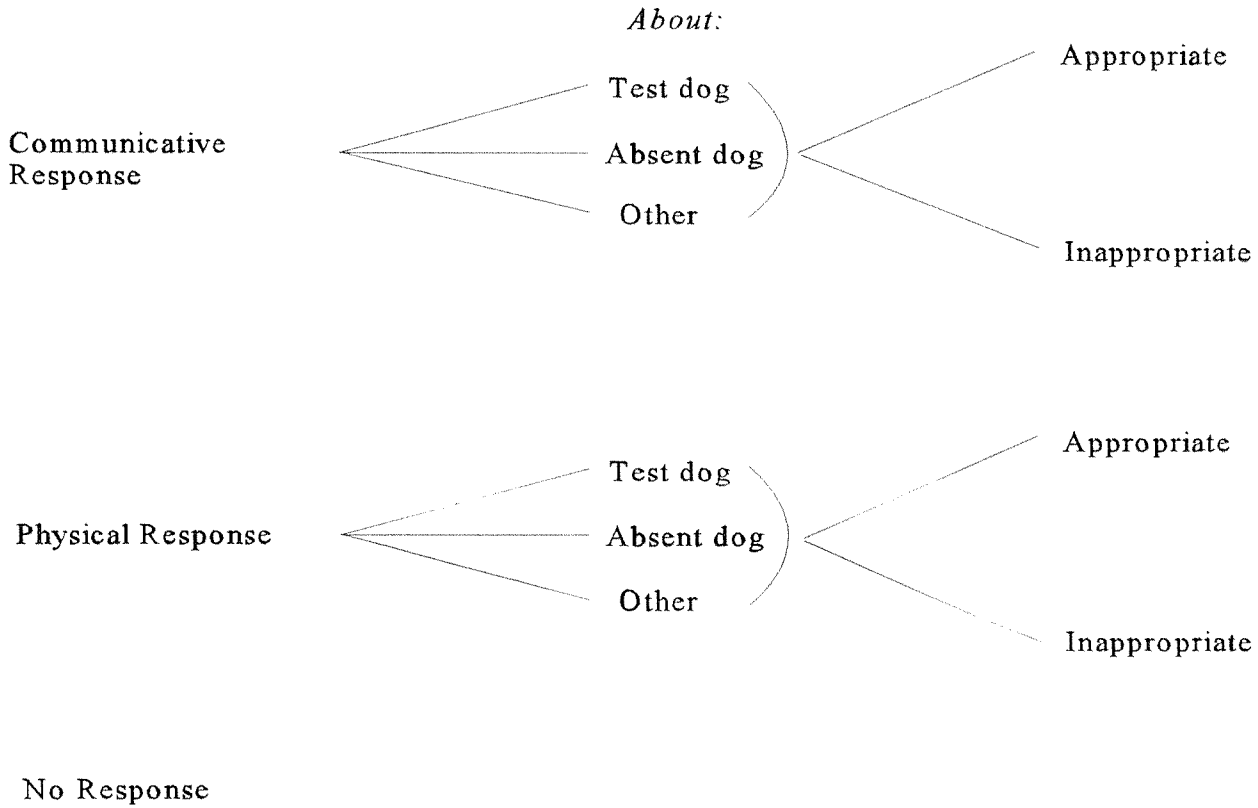
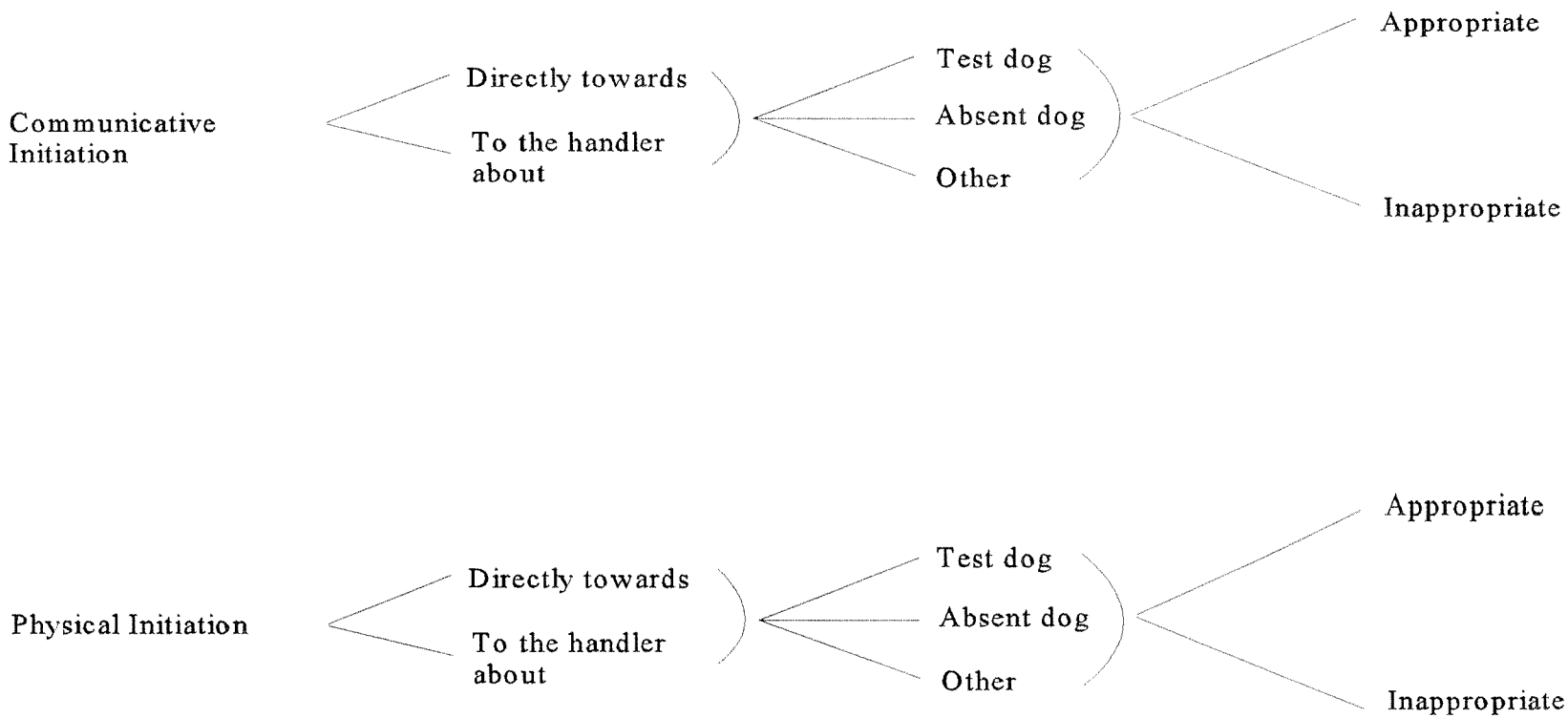


Figure 3.3 Dendrogram to Illustrate the Hierarchical Ethogram Used to Record Initiating Behaviours



With regard to the welfare of animals involved in animal-assisted programmes, the most common concern is fatigue. Ianuzzi and Rowan (1991) suggest that visits should be limited to one hour, with ready access to water, and with no more than three visits per week. This study required the dog to visit twice a week for one hour each visit, with regular breaks outdoors. The dog was examined by a veterinary surgeon shortly before the study. After the study the dog handler (and owner) was interviewed about the dog's health and temperament before, during and after the study.

RESULTS

Individual children's behavioural results were pooled to obtain information about group effects across conditions, giving information about behaviours that were generally affected differently by the real dog and the imitation dog. Analysis of Variance (ANOVA) was carried out to compare the two conditions. F-ratios were calculated using the Condition*Subject interaction as the error term, so as to only include differences between conditions that were common to the group as a whole. The results of behaviours that were significantly different or occurred frequently (an average of more than twice per session) are presented, to describe the range of behaviours seen and the differences between conditions. Mean frequencies/durations per child per session are presented. As this is the first study using these methods and data collection techniques, significant differences at the 10% level (two-tailed) are included to illustrate tendencies towards a type of behaviour in one condition rather than the other.

BEHAVIOURAL MEASURES

The children directed their gaze at the dog (whether real or imitation) for longer than they looked at anything else (see Figure 3.4), as the handler was consistently encouraging their attention towards the test dog. However, the children spent significantly longer looking at the dog in the real condition compared with the imitation condition ($p<0.005$). During the imitation dog condition the children spent significantly longer looking at the handler ($p<0.05$), the toys ($p<0.005$) and other things ($p<0.025$), indicating that the real dog provided a significantly stronger focus of attention than the imitation dog did. The frequencies of children's looks follow a similar pattern (see Figure 3.5), but only reach a level of 10% significance ($p<0.1$) for looks towards the dog, handler and other things. The frequency of looks towards the alternative toys (the truck and the pop-up animals) was

Figure 3.4 Duration of Looking Behaviour Comparing Real Dog and Imitation Dog Conditions
Average Duration (Type III means)

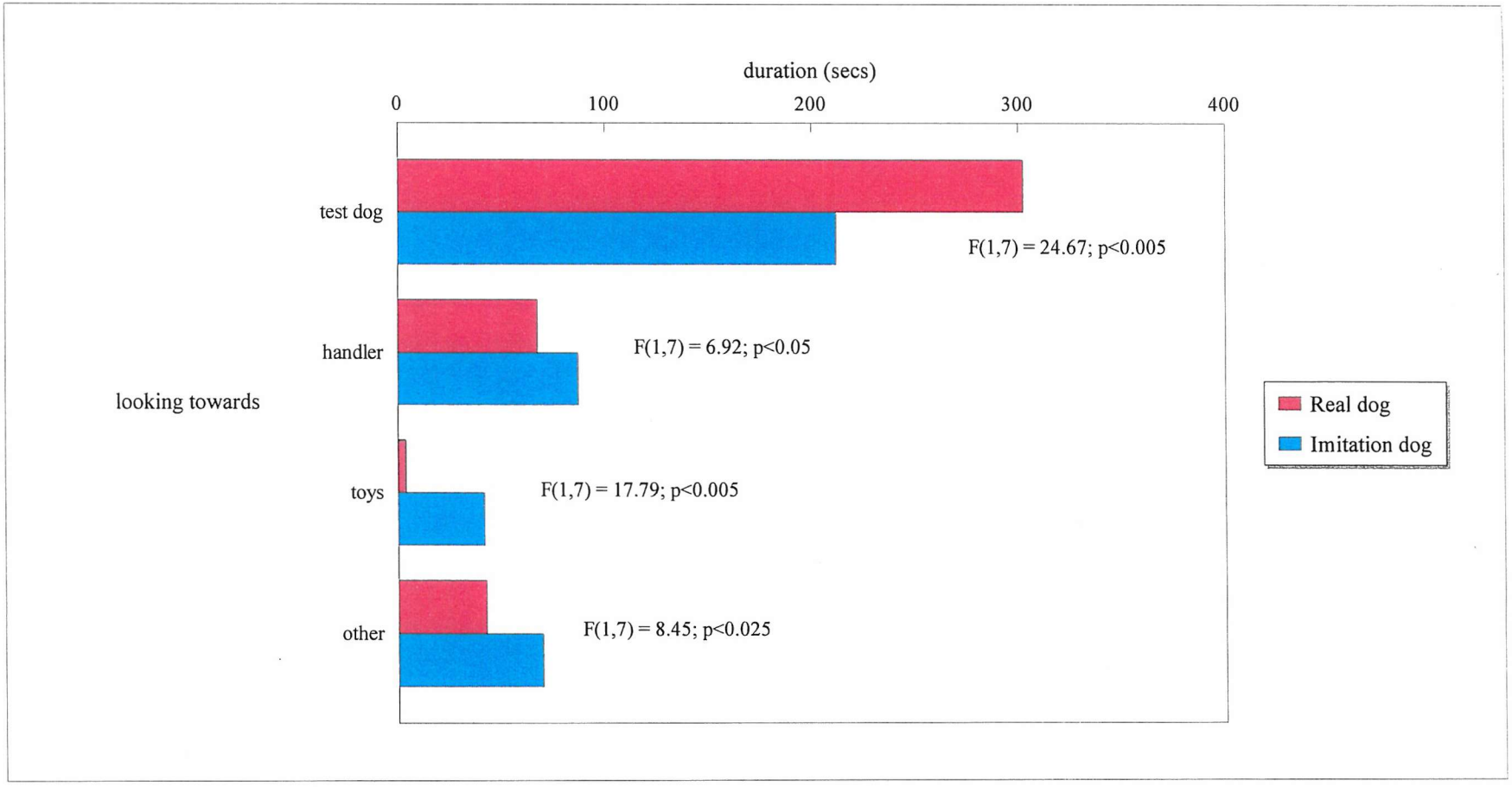
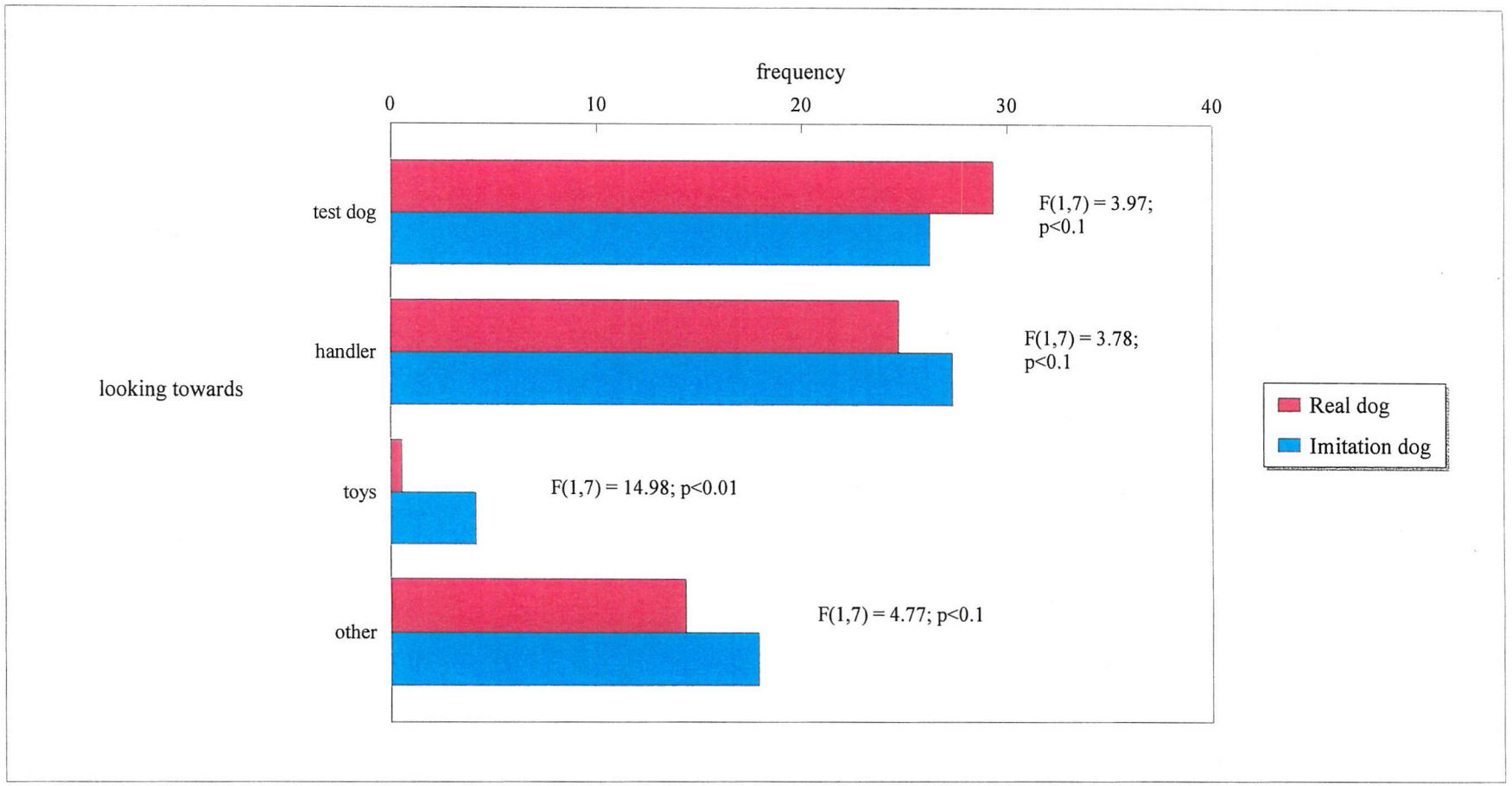


Figure 3.5 Frequency of Looking Behaviours Comparing Real Dog and Imitation Dog Conditions
Average Frequency (Type III means)



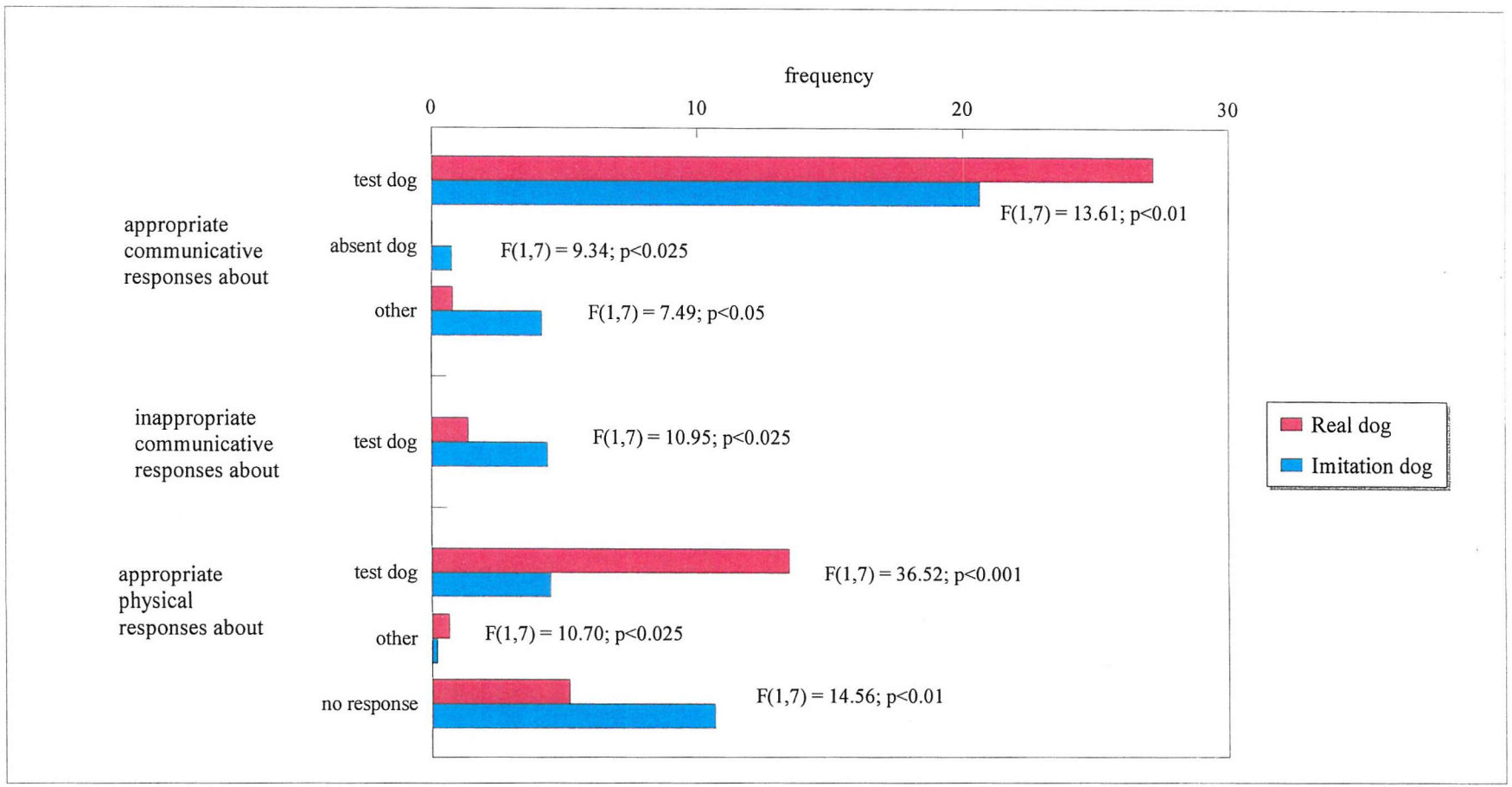
significantly greater ($p<0.01$) during the imitation dog condition. This suggests that these alternative toys were much more distracting when the activities were centred on the imitation dog.

For the analysis of the responding and initiating behaviours the category 'other' includes everything apart from the test dog and the absent dog (i.e. 'other' includes the alternative toys and the experimenter).

Appropriate communicative responses about the test dog (see Figure 3.6) were significantly more frequent during the real dog condition ($p<0.01$), while those about the absent dog and other things were significantly more frequent during the imitation dog condition ($p<0.025$ and $p<0.05$ respectively). This illustrates how in the real dog condition the children will 'go along with' the activities, while in the imitation condition they direct the activity towards and about other things (including the real dog when it is not present i.e. the absent dog during the imitation dog condition). This suggests greater interest and cooperation during the real dog activities. In addition a small number of inappropriate communicative responses occur in both conditions, but the frequency of those in the imitation dog condition significantly exceed those in the real dog condition ($p<0.025$). This most likely reflects a lack of concentration and/or interest in the imitation dog activities. It is worth noting that the dog did not have the effect of increasing the overall frequency of communicative responses (mean for real condition = 29.54; mean for the imitation condition = 31.52), but that it did affect whether the responses were appropriate or inappropriate and what they were about (with the children moving away from the things that the handler was encouraging during the imitation dog condition). This suggests that it is the *quality* of interactions that is affected by the involvement of a real dog.

Physical responses were almost always appropriate and were usually in connection with the test dog (Figure 3.6). However, the number of appropriate physical responses concerning the test dog was significantly greater during the real dog condition ($p<0.001$) as were those concerning other things ($p<0.025$). This indicates a greater level of cooperation in response to the handler's requests during the real dog condition. The higher level of responses to other things may also indicate a cooperation-increasing effect or it may be the result of responses to dog-related objects (for example, the child is asked to put the brush away). Unfortunately, the fact that dog-related objects could be incorporated into the 'other' category when not being used in direct connection with the activity does confound this particular finding. Additionally the frequency of ignoring (not responding to) the handler's questions and requests (Figure 3.6) was significantly greater during the imitation dog condition

Figure 3.6 Responding Behaviours Comparing Real Dog and Imitation Dog Conditions
Average Frequency (Type III means)



($p<0.01$). This supports the interpretation of the communicative and physical responding data as well as the looking behaviours that the children were more interested and responsive with the real dog. The handler attempted to maintain a similar rate of questions and requests in both conditions, and the balance of the data presented in Figure 3.6 suggests that this was successful. The mean total of questions and requests made by the handler in the real condition was 53.8 and in the imitation 52.9.

While the children's responding behaviour was closely related to the handler's behaviour, initiations (see Figures 3.7 & 3.8) were directed by the children themselves, and not directly influenced by the dog handler. The children would talk to the dogs (real or imitation) and the handler, and the speech or sign-language directed towards the handler is further sub-divided on the basis of what the content of the speech was about (i.e. whether it was about the test dog, the absent dog or other things). The children would talk directly to the test dog significantly more often if it was the real dog. They would also talk to the absent dog during the imitation dog condition (i.e. talking to the real dog that was currently outside the test area). This suggests that the real dog would elicit significantly more communicative initiations directed towards itself. The communicative initiations towards the handler were significantly more often about the test dog during the real dog condition ($p<0.005$), while they were more likely to be about the absent dog ($p<0.01$) or other things ($p<0.1$) during the imitation dog condition. Again this suggests the children were more interested in the real dog activities than the imitation dog activities. It is interesting to note that as with the communicative responses, the total number of communicative initiations towards the handler is not very different between conditions (mean for the real condition = 11.64; mean for the imitation condition = 10.35). It is the subject of the interaction that is affected differently by the two types of dog, with the real dog stimulating interest in itself and activities relating to the dog, while the imitation dog encourages the children to direct sessions away from those focal activities.

Most of the physical initiations made by the children (Figure 3.8) were appropriately directed towards the test dog and no significant difference was found between the frequencies in the two conditions. However, a significantly greater number of physical initiations were made towards the absent dog ($p<0.025$) and other things ($p<0.005$) during the imitation dog condition. This finding indicates that the children were easily distracted during the imitation dog condition. The imitation dog also elicited a number of inappropriate physical initiations directed towards it ($p<0.1$), with the children sometimes hitting it or trying to move it out of the test area. The real dog also encouraged the children to make appropriate physical initiations about itself (i.e. to go and get an appropriate toy

Figure 3.7 Communicative Initiating Behaviours Comparing Real Dog and Imitation Dog Conditions
Average Frequency (Type III means)

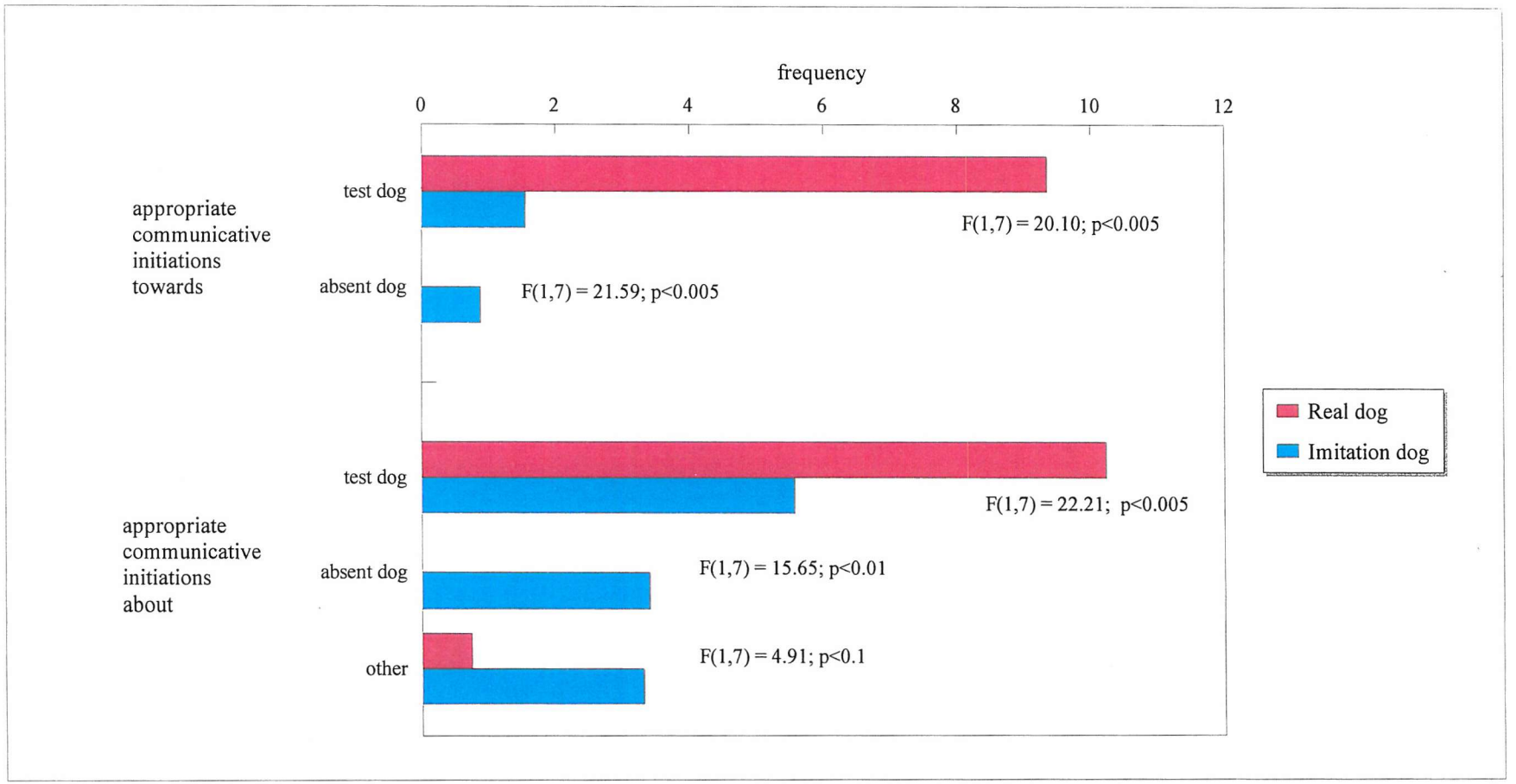
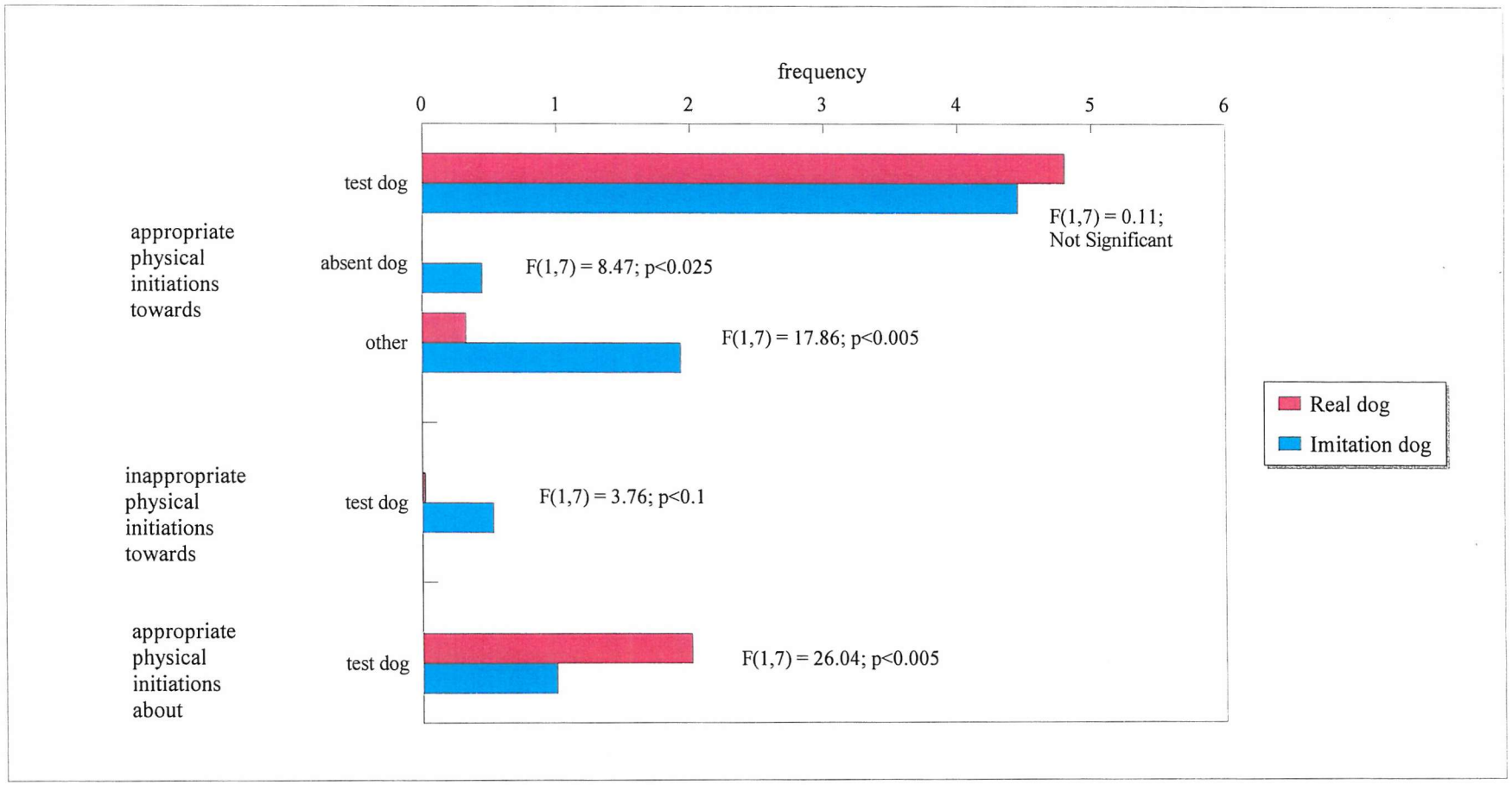


Figure 3.8 Physical Initiating Behaviours Comparing Real Dog and Imitation Dog Conditions
Average Frequency (Type III means)



or object in order to interact with the dog) without any prompting from the handler. This suggests that the real dog gave the children the confidence and motivation to demonstrate the skills they had learnt in connection with the dog activities and to show that they wanted to do these things.

Linear Trends for Behaviours Significantly Different Between Conditions

Multiple regression was also carried out within each condition to investigate linear trends in behaviours over the course of the six experimental sessions. These trends must be interpreted cautiously as the guidelines for sessions progressed, with new activities being introduced, although the guidelines for each session were identical for the two conditions. These linear trends will have been influenced by the differing guidelines in successive sessions, but they may indicate subtle changes in the children's behaviour over the course of the study. Such changes in turn would influence and be influenced by the children becoming familiar with the experimental situation and developing a relationship with both the handler and the test dogs. Where significant linear trends were found in both conditions, the trends were in the same direction (i.e. positive or negative) but the degree of change was often different. Some behaviours were only found to have a linear trend in one of the two conditions. Significant findings from this linear trend analysis are presented in Table 3.1.

Over the course of the study, where frequencies or durations changed and linear trends were apparent, the real dog tended to stimulate greater interest in itself for longer than the imitation dog, so even though the duration of looking towards the dog decreased over sessions, it decreased at a greater rate with the imitation dog (see Table 3.1). The exception was the number of appropriate physical responses about the test dog which showed a greater drop in the real condition. This may be the result of the children playing a lot of 'throwing the toy' games in the first few sessions of the real condition (an activity that was more often rejected in the imitation condition) and so when the guidelines in later sessions did not include this activity, a drop was only seen in the real dog condition.

There is some evidence of a 'novelty effect' for both dogs that began wearing off after a couple of weeks, but it is clear that the positive behaviours that were seen significantly more often in the real dog condition also declined at a lesser rate than those seen in the imitation dog condition. This would suggest that the impact of the real dog, although not maintained at the initial very high level did not deteriorate to the same extent as that of the imitation dog (which was already lower). A corresponding change of increasing inappropriate behaviours over the weeks was not seen in the real

dog condition, while inappropriate physical initiations towards the imitation dog were seen to increase significantly. This may demonstrate a lack of interest in the imitation dog or perhaps the children's 'disapproval' of this dog as a focal object.

The increase in appropriate initiations (both communicative and physical) suggests that the children became increasingly confident over the weeks, as they became familiar with the handler, the dogs and the general environment. Again these behaviours are seen to increase at a greater rate for the test dog when it is the real dog condition and for other things when it is the imitation dog condition. Further evidence of their waning interest in the imitation dog, but sustained interest in the real dog.

Looking behaviours were seen to change over the six weeks, in the real dog condition both frequencies and duration were affected with all frequencies increasing but duration of looks towards the dog reduced and those to the handler and other things increased. This suggests that the children learned to interact better with the handler , referring to her and the activities more often. The durations of looks follow a similar pattern for the imitation dog condition but looks towards the test dog decrease more dramatically and looks to the handler increase at a lesser rate.

Table 3.1 Summary of Behaviours that were Significantly Different Between Conditions (from the ANOVA comparing the two conditions) **and** Showed Linear Trends (using Multiple Regressions within each condition) Over the Course of the Study *(b = the slope)*

Behaviour	**Real dog condition**	**Imitation dog condition**
Appropriate communicative response about the test dog	b = -2.4; $p<0.005$	b = -3.5; $p<0.005$
Appropriate physical response about the test dog	b = -1.5; $p<0.01$	b = -0.7; $p<0.005$
Appropriate physical response about other	b = -0.2; $p<0.005$	*no significant trend*
Appropriate communicative initiation towards the test dog	b = +2.3; $p<0.005$	b = +0.6; $p<0.005$
Appropriate communicative initiation about other	*no significant trend*	b = +1.4; $p<0.005$
Appropriate physical initiation about the test dog	b = +0.7; $p<0.005$	b = +0.3; $p<0.005$
Inappropriate physical initiation towards the test dog	*no significant trend*	b = +0.3; $p<0.01$

Table 3.1 (continued)

Behaviour	Real dog condition	Imitation dog condition
Looking towards the test dog (duration)	b = -15.2; p<0.005	b = -20.9; p<0.005
Looking towards the handler (duration)	b = +8.9; p<0.05	b = +6.2; p<0.05
Looking towards other (duration)	b = +8.8; p<0.005	b = +8.1; p<0.01
Looking towards the test dog (frequency)	b = +2.1; p<0.05	*no significant trend*
Looking towards the handler (frequency)	b = +2.7; p<0.005	*no significant trend*
Looking towards other (frequency)	b = +2.6; p<0.005	*no significant trend*

Individual Differences

In order to investigate whether individual children responded differently to sessions with the real dog, analysis was carried out on two subsets of the data:

a) initial data from the first two sessions only, to investigate individuals' initial responses to the real dog,

b) changes from the first two sessions to the last two sessions were calculated, to investigate if children changed differently over the course of the study.

Spearman Rank correlations were carried out to investigate whether these behaviour measures showed a relationship with information gathered from the teachers' ratings of abilities and the BAS scores.

Correlations were only found relating to initial behaviours. These showed that children rated high on general communication abilities were more likely to initiate appropriate communication about the test dog ($\rho = .9164$; $p<0.005$) but were less likely to initiate appropriate physical initiations about the test dog ($\rho = -.7425$; $p<0.05$). These results suggest that those children with good communication abilities would use them, while those rated poorly would use other ways of communicating their interest in an activity, for example by selecting available dog accessories. Children with a higher score on the BAS were more likely to make appropriate communicative

initiations towards the test dog ($\rho = .7295$; $p<0.05$), suggesting that the more able children would also talk directly to the dog, giving commands or encouragement. Children that were rated as active by the teachers were more likely to look at the dog frequently ($\rho = .7727$; $p<0.05$), probably reflecting their tendency to move and look around them.

These differences in initial responses to the real dog indicate that different children do respond differently in their individual behaviours when involved in dog-assisted activities, and this should be considered in future research, particularly when working with different populations.

Previous Contact with Animals

With such a small subject group and considering that most of the children either had pets at home or had regular contact with pets or other animals, it was not possible to determine whether previous interaction with animals affected the children's behaviour.

Animal Welfare

When interviewed the dog owner reported neither beneficial nor harmful effects on the dog (see Appendix 5) However it was noted that the dog appeared to be very tired immediately after the sessions and that future visits should not be for any longer than those in this study (the length of interaction time per visit was approximately 30 minutes, with regular breaks of 10-15 minutes, within a total visiting time of 1-1½ hour).

DISCUSSION

Many behaviours were performed at significantly different rates between the real dog and the imitation dog conditions. In the real dog condition the children were less likely to ignore the handler's questions and requests. They were also more cooperative, doing as they were asked, in relation to the activities and interacting appropriately with the handler more often through the real dog activities than with the imitation dog activities. However, neither the total rate of responses nor of communicative initiations were significantly different between conditions and therefore an overall social facilitation effect, as reported by, for example, Corson *et al.*, 1977, was not seen. However, the adult was able to **direct** the focus of interactions more successfully with the real dog activities.

These similar levels of interaction may be due to the fact that the children involved in this study would normally show reasonably high levels of social behaviour.

The causes behind the different behaviours were not investigated by this study, although it can be suggested that it is the real dog's animacy that affects the children's behaviour. It is not just the tactile stimulation of a soft object to touch (which was provided in both conditions), that is dictating alternative patterns of behaviour when interacting with the real dog.

A number of problems and limiting factors became apparent during this study, and these could be avoided in future studies. The category 'absent dog' was necessary as the two conditions were in quick succession and the children were aware that the real dog was in the classroom (although in a bed out of view of the test area). The children would attempt to interact with and about the real dog even when they could not see or hear it. This illustrates their interest in the real dog but could be interpreted as a distraction. It would be more suitable to have the two conditions on separate days, with imitation dog sessions being held on days when the real dog did not enter the school grounds.

The setting and repeated measures design ensured as controlled an environment as possible within a school. However, one potential problem that might have confounded the results was the behaviour of the handler. The instructions and guidelines given to the handler controlled her behaviour to some extent between conditions and a comparison of means showed that her behaviour in the two conditions was quantitatively very similar. Only when children persisted in ignoring her suggestions concerning the test dog did she alter the direction of her encouragement, so any qualitative difference in her behaviour between the two conditions was a direct result of a difference in the children's own behaviour.

The methods used described a range of behaviours that present a picture of the interactions that occurred during sessions. It was then possible to compare these behaviours between different conditions, providing information about the effects of an animate dog on social interactions. Initially, a differentiation between appropriate and inappropriate was not applied, but it became clear that these qualitative categories would provide more detailed and descriptive information. The use of videotapes and an ethological approach allowed the development of this method to better suit the behaviours that were seen.

In conclusion, it was found that the methods employed provided a valid description of a full range of social interaction behaviours that occurred during animal-assisted activity sessions. In addition it can be concluded that a real dog elicited different behaviour, both qualitatively and quantitatively, to an inanimate imitation dog. Findings from this study suggest that future research could usefully employ similar methods to compare AAA with other interventions, and to compare different activities that are not necessarily focused on dog-related activities.

STUDY 1a

DEVELOPMENT AND REPLICATION OF STUDY 1: CROSS-CULTURAL COMPARISON CARRIED OUT IN THE CZECH REPUBLIC

INTRODUCTION

The design of the study described in the previous section of this chapter was developed and adapted for a group of children living at or attending a residential centre in Prague. Certain findings from the previous study (Southampton, UK) suggested changes and adaptations that should be made to the experimental procedures. In addition different factors that might affect the behaviour of children with severe learning disabilities was further investigated. For full details of the study see Chamradova (1995). The study was collaborative; I developed the experimental design as described in the previous section of this chapter, and made recommendations for additional aspects of the methods and procedures. My Czech co-workers carried out the practical work with the children and extracted the behavioural data from the video recordings and I supervised the analysis of this data. The findings of this study were collaboratively interpreted and written up by myself and my Czech colleagues.

Despite some changes to the design and procedure of the Prague study it provides a good replication of the UK study and allows a comparison of findings. Similarities and differences in the methodology and results are described, plus a short discussion of additional findings.

METHOD

PARTICIPANTS AND EXPERIMENTERS

Sixteen children and young adults, eight boys and eight girls, at Modry Klíč, Prague, a residential centre for children with severe or profound and multiple learning disabilities participated in the study. Participants were selected randomly from those attending the centre. Their chronological ages ranged from 7 to 21 years. The real dog was a neutered, 2 year old black flatcoat retriever. It

had been trained as a therapy dog by Elisabeth Färbinger of Partner-Hunde Österreich (Assistance Dogs Europe), and recently placed at the residential centre. The experimenter was a 24 year old female clinical psychologist.

DESIGN

Participants were assigned to either a control group or an experimental group. The two groups were matched as closely as possible for age, sex and residential/day pupil status. The experimental group replicated the UK study: a counterbalanced, repeated measures design, with each child participating in two conditions per session - real dog (black) and imitation dog (white) conditions. Each session consisted of an individual spending seven minutes in each condition, one immediately following the other. The order of presentation of the real dog and the imitation dog was alternated between sessions, with half of the children starting their first session with the real dog and half with the imitation dog. The control group followed a similar pattern except that another imitation dog replaced the real dog. Therefore the two conditions for the control group were: imitation dog (black) and imitation dog (white). This control group served to demonstrate whether the colour of the dog might affect behaviour, or whether any other factors might have contributed to findings in the experimental group. The results presented here and compared with the UK study are those from the experimental group only. Sessions were run every week for a period of eight weeks.

SETTING AND APPARATUS

Sessions were run in a restricted part of the centre's gymnasium and were recorded using a surveillance camera and a microphone connected to a video recorder. Two dogs were used for the experimental group, the real dog and the imitation (of similar size and texture, but a different colour). The same accessories were available for both dogs (collar, lead, brush, biscuits and dog toy) and two alternative toys were available (a toy truck and a pop-up toy).

PROCEDURE

A familiarisation session was run a week before the study began, so that each child could experience the situation without either of the dogs being present. This session was recorded but no data was extracted. Additional sessions with the real dog were carried out in between the experimental sessions, and again these additional sessions were recorded but data was not extracted. The

additional sessions with the real dog were the same length (seven minutes) as the experimental real dog condition and followed the same guidelines as that week's session.

Assistants brought the children to and from sessions, and also brought the dog in and out of session (but not with the children). The clinical psychologist operated video equipment and guided all sessions, following the guidelines used in the UK study (see Appendix 1). This study included an extra two weeks compared to the UK study, so the last four weeks of the study followed the same guidelines as the final two weeks of the UK study. The children were presented with the clinical psychologist and the test dog (real or imitation). The dog accessories and the alternative toys were clearly visible but were not mentioned to the children. After seven minutes the psychologist would say that the dog was tired and the other dog wanted to come and say 'hello'.

BEHAVIOURAL MEASURES

All sessions were recorded on videotape and the behavioural data was extracted using The Observer (v 2.0) software (Noldus Information Technology). As with the UK study the behaviours were divided into three main categories: direction of attention/looking, responses and initiations; these categories were then sub-divided into what the children were attending to, responding or initiating to/about (see Appendix 6).

Differences in the Prague ethograms compared to the UK ethograms:

The distinction between communicative and physical responses/initiations was not made, as the children involved in the Prague study had very limited communication skills. The category 'absent dog' was not necessary as the dog was returned to her area elsewhere at the centre. A category for indistinguishable responses/initiations was included for those behaviours that could not be interpreted. In addition the children were seen to directly respond to the dog's behaviours and this was recorded as a distinct behaviour. The direction of attention was recorded instead of just 'looking' as many of the children would appear to be looking elsewhere when the psychologist was aware that they were actually attending to the activities. Direction of looking and attention are complex areas for definition but for the purposes of this study the two will be considered comparable.

OTHER MEASURES

Portage checklists were completed by the clinical psychologist before and after the study, giving an indication of social, self-help, cognitive, motor and language skills.

Table 3.2 Summary of Differences Between the UK and Czech Republic Studies

Country	UK, Southampton	Czech Republic, Prague
Participants	Severe learning disabilities with Down's syndrome	Severe and profound learning disabilities (not necessarily with Down's syndrome)
	Small age range (7 - 11 years)	Large age range (7 - 21 years)
	Attending the school daily	Residential and day pupils
Design/Procedure	Six weeks of sessions	Eight weeks of sessions
	One session per week for each child - all sessions observed	Two sessions per week (with the real dog) - one observed
	Imitation dog (black) the same colour as the real dog (black)	Imitation dog (white) a different colour to the real dog (black)
	Communicative and physical responses and initiations differentiated	Communicative and physical responses/initiations combined
	The category 'absent dog' included in the behaviours coded	The category 'absent dog' not included
	British Ability Scales and staff ratings used to assess children's abilities	Portage checklists used to assess children's abilities
Analysis	Analysis of Variance carried out on raw data	Analysis of Variance carried out on rank transformed data

RESULTS

The individual children's results were pooled to obtain information about group effects giving information about behaviours that were generally affected differently by the real dog and the imitation dog. All data was ranked before analysis, as the participants in this study showed very different rates of behaviours, due to large individual differences in abilities. F-ratios were calculated using the Condition*Subject interaction as the error term so as to only include differences between conditions that were common to the group as a whole. Mean frequencies or durations per child per session are presented, for behaviours that were found to be significantly different between conditions using a criteria of $p<0.01$. Comparison of behaviours between the UK study and the Prague study are only carried out for those behaviours with significance values of $p<0.01$ in either study.

BEHAVIOURAL MEASURES FOUND TO BE SIGNIFICANTLY DIFFERENT BETWEEN CONDITIONS IN THE PRAGUE STUDY

Direction of attention was found to be significantly different between conditions. During the real dog condition the children would attend to the dog more frequently ($F_{(1,7)} = 16.66$; $p<0.01$) and for more of the session ($F_{(1,7)} = 80.89$; $p<0.001$). They would also spend significantly less time attending to the psychologist ($F_{(1,7)} = 29.86$; $p<0.005$) during the real dog condition. It should be noted that attending to the dog includes interaction with the therapist about the dog-related activities, while attention to the psychologist is just focusing on her without reference to the encouraged activities.

Responding and initiating behaviours were also found to vary between conditions. The children were more likely to respond appropriately to questions and requests about the real dog ($p<0.001$) compared to the imitation dog and would also respond directly to the real dog ($p<0.005$) more often. In addition the frequency of ignoring the psychologist's questions and requests was significantly greater during the imitation dog condition ($p<0.001$) (see Figure 3.9). These responsive behaviours indicate a greater level of cooperation during the real dog condition. Appropriate initiations directly towards the dog were seen to be higher in the real dog condition ($p<0.005$) as were appropriate initiations about the dog ($p<0.005$). The children also appear to be distracted towards other things than the imitation dog as shown by the higher level of appropriate initiations about other things ($p<0.005$) during the imitation dog condition (see Figure 3.10).

Figure 3.9 Responding Behaviours Comparing Real Dog and Imitation Dog Conditions (Prague Study)
Average Frequency (Type III means)

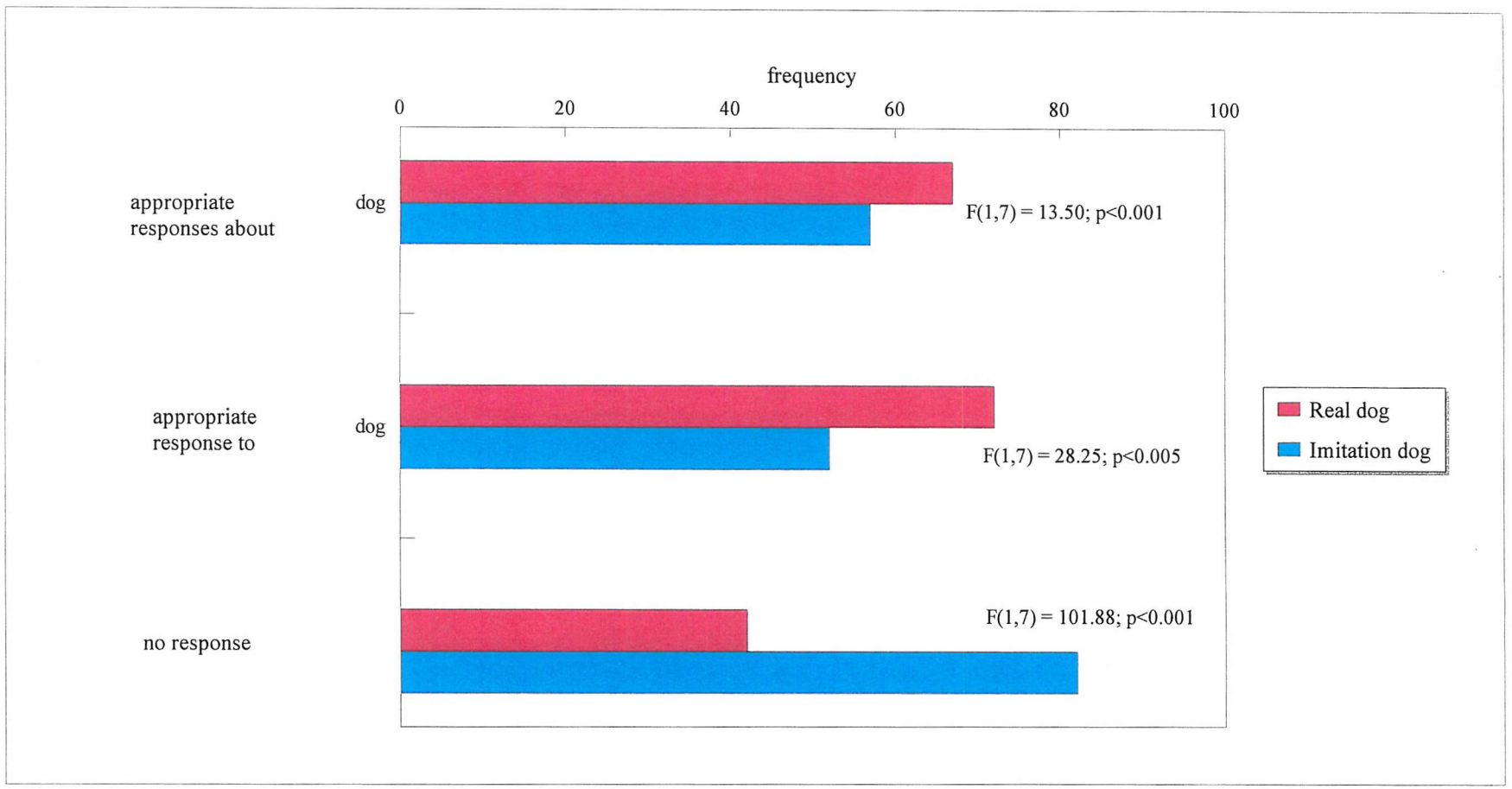
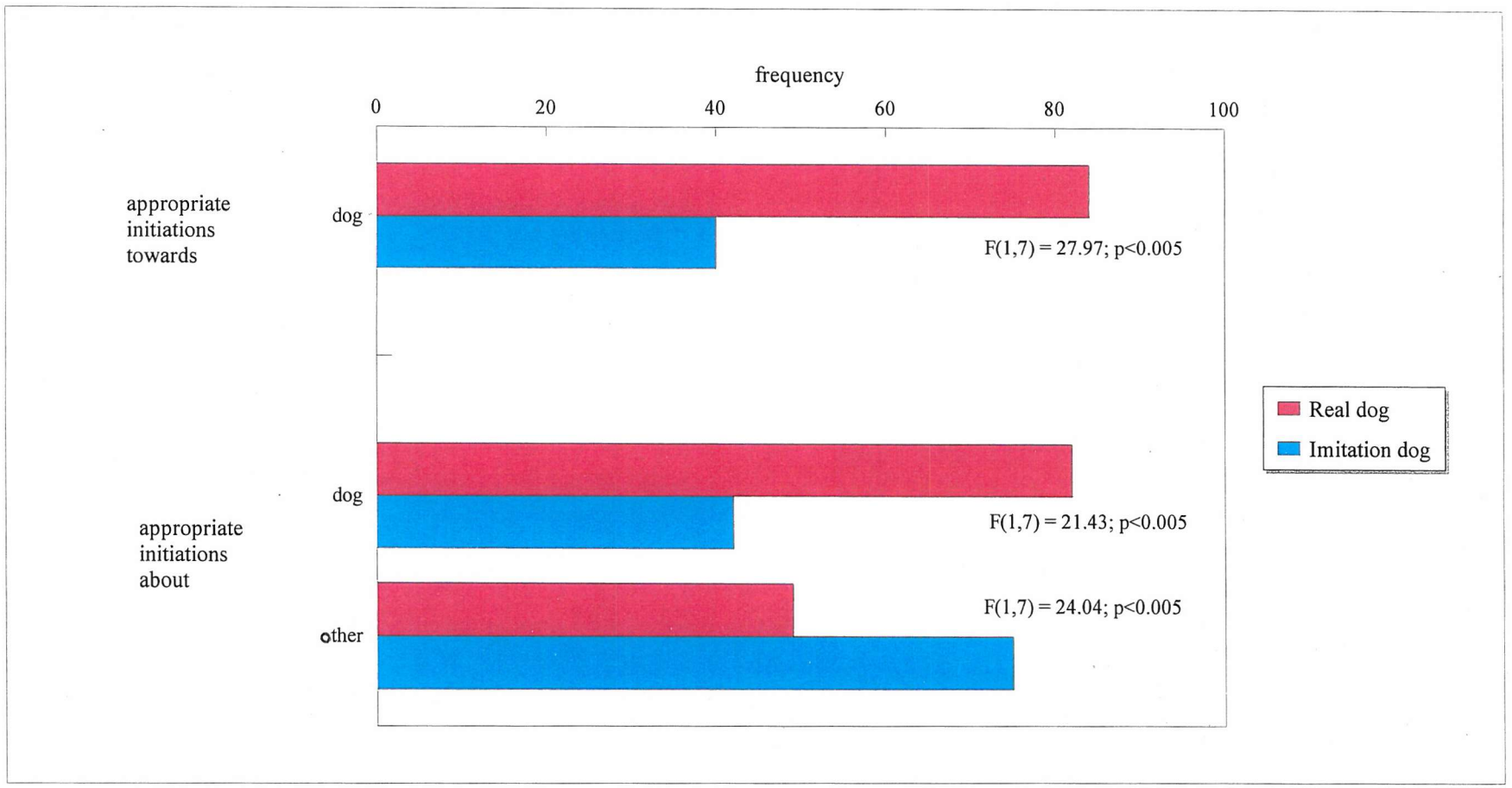


Figure 3.10 Initiating Behaviours Comparing Real Dog and Imitation Dog Conditions (Prague Study)
Average Frequency (Type III means)



Overall, the findings from the Prague study indicate a greater level of cooperation and interest in the dog during the real dog condition. The imitation dog condition produced greater distraction away from the dog activities towards other things.

Linear Trends Within Conditions

Three of the behaviours that were significantly different between conditions were found to have significant linear trends within each condition:
Frequency of attending to the dog was found to decrease in the real dog condition ($p<0.005$) and the imitation dog condition ($p<0.01$). The frequency of appropriate responses about the dog was also seen to decrease ($p<0.001$) over the eight weeks for both conditions, as were direct responses to the dog ($p<0.001$). These findings suggest that there is some novelty effect for both the real dog and the imitation dog, which drops off within a short period. However the differences between the two conditions are still apparent, suggesting that the novelty effect of the real dog does not decrease more rapidly than the imitation dog, as appropriate behaviours and attention to the dog are still significantly higher for the real dog. The guidelines also changed over the period of the study, where the children were encouraged to choose and direct activities themselves in the last two sessions, and therefore a decrease in the number of responses may be a result of fewer questions and requests being made by the handler.

Individual Differences from the Prague Study

Individual differences were examined to investigate how the children might have been differently affected by the real dog. Therefore analysis (Mann-Whitney nonparametric comparison of two samples; Spearman rank order correlations) was carried out for behaviours measured during the real dog condition. A significance value of $p<0.05$ was used, as the number of subjects was small and this process was done as a preliminary investigation of individual effects. Initial behaviours (from the first two sessions), and behavioural changes over the course of the study (last two sessions minus the first two sessions) were calculated for the comparisons.

It was found that younger children were more likely to make inappropriate initiations towards the dog at the beginning of the study ($z = -2.40$; $p<0.05$) but this diminished towards the end of the study ($z = 2.40$; $p<0.05$). It seems that the younger children were more anxious and less experienced when they first met the real dog, and as their confidence increased over the sessions and they learnt

how to interact with the dog, inappropriate behaviours were lost. Over the course of the study the low ability children increased their attention towards the psychologist, while the high ability children's attention to the psychologist decreased ($z = 2.09$; $p<0.05$). Children attending the centre on a daily basis increased their attention towards the psychologist ($z = -2.09$; $p<0.05$) and other things ($z = -2.10$; $p<0.05$) over the course of the study, while residents reduced their attention to the psychologist and other things ($p<0.05$). These two findings seem rather arbitrary at this stage and no obvious conclusions can be drawn. Portage scores were significantly correlated with the children's levels of attention to the real dog and the psychologist. Children obtaining high scores on social, self-help, language and overall Portage scores initially showed higher levels of attention to the dog ($\rho >0.8$; $p<0.05$) but this decreased over the period of the study ($\rho >0.75$; $p<0.05$). Those children scoring high on self-help skills initially attended to the psychologist more frequently($\rho >0.85$; $p<0.05$). High scores on self-help, cognitive and language skills resulted in the children initially attending to the psychologist for longer ($\rho >0.75$; $p<0.05$), but a reduction over time was seen for those scoring highly on self-help, cognitive and social skills ($\rho >0.75$; $p<0.05$). These findings suggest that the more able children (as seen from a simple high/low split and Portage scores) attended to the dog for significantly longer at the start of the study with this reducing as the guidelines require the children to direct the activities themselves.

Overall it is clear that individual differences did affect some behaviours during the real dog sessions. The reasons behind these differences are not always clear. However, there is some indication that the higher ability children responded as would be expected considering the activity guidelines. They required less direction from the therapist in the last two self-guided sessions and showed a higher initial level of interest in the dog compared to the lower ability children.

COMPARISON OF RESULTS FROM THE UK STUDY AND THE PRAGUE STUDY

In order to compare the results from the two studies, behaviours were matched as closely as possible. All significant results ($p<0.01$) from both studies are presented (see Table 3.3). The overall impressions from the two studies are very similar, and many of the individual behaviours were significantly different between conditions, in the same direction, for both studies. No contradictory findings were apparent. Behaviours from the UK study relating to the 'absent dog' are not included in this comparison.

Table 3.3 Comparison of Results from the UK Study and the Prague Study - Behaviour Measures

Behaviours; (S) = Southampton; (P) = Prague	SOUTHAMPTON	PRAGUE
Looking towards the test dog (S) Attention directed towards the test dog (P)	Duration higher with the real dog.	Duration and frequency higher with the real dog.
Looking towards the handler (S) Attention directed towards the psychologist (P)	Not significant.	Duration higher with the imitation dog.
Looking towards the alternative toys (S) Attention directed towards the pop-up toy and toy truck (P)	Duration and frequency higher with the imitation dog.	Not significant.
No response to the handler (S) No response to the psychologist (P)	Higher with the imitation dog.	Higher with the imitation dog.
Appropriate communicative and physical responses to the handler about the test dog (S) Appropriate responses to the psychologist about the dog (P)	Higher with the real dog.	Higher with the real dog.
Not measured (S) Appropriate responses to the dog (P)		Higher with the real dog.
Appropriate communicative and physical initiations to the handler about the test dog (S) Appropriate initiation to the psychologist about the dog (P)	Higher with the real dog.	Higher with the real dog.
Appropriate communicative and physical initiations to the handler about other (S) Appropriate initiation to the psychologist about other (P)	Not significant.	Initiations about other higher with the imitation dog.
Appropriate communicative and physical initiations directly to the test dog (S) Appropriate initiations directly to the dog (P)	Communicative higher with the real dog.	Higher with the real dog.
Appropriate communicative and physical initiations towards other (S) Appropriate initiations directly to other (P)	Physical higher with the imitation dog.	Not significant.

The duration of looking towards/attending to the real dog was seen to be similar for the two studies. For the imitation dog condition the children in Prague appeared to direct their attention to the psychologist and the children in Southampton looked more at the alternative toys. This may reflect the different levels of imaginative play skills and needs of assistance/guidance between the two groups of children.

Responding and initiating behaviours were found to show very similar patterns for the two studies with appropriate responses being more frequent and levels of ignoring the handler/psychologist being lower during the real dog condition. Appropriate initiations about and directly towards the dog were also similar for both studies, with the real dog eliciting a higher frequency of these behaviours. Differences were seen in the children's initiations towards and about other things during the imitation dog condition in both studies. In the UK study the children were more likely to make initiations (physical) directly **towards** other things, while those in the Prague study were more likely to make initiations (communicative and physical combined) **about** other things (a similar trend of communicative initiations about other things was also found in the UK study but only at the 10% significance level). This discrepancy is probably the result of different social skills and interaction abilities, it might also reflect differing levels of confidence to actually go and do other things when the handler/psychologist is encouraging the dog activities.

The children in the Prague study were seen to respond directly to the dog, significantly more often during the real dog condition. This behaviour was not seen during the UK study and might be the result of the dog's residency at the Prague centre, with the children being more familiar with the dog.

Linear Trends

The linear trends found in both studies show a decrease in appropriate responses about both test dogs over the period of each study. This suggests that initial interest in the dogs is not maintained, however the real dog still elicits significantly more appropriate responses about itself than the imitation dog, over the course of the study. This finding might also be confounded by the guidelines for sessions, as the last two sessions in both studies were largely directed by the children themselves. This is reflected in the Southampton study which found a corresponding increase in communicative initiations towards and physical initiations about the test dog in both conditions (with greater increases being seen in the real dog condition). This change in level of initiations is not seen in the

Prague study and indicates that the children were less able to (or confident about) directing the activities themselves.

Individual Differences

The individual differences from the Prague study suggest that the higher ability children may have gained more from the real dog sessions than the low ability children (who showed an increase in attention towards the psychologist rather than the dog activities). It may be that the guidelines for the sessions could be adapted to suit younger/less able children, with more guidance from the psychologist in the last few sessions. Effects of individual differences in the UK study were found only for frequencies of behaviours, and these can largely be explained by children with better communication skills showing higher levels of communication behaviours.

Overall, the Prague study shows that the differences between real and imitation conditions are quite robust since abilities within the experimental group were more diverse than in the Southampton study.

Additional Findings from the Prague Study

The control group had sessions involving two imitation dog conditions, one imitation dog being white (comparable to the experimental group's imitation dog) and the other black (comparable to the experimental group's real dog). None of the behaviours measured were found to be significantly different between the two conditions. This finding indicates that the colour of the dog did not affect behaviour, and it also suggests that there were no other factors that might influence the results from the experimental group in terms of presentation of conditions, or the situation.

Portage checklists that were completed before and after the study for both the experimental and the control group did not indicate any changes in scores over the period of the study. This suggests that the real dog did not have any impact on the skills measured, either positive or negative, over an eight week period.

DISCUSSION

There were a number of experimental differences between the two studies; the participants from Prague were not exclusively children with Down's Syndrome, and their ages and abilities were more diverse. In addition the design of the study was adapted and developed. Despite these differences a very similar pattern of results was obtained. In both studies, the real dog increased responsiveness and cooperation, and received higher levels of looking or attention. The Prague study supported the UK findings that the real dog provides a more positive and sustained focus of interest over an eight week period. Unfortunately it was not possible to examine any possible social facilitation effects, in terms of communicative behaviour, as the communicative and physical categories had to be combined for analysis. A physical response or initiation towards an irrelevant aspect of the environment cannot be classed as a social interaction. However, the frequency of initiations **about** things illustrates attempts to initiate interactions with the handler, and the total number of these initiations are of similar frequency in both conditions. Again, this supports the UK study and suggests that the real dog is not acting as a general social facilitator. The real dog is eliciting behaviours towards and about itself.

Significant differences between the real dog and imitation dog conditions for specific behaviours were very similar in the two studies. The real dog encouraged interaction about itself but did not increase the total number of initiations. The real dog and activities relating to it were something that the children were willing to interact about and would follow guidance from an adult, as well as taking the opportunity to take the initiative themselves where appropriate. The extra sessions each week with the real dog (in the Prague study) did not seem to affect the differences between conditions, although it is possible that the children with more severe disabilities were able to learn appropriate behaviour and gain confidence with the dog more quickly.

The methods were again found to be of value, and provided detailed information of the behaviours shown during sessions. The high level of similarity between the findings from the two studies suggest that they are extremely robust and are not necessarily restricted to one culture or a particular group of individuals. In addition it suggests that the behaviours identified in the UK study can also cover other situations, giving a good indication of the types of behaviour that might be expected during activities that focus on a real dog (such as high levels of responding to the handler's or the psychologist's requests as well as communicative and physical initiations towards and about the dog). Both studies also suggest that individual differences are a factor when considering possible

reactions to dog assisted activities, but a general effect on social interactions is demonstrated. It can be concluded from both these studies that a real dog will elicit significantly different behaviours to an imitation dog of similar appearance.

OVERALL CONCLUSIONS FROM THE UK AND CZECH REPUBLIC STUDIES

The methods used provided valid descriptions of the interactive behaviours that occurred during animal-assisted activity sessions, in both countries. The use of videotapes was essential to achieve this, since repeated observations were required in order to code all behaviours seen. It would be highly recommended to use these methods in future studies to further replicate these findings, and develop ethograms that are appropriate in different situations that use AAA.

It can also be concluded that a real dog elicited different behaviour to an inanimate imitation dog, and that these differences in behaviour followed similar patterns in both studies. Data collection and coding was carried out independently by different researchers for the two studies, and this supports the conclusion that the findings were both robust and reliable.

The higher functioning of the UK children meant that more communicative interactions were seen, and there were some differences in the frequencies of specific behaviours shown by the UK and Czech Republic children. This illustrates the importance of considering the individual differences and needs of those involved, as well as the need to examine the full range of behaviours shown. However, both studies showed a similar effect of the real dog, compared to the imitation dog, encouraging the children to cooperate and interact about adult-guided activities.

It would be of value for future studies to compare animal-assisted activities with other interventions and to compare activities that focus on the dog to different degrees. Longitudinal information about such activity programmes would also make an important contribution to the AAA research field.

CHAPTER 4

STUDY 2
EVALUATION OF DOG-ASSISTED CLASSROOM ACTIVITIES FOR CHILDREN WITH SEVERE LEARNING DISABILITIES

STUDY 2

EVALUATION OF DOG-ASSISTED CLASSROOM ACTIVITIES FOR CHILDREN WITH SEVERE LEARNING DISABILITIES

INTRODUCTION

The previous study indicated that a real dog, when compared to an imitation dog, would encourage responsive and cooperative behaviour in children with severe learning disabilities and Down's syndrome. The aim of this study was to further investigate the generality of these findings by:

i) comparing a real dog with standard educational equipment and classroom tools

ii) working with groups of children rather than individuals, and

iii) comparing activities which utilised the dog to different degrees

It was considered unnecessary to continue working solely with children with severe learning disabilities that also suffer from Down's syndrome, as they did not (in the previous study) form as homogenous a group as had been hoped.

The first study compared a real dog with a toy imitation, suggesting that the active component behind a real dog's effectiveness with these children is its 'animatedness'. What it does not indicate is where the effectiveness of the real dog stands in relation to standard educational tools. Comparing a real dog with standard educational equipment would indicate whether introducing a dog into classroom activities was worthwhile for these children. Obviously, if there are no apparent benefits when compared to their standard activities, introducing a dog would be an unnecessary interference in their established programmes. If it was found that groups of children showed positive effects when a dog was included in activities this would be a good guideline for any teachers or professionals who were planning to incorporate a dog into their sessions with the children; establishing that it is worthwhile to bring a dog into group activities. Comparing different activities may also provide some indication of the types of activities that are best assisted by a dog, allowing staff to plan and implement the most suitable programme for the children they are working with.

METHOD

PARTICIPANTS AND EXPERIMENTERS

This study involved 16 pupils at a school for children with severe learning disabilities. Their chronological ages ranged from 6 years 4 months to 9 years 9 months (6 girls; 10 boys). Two adults (1 male; 1 female, both 25 years of age) were present to supervise the children and guide each session. The Pets as Therapy (PAT) dog was an entire female, grey Flat-coat Retriever/Old English Sheepdog cross-breed, 2 years of age, and was present in sessions for the experimental groups only. The dog was given a clean bill of health from a veterinarian shortly before the study began.

DESIGN

Before the start of the study parents were asked to give information concerning i) pets in the family, and ii) their child's access to animals outside the home (see Appendix 7). Before the study, sections of the BAS were administered to each child, and teachers completed a Portage questionnaire, before and after the study, concerning the children's social skills (see Appendices 8 and 9). These tests and checklist were used in order to assess the children's developmental abilities and skills, and to monitor changes that may have occurred over the course of the study.

On the basis of teachers' ratings of general abilities and results from sections of the British Ability Scales (BAS), and details of pet ownership the children were matched as far as possible and placed in one of four groups:
Group 1 - control group for children of low ability (LC)
Group 2 - experimental group for children of low ability (LE)
Group 3 - control group for children of higher ability (HC)
Group 4 - experimental group for children of higher ability (HE)
There were four children in each group.

SETTING AND APPARATUS

All sessions were carried out in a classroom that was familiar to the children, the activities were centred in the middle of this classroom. Sessions were recorded through a wide-angle surveillance camera and microphone connected to a video recorder.

PROCEDURE

Written consent was obtained from parents/guardians for all children before the study began (see Appendix 7). A week before the experimental sessions began, each group of children was introduced to the experimental situation for a familiarisation session where the children could explore and investigate the classroom being used. This also allowed the children to experience the novelty of being taken out of assembly and meeting the two adults involved in the study. The experimental groups could meet the dog, and a box of toys from the classroom was available for the control groups.

Children were brought into the experimental room by one of the adults (A1), in pairs or four at a time. The second adult (A2) would be waiting in the room with the dog and/or focal object(s) to be used in the activity. A2 stayed with and guided the activity throughout each session. A1 also helped to guide the activities and encourage the children but would supervise any children outside the 'group' who had chosen not to join in. The two adults would attempt to interact with all the children as a group, wherever possible. Guidelines for an activity were the same for experimental and control groups (dependent on ability) which differed only in focus of attention e.g. the dog versus the toy bear, or buttons and string versus biscuits and dog.

All groups had sessions in the same afternoon of each week and were seen in the following order:
i) LC, HC, HE, LE - for familiarisation, number skills activity, non-observed sessions 1 and 3
ii) LE, HE, HC, LC - for social activity, writing skills activity, non-observed session 2
The experimental groups were successive so that the dog was brought into the school only once in the afternoon. This resulted in the dog being involved in a ten-minute session, having a 5 minute break between groups, a ten-minute session and then leaving the school. This was considered to be the least stressful pattern for the dog.

Each group had weekly sessions for ten minutes, over a period of six months (2 school terms - excluding holidays). The children were encouraged to explore and talk about the situation. The sessions rotated through three different activities, matched as closely as possible between experimental and control groups (see Table 4.1):

i) a social activity - imitating each other (e.g. "Simon says...")

ii) a number skills activity - matching, sorting, and counting

iii) a writing skills activity - colouring in a pre-drawn outline or drawing their own picture (this activity is actually a *pre*-writing skills activity, but for the purposes of this report will be referred to as a 'writing skills' activity).

Table 4.1 Equipment/focal objects introduced to sessions:

Activity	Experimental Groups	Control Groups
Social	focus on adults, peers and dog PAT dog present throughout	focus on adults and peers No additional focal objects
Number skills	biscuits to feed to the dog PAT dog present throughout	buttons to put on a string No additional focal objects
Writing skills	dog outline or own picture PAT dog present throughout - used as a reference for colouring in dog outline	toy bear outline or own picture Toy bear present throughout - used as a reference for colouring in toy bear outline

Between the third and fourth block of sessions, three sessions (not analysed) were held that were more fun-orientated, to avoid over-repetition of the same activities. The activities in these sessions were:

1. experimental groups - grooming the dog
   control group - doing jigsaws

2. experimental groups - throwing a ball for the dog to catch and fetch
   control groups - playing catch with peers and adults

3. experimental groups - choice of grooming or playing catch/fetch
   control groups - choice of jigsaws or playing catch

BEHAVIOURAL MEASURES

All sessions were videotaped and behavioural data was extracted using the Observer (version 3.0) software (Noldus Information Technology, 1993). In order to do this ethograms were designed to measure frequencies of some behaviours and durations of others:

Frequency Data

Responses and Initiations to peers, adults, focal objects (including dog and inanimate objects relating to the activity) or other. These responses and initiations could concern either the focal objects or other and could be appropriate, inappropriate or indistinguishable.

Durations Data

Length of time in each session, that the children spent doing the activity, as well as the amount of time that the children were in the group area.

Figures 4.1, 4.2 and 4.3 illustrate the ethograms constructed. For more detailed descriptions of each behaviour see Appendix 10.

ANALYSIS OF DATA

Data was drawn from the full ten minutes of every session, with the exception of the number skills activity for the low ability groups, where only the first five minutes of every session was used. This was due to equipment failure during recording of one of the sessions.

The two main aspects of behavioural differences that were examined for the frequency data were:

i) the initial effects of the dog , and activity type on the children's behaviour, and

ii) the effects of the dog that were apparent over the course of the study, and how these may have changed over the six months, within each activity.

For the durations data each activity was considered separately and general patterns examined.

The dog's behaviour was also observed to monitor any stressful behaviour shown.

Figure 4.1 Dendrogram to Illustrate the Hierarchical Ethogram Used to Record Responsive Behaviours

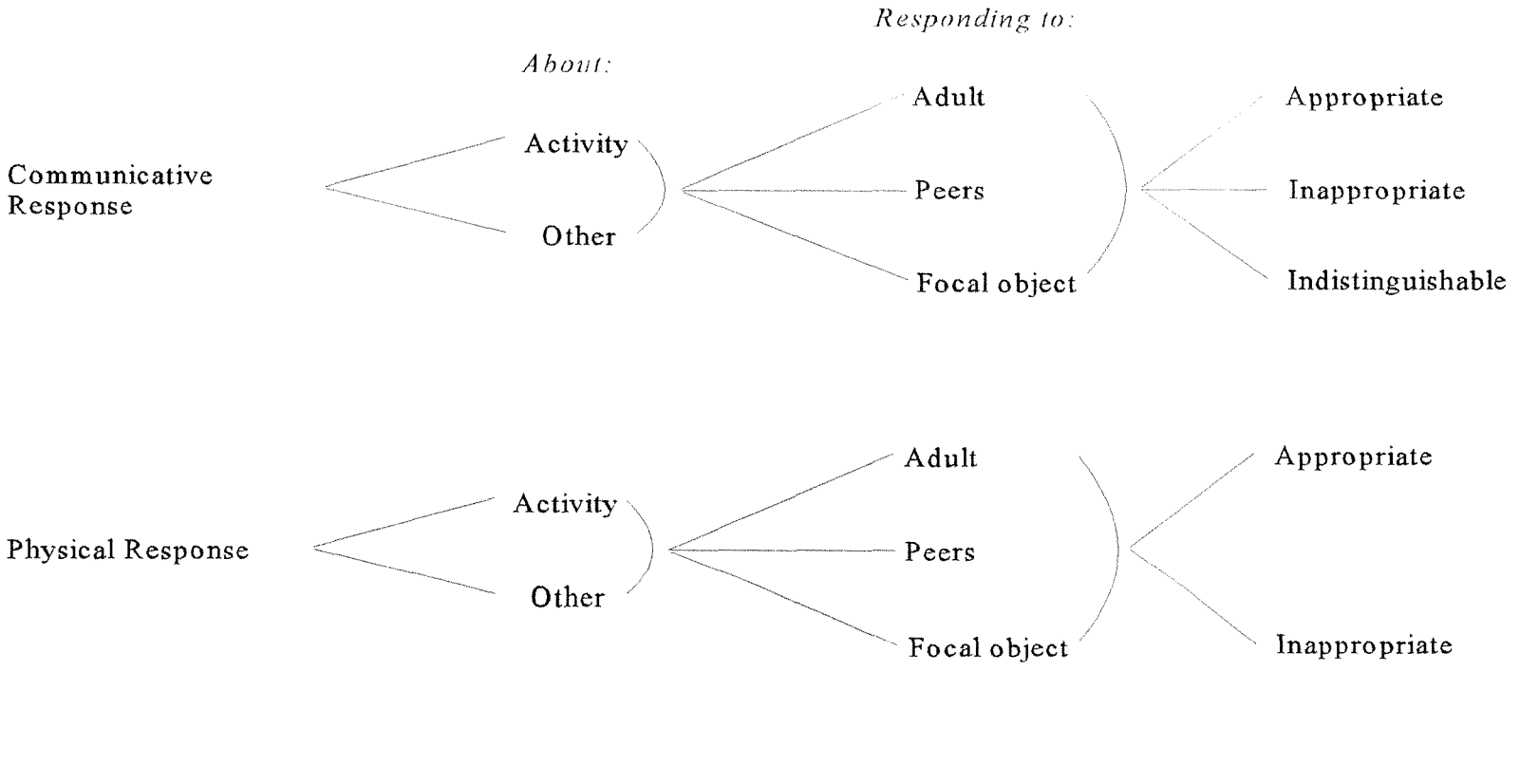


Figure 4.2 Dendrogram to Illustrate the Hierarchical Ethogram Used to Record Initiation Behaviours

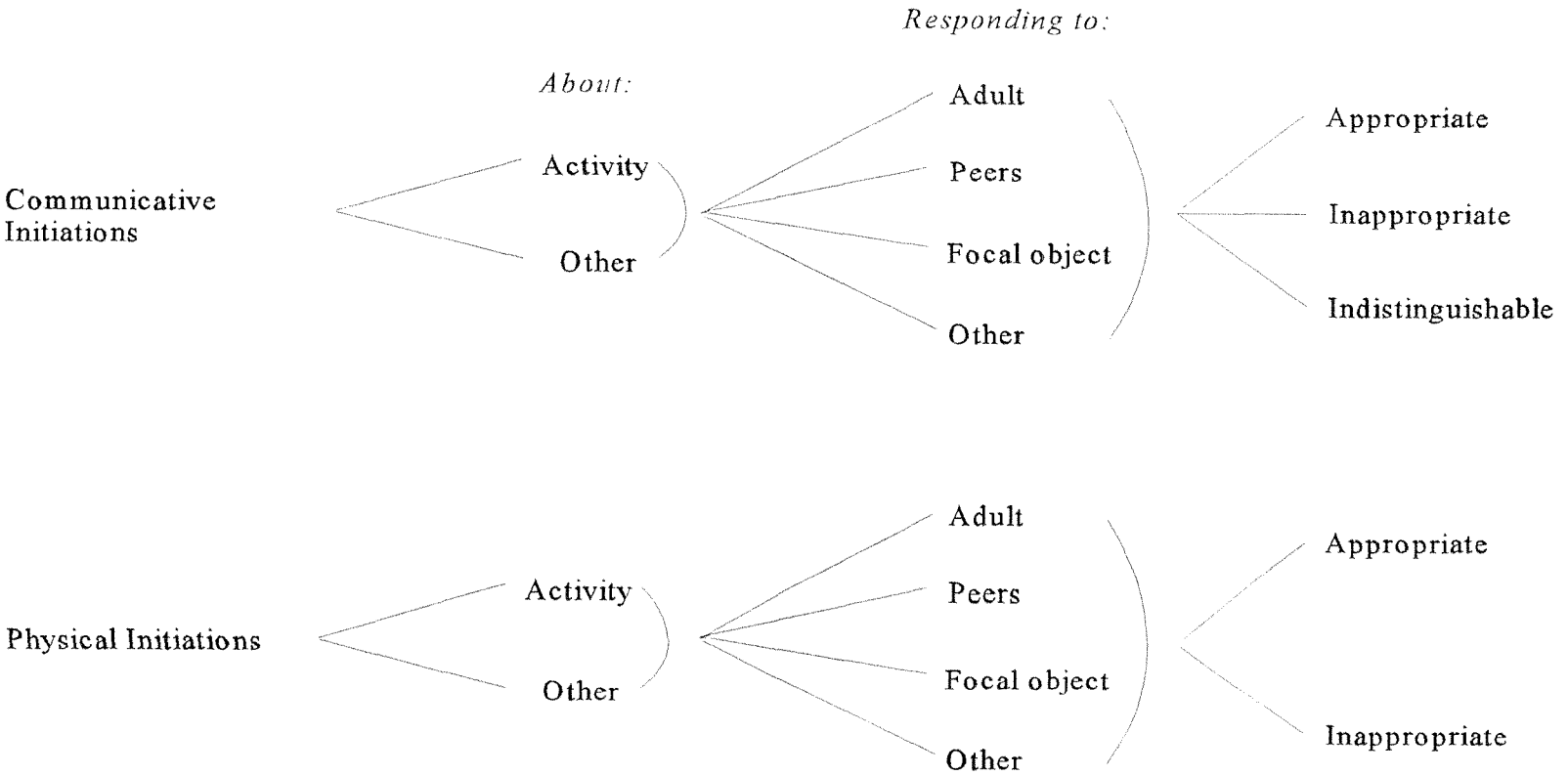
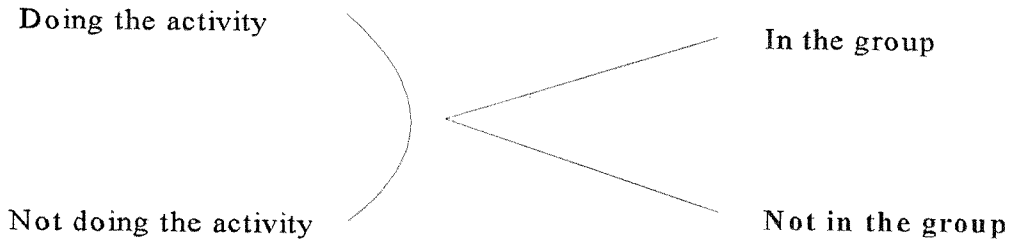


Figure 4.3 Dendrogram to Illustrate the Hierarchical Ethogram Used to Record Involvement in the Group (Durations; Number Skills and Writing Skills Activities Only)



RESULTS

For the purposes of analysis, two children were dropped from the study - one from each of the low ability groups. This was due to both children having shown no interactive behaviour during any of the sessions (i.e. they were neither in the group nor doing the activity).

Initial assessment of the data clearly demonstrated that the high and low ability groups were different in their behaviour. Therefore the data from these groups was analysed separately. As a result the term 'comparison of groups' refers to HC compared with HE **or** LC compared with LE.

FREQUENCY DATA

Examination of the frequency data showed that within-group distributions did not follow a normal distribution pattern, thereby precluding the use of analysis of variance (ANOVA) on the raw data. This would suggest that rank-transformed (RT) data should be considered. However, the RT ANOVA method described by Seaman et al (1994) is designed primarily to examine main effects. The authors stress that this method is not necessarily as robust when considering interactions, which are important in this design, to examine the differential effect of the dog on each of the three types of activity. Salter & Fawcett (1993) suggest the use of the aligned rank transformation (ART) test of interaction in factorial models. This method involves aligning the data before ranking and analysis of variance (ART ANOVA). The data from this study was considered to require both of these methods: RT ANOVA to investigate main effects and ART ANOVA to investigate interactions. Examples of ANOVA tables for main effects and interactions are given in Tables 4.2 - 4.4. For RT ANOVA the raw data was replaced with the overall rank, i.e. the smallest figure was given a rank of 1 and the largest a rank equal to the number of data points. For ART ANOVA each raw data point was replaced with <raw score + grand median - condition median - activity median>.

During the course of this project, some children were absent for one or more of the sessions. For ART ANOVA there must be no missing data points, therefore all missing values were estimated using the missing plot equations described in Steel and Torrie (1980). After aligned values had been calculated, the data rows which had previously contained missing data were reassigned as missing data, so as not to falsely increase the degrees of freedom used in the subsequent ANOVA.

Raw data values that have been ranked directly are referred to as scores, while raw data values that have been aligned and then ranked are referred to as aligned scores.

DURATIONS DATA

The durations data was examined by plotting means and variances. This illustrated that the variances were independent of the means after square root transformation, which was therefore carried out prior to ANOVA.

The following aspects of the study were examined:

Frequency data:

i) overall dog vs. control effects across initial sessions (i.e. week one of each activity)

ii) dog by activity interactions for initial sessions

iii) overall dog effects within each activity

iv) linear trends within the dog and control sessions for each activity

Durations data:

v) comparison of time spent doing/not doing the activity and time spent in/out of the group.

FREQUENCY DATA

All behaviours analysed occurred when the children were either in the 'group' (i.e. with their peers and at least one adult, where the activity was focused - although they may not be attending to the activity) or were out of the group but still focused on the activity.

Some of the behaviours that were recorded occurred only occasionally. Therefore these rare behaviours were placed into logical groups to create composite variables. Single variables were analysed separately only if the total occurrence of that behaviour (combining both experimental and control groups) was equal to or greater than twice the number of data rows (i.e. data rows is the number of children multiplied by the number of sessions minus absentees). This equation was applied in order to avoid analysis of infrequent variables which might result in Type I errors.

Variables were grouped together in the following way:
Initiations about the focal objects/activity; Initiations about other; Responses about the focal objects/activity; Responses about other. Single variables that were analysed separately were not included in these groupings (see Appendix 11).

i) **Overall dog effects for initial sessions**

(week 1 of each activity combined, i.e. the first three weeks of the study, see Table 4.2 for ANOVA model)

Low Ability and High Ability Groups

No significant dog effects were found, in either the high or low ability groups, at $p<0.05$, when the data from the first week of each activity was combined. Differences in the children's initial reactions to the dog's involvement in the different activities may have obscured any dog effects. Therefore analysis of dog*activity interactions was carried out.

Table 4.2 An example of the RT ANOVA carried out on all variables for dog effects in the initial sessions: RT ANOVA table for appropriate physical responses to the adult about the activity (shaded area highlights the F-ratio and p-value for dog effects).

Source	Sum of Squares	DF	Mean Square	F-ratio	P-value
activity	434.36	2	217.18	40.93	<0.001
dog	64.96	1	64.96	3.62	Not significant
subject nested in dog	107.62	6	17.94	3.38	<0.05
Residual	53.06	10	5.31		

ii) **Dog by activity interactions for initial sessions**

(week 1 of each activity combined, i.e. the first three weeks of the study, see Table 4.3 for ANOVA model)

Low Ability Groups

No significant dog*activity interactions were found at $p<0.05$.

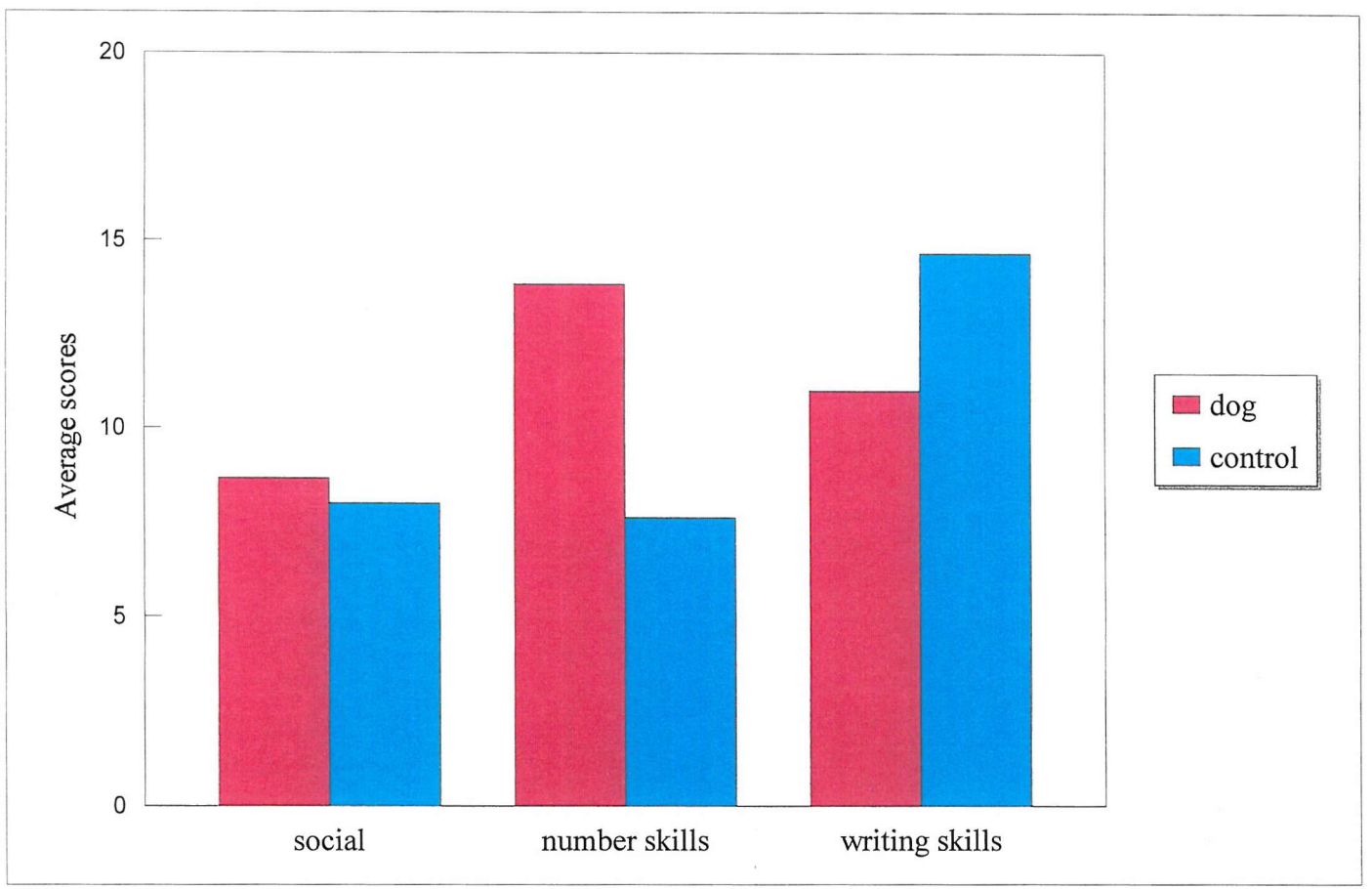
High Ability Groups

For the number skills activity, the children in the dog group were more likely to initiate appropriate communicative interactions with the adult about the focal activity ($p<0.05$). In the writing skills activity the opposite was found (fewer initiations were made in the dog group) and in the social activity there was little difference (see Figure 4.4). Initiations concerning things **other** than the focal activity ($p<0.05$) were seen to be higher in the dog group during the writing skills activity, while the opposite effect (with initiations about other being lower in dog groups) was seen in the number skills and social activities (see Figure 4.5). These findings strongly suggest that different activities are differentially affected by a dog's involvement. In the activity where the dog was highly involved and an integral part of the sessions (number skills), the children felt more able to initiate 'conversations' about the activity. Whereas when the dog was little involved (writing skills) the opposite effect was seen **and** more initiations about other things were made. The lack of dog involvement during the writing skills activity may have confused the children; they may have perceived the dog as out of place when not the main part of the activity, resulting in the children making fewer initiations to the adult about the focal activity and more about other things. Overall this data suggests that the dog would help focus the children on the specified activity if the dog was an important part of the sessions, leading to the conclusion that the degree or type of dog involvement in activities does affect the children's initial reactions to the dog's presence. High dog involvement appears to focus the children on the activity in question.

Table 4.3 An example of the ART ANOVA carried out on all variables for dog*activity interactions in the initial sessions: ART ANOVA table for appropriate communicative responses to the adult about the activity (shaded area highlights the F-ratio and p-value for dog*activity effects). Main effects are disregarded in this analysis, since they are distorted by the ART procedure.

Source	Sum of Squares	DF	Mean Square	F-ratio	P-value
activity	32.30	2	16.15	.96	Not significant
dog	1.23	1	1.23	.07	Not significant
subject nested in dog	543.29	6	90.55	5.35	<0.05
activity*dog	150.63	2	75.31	4.45	<0.1
Residual	135.30	8	16.91		

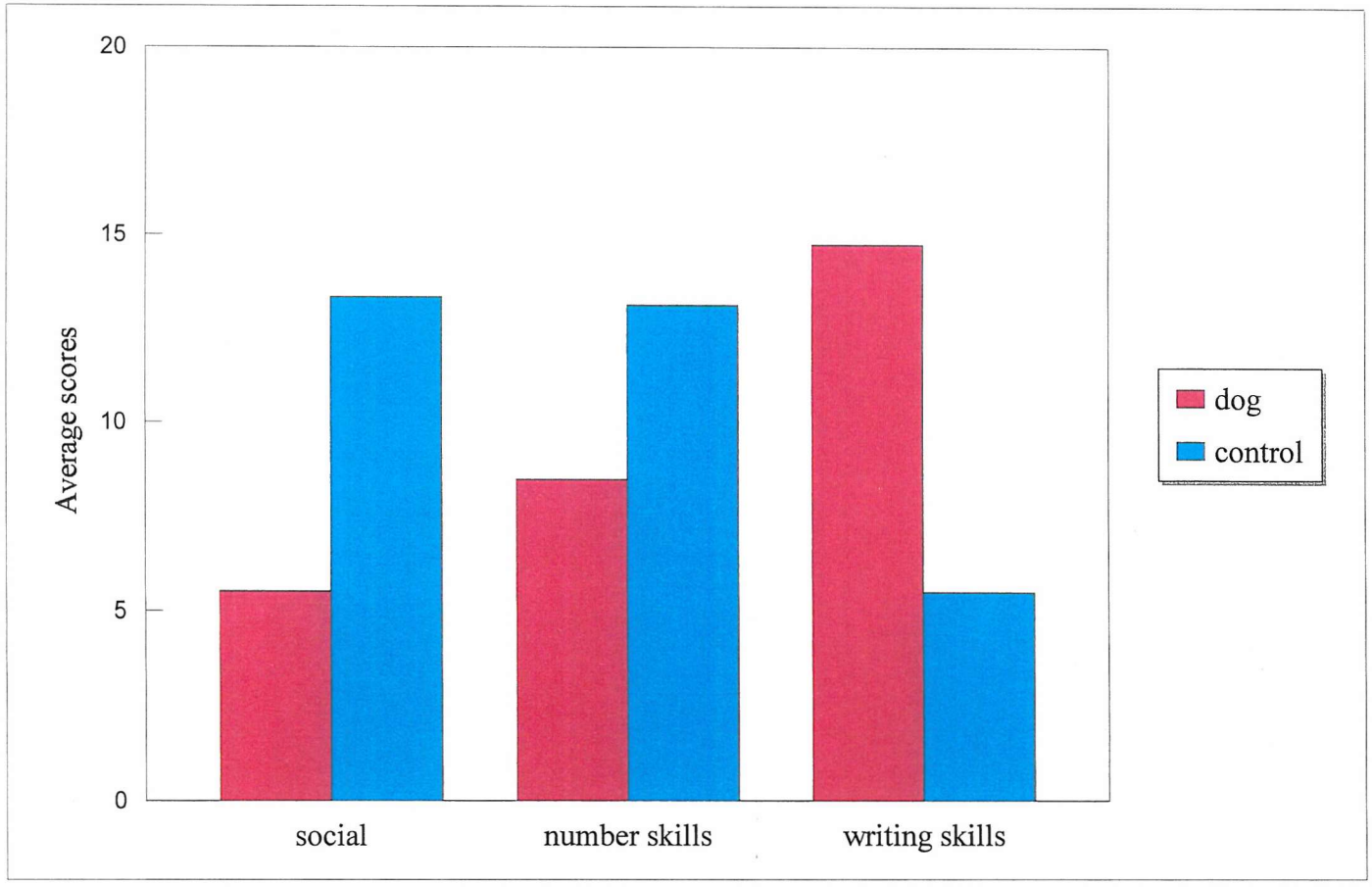
Figure 4.4 Appropriate Communicative Initiations to the Adult About the Activity - High Ability Children
Significance values obtained from aligned scores; for the purposes of interpretation, values for scores (i.e. ranked raw data) are shown



Dog*Activity Interaction:

$F(1,6) = 6.80$; $p<0.05$

Figure 4.5 Initiations About Other - High Ability Children
Significance values obtained from aligned scores; for the purposes of interpretation, values for scores (i.e. ranked raw data) are shown



Dog*Activity Interaction:

$F(1,6) = 7.26$; $p<0.05$

iii) **Overall dog effects within each activity**

(see Table 4.4 for ANOVA model)

Social Activity

Low Ability and High Ability Groups

In the social activity ("Simon says") it was found that the children of both high ability ($F_{(1,7)}$ = 129.342; $p<0.005$) and low ability ($F_{(1,5)}$ = 55.971; $p<0.005$) were more likely to physically approach the dog referring appropriately to the activity (e.g. showing the dog how to sit, when the activity involved everyone sitting on command). However, it is important to note that there was really no comparable behaviour that could have been shown in the control groups (for this particular activity only), because the dog was an addition rather than a substitute. As a result this comparison is not strictly valid, although no other behaviours were seen to be higher in the control groups which may have been the same type of behaviour directed elsewhere (e.g. towards their peers or the adults). However, this result does suggest that the dog acted as a consistent focus for the children's attention during this activity. The children physically approached the dog in order to include her in the activity (the children were neither discouraged nor encouraged to do this). Perhaps having the dog to focus on as part of the task in hand encouraged the children to concentrate more on what they were doing (the fact that these approaches were appropriate demonstrates that the children were showing the dog what to do rather than what **not** to do).

Numbers Activity

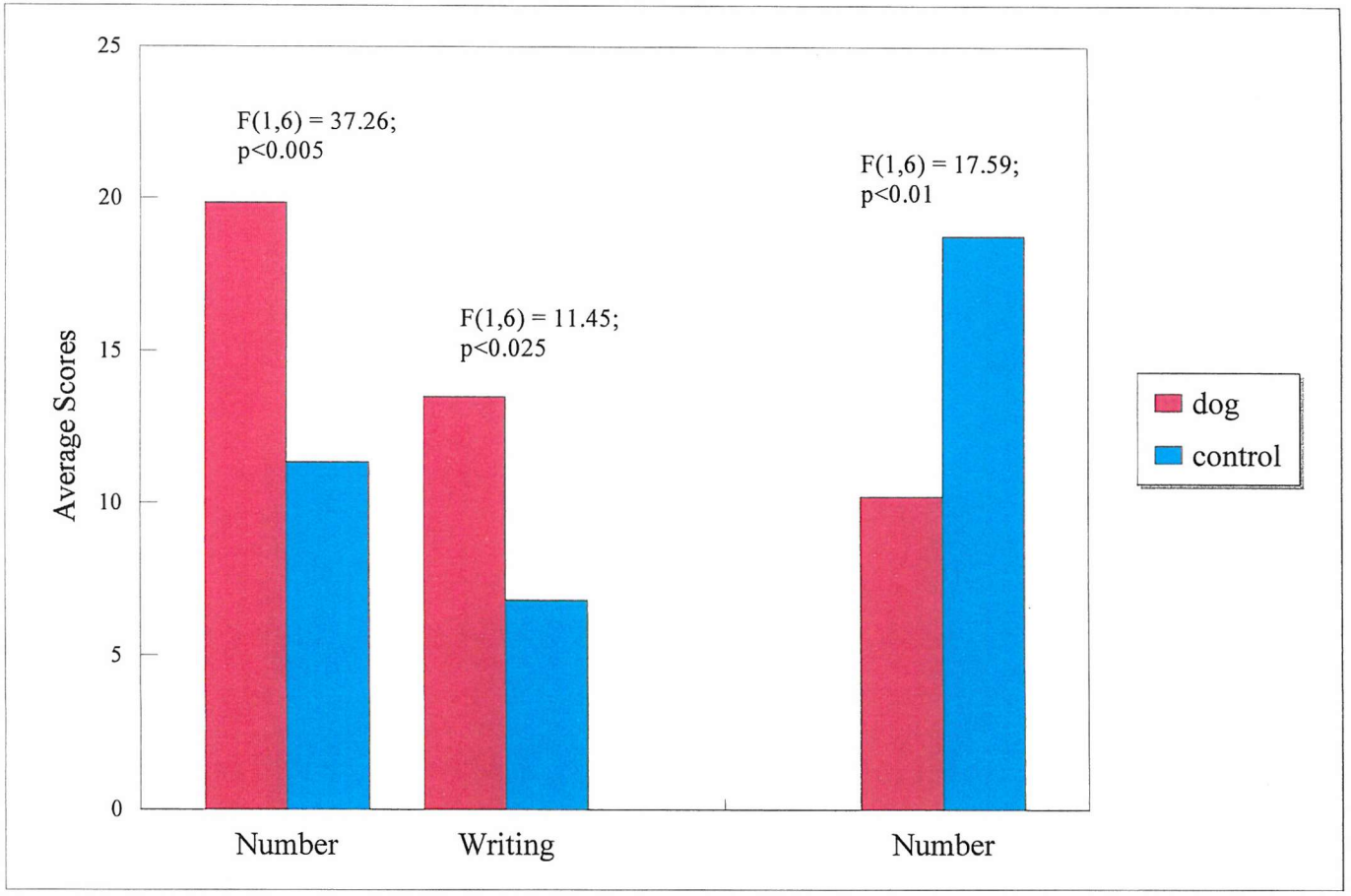
Low Ability Groups

No significant dog effects were found at $p<0.05$.

High Ability Groups

Appropriate physical responses ($p<0.005$) concerning the focal activity and directed towards an adult were higher in the dog group (see Figure 4.6). So in this activity the dog appears to have encouraged the children to do as they were asked, supporting the findings of the first study that the children were more cooperative when a (real) dog was present. However, it was found that in the

Figure 4.6 Dog Effects Found Within Number and Writing Skills Activities - High Ability Children



NOTE:
The average number of questions and requests made by the adults was only slightly different between groups:

Number skills activity, average no. of requests: HC = 24; HE = 21

Writing skills actiivty, average no. of requests: HC = 20; HE = 18

The frequency of requests reflects the nature of the group dynamics for each group during different activities.

control group there was a higher rate of appropriate physical initiations ($p<0.01$) concerning the focal activity and directed towards an adult, so the dog did not facilitate the children's own social initiations in terms of showing the adult what they were doing or wanting to do concerning the activity; see Figure 4.6. It is not clear whether these findings are directly related to one another; but it may be that in the dog group it was easier for the adults to direct and control the sessions (hence more responses), while in the control group the children were more excitable and demanding, on their own terms (hence more initiations).

Writing Skills Activity

Low Ability Groups

No significant dog effects were found at $p<0.05$.

High Ability Groups

Appropriate physical responses to an adult concerning the activity were significantly more frequent in the dog group ($p<0.025$; see Figure 4.6). Despite the dog's involvement being minimal in this activity, the children were still more likely to do as they were asked. This result is not quite as strong as that found in the number skills activity, but it does indicate again that the children in the dog group were more cooperative.

Table 4.4 An example of the RT ANOVA carried out on all variables for dog effects within each type of activity: RT ANOVA table for appropriate physical responses to the adult about the activity during the number skills activity (shaded area highlights the F-ratio and p-value for dog effects).

Source	Sum of Squares	DF	Mean Square	F-ratio	P-value
week	1202.86	3	400.95	35.75	<0.001
dog	529.52	1	529.52	37.26	<0.005
subject nested in dog	85.26	6	14.21	1.27	Not significant
Residual	201.87	18			

iv) **Longitudinal dog effects within each activity**

Linear regression analysis was carried out on the behaviours that had shown a significant dog effect, in order to investigate whether these altered consistently over the period of the study.

Rank Transformed data was used (transformations that are suitable for analysis of variance are also considered to fit the requirements of regression analysis).

Social Activity

Low and High Ability Groups

No significant linear effects were found at $p<0.05$.

Number Skills Activity

High Ability Groups

Appropriate physical responses to the adult concerning the focal activity were found to have a significant linear effect in both the control ($T = 3.596$, $p<0.005$) and the dog ($T = 6.727$, $p<0.001$) groups. This effect indicates an increase in responses as the sessions progressed, and although this was slightly stronger in the dog group, both control and dog groups show a change in the same direction. This suggests that as the study progressed the children settled into a more cooperative pattern (which has already been found to be significantly greater in the dog group) but this increase in cooperation was also more obvious in the dog group.

Appropriate physical initiations to the adult concerning the focal activity were found to have a significant linear effect only in the control group ($T = 3.044$, $p<0.01$), showing an increase in this type of behaviour over the course of the study. The dog group showed a trend in the same direction, but this was not significant. So, again this might just be indicative of the children's increasing confidence over the period of the study.

Writing Skills Activity

High Ability Groups

No significant trends were found at $p<0.05$.

DURATIONS DATA

Durations data was only recorded for the number skills and writing skills activities. The social activity involved using the whole classroom and being motionless at certain times, so it was not always possible to differentiate between doing and not doing the activity (for example the children might have been instructed to hide and any child that was already hiding would be unintentionally doing as instructed and may or may not subsequently join in the activity). In addition, during the social skills activity the group area was not defined, the whole classroom was used for this activity whereas the other activities were restricted to a central area of the classroom, as a result the distinction between 'in the group' and 'not in the group' could not always be made.

The data was transformed using square root transformation, and analysis of variance was carried out in order to investigate any dog effects. As the data was collected from sessions that had a defined time limit, one duration variable had to be omitted from the analysis (as it comprised the remainder of the total time available in a session, after the other three variables had been accounted for). The children were all encouraged by the adults to be in the group and doing the activity, and as a result this was considered to be the least valuable of the four variables, the others being: doing the activity while not in the group; not doing the activity in the group; not doing the activity while not in the group.

None of these duration measurements were statistically significant for either group, possibly due to the fact that the children were strongly encouraged to join the group and do the activity (a child had to be quite determined in order **not** to do the activity or to leave the group). However, some trends were apparent.

Number Skills Activity

Low Ability Groups

On average, the children in the control group spent more time not doing the activity while not in the group, and the children in the dog group were spending more time in the group not doing the activity (see Figure 4.7). Perhaps the dog was distracting the children away from the specified activity, as they may have wanted to investigate the dog rather than concentrate on the task in hand. This does not contradict the lack of results from the frequency data, as it may be that these children would always find something that would distract them from the required activity (hence the lack of inappropriate behaviours found in the frequency data). This trend does suggest that the dog enhanced group cohesion and would probably be more useful in strictly social based sessions.

High Ability Groups

On average, the children in the control group spent slightly more time not doing the activity while in the group. So these higher ability children do not show the social cohesion tendencies with the dog that the lower ability children do, but they do seem to spend more time more time doing the activity in the group (inferred from the 3 variables analysed). This supports the findings of the frequency data that the children were more likely to respond to questions about the focal activity and initiate communication when the dog was a highly involved part of the group (see Figure 4.8).

Writing Skills Activity

Low Ability Groups

The same trends were apparent in the writing skills activity as the number skills activity: the children in the control group spent more time not doing the activity while not in the group, with the children in the dog group spending more time in the group not doing the activity. In addition the children in the control group also spent more time doing the activity whilst out of the group area. These findings support those of the number skills activity but also lend more support to the idea that the dog enhanced group cohesion (see Figure 4.9).

Figure 4.7 Involvement in the Number Skills Activity (Durations) - Low Ability Children
Back-transformed data is presented in seconds; all sessions lasted for 600 seconds

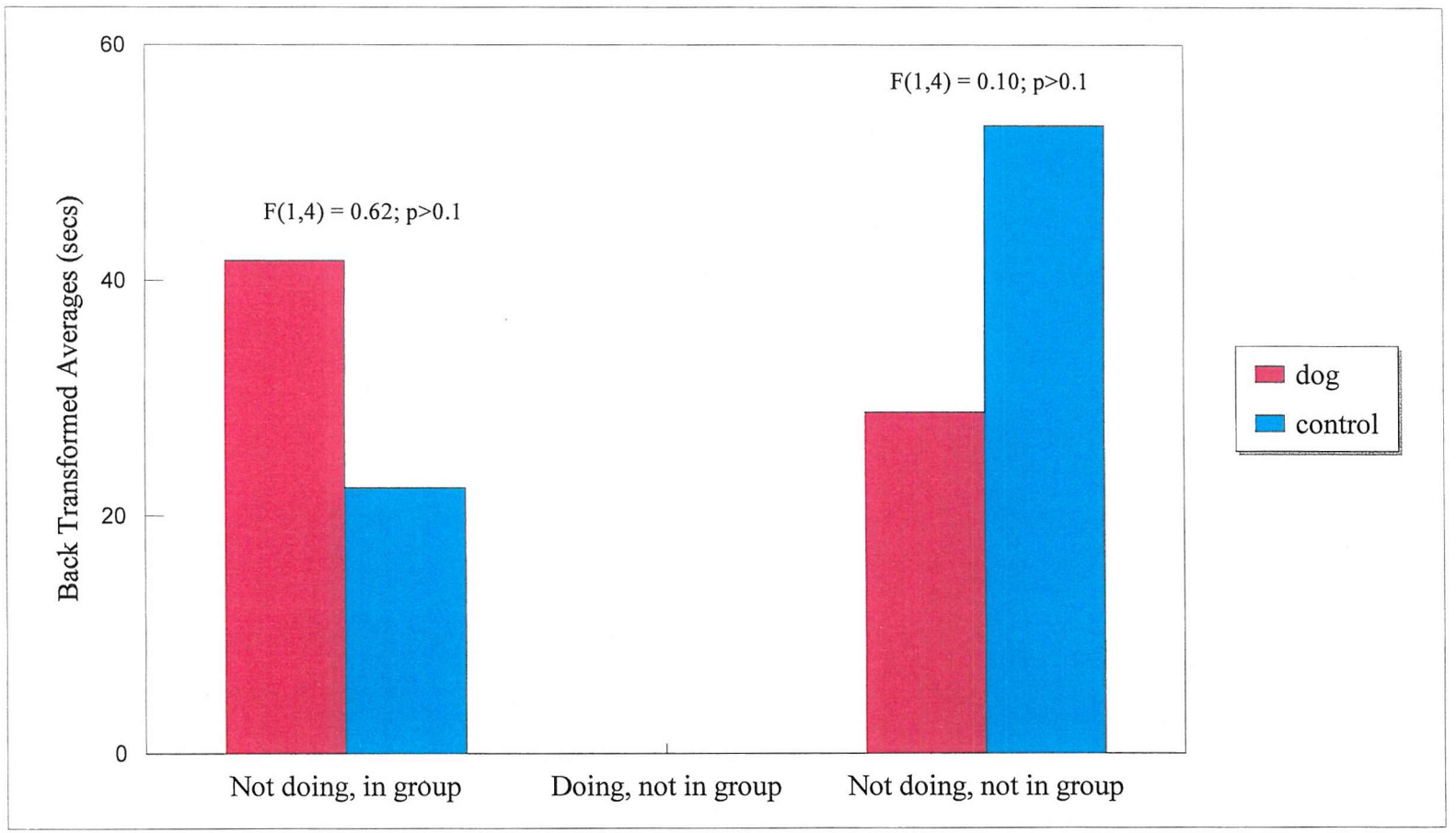


Figure 4.8 Involvement in the Number Skills Activity (Durations) - High Ability Children
Back-transformed data is presented in second; all sessions lasted for 600 seconds

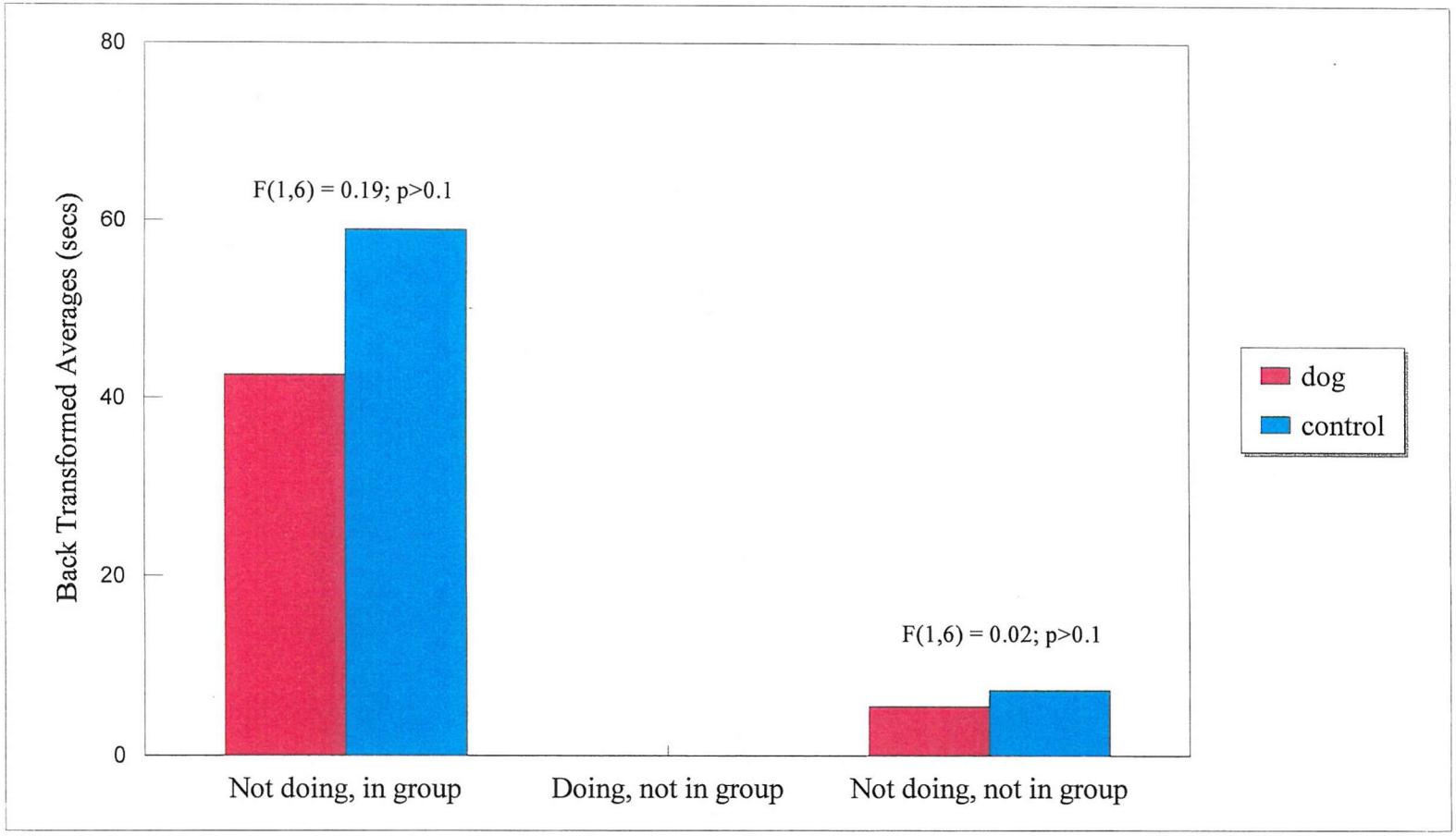
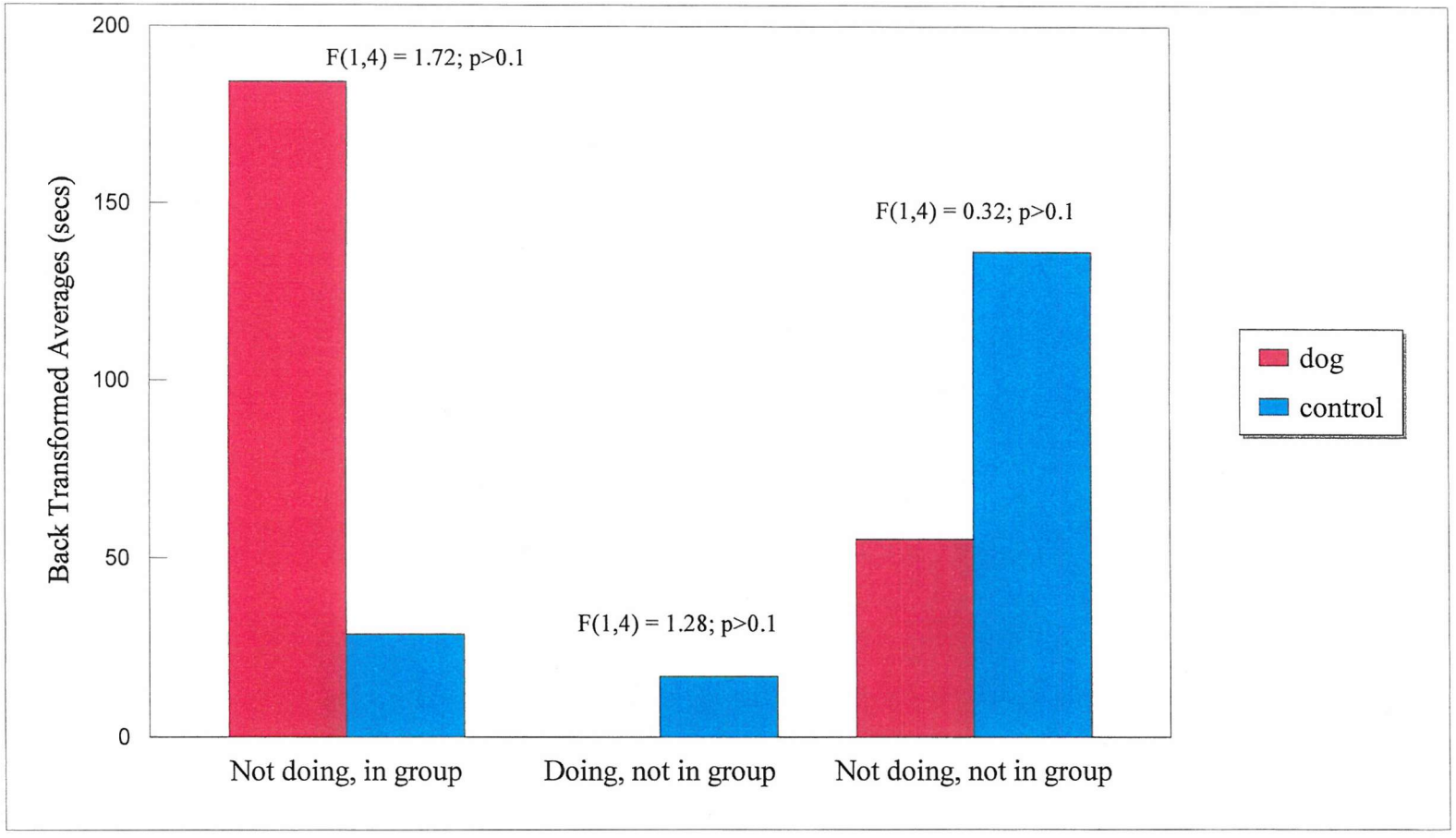


Figure 4.9 Involvement in the Writing Skills Activity (Durations) - Low Ability Children
Back-transformed data is presented in seconds; all sessions lasted for 600 seconds



High Ability Groups

No trends were apparent.

INFORMATION OBTAINED BEFORE AND AFTER THE STUDY

Due to the small number of subjects and the apparent individual differences, analysis of the effects of pets at home and contact with animals was not carried out.

The Portage Checklist showed improvements in social skills for fifteen out of the sixteen children involved in the study. The greatest increase was shown by a child in the low ability control group. It was concluded that the dog sessions did not produce any long-term effects on the children's social skills.

DOG BEHAVIOUR

The dog did not show any behavioural signs of stress.

DISCUSSION

Certain methodological problems were encountered during the course of this study. Absenteeism could not be avoided but it may have disrupted group dynamics and there was no possibility of 'catching up' with sessions as there was no guarantee of all children being available at an appropriate time. In addition there were too few children (or groups) for satisfactory analysis of the observed behaviours, particularly for the lower ability children where two children were dropped from the analysis. The design of this study introduced several problems in the analysis and interpretation of the results obtained. The fact that the individual differences shown by these children were so great weakened the positive aspects of the group design. Although the results obtained would therefore be quite robust and give a likely indication of the effects of dog involvement in activities for SLD children, a great deal of information may have been lost concerning the children's idiosyncratic characteristics and reactions to the dog's involvement in activities. However, the nature of the group activities may also have influenced the children's responses to the dog, for example time spent

waiting their turn, peer competition and distraction. For this type of population it would be recommended that, in future, repeated measures or single-case designs be used.

Low Ability Groups

The low ability groups showed no significant differences in behaviours either for the initial weeks of the activities or for all the sessions within an activity except for the social activity where they physically approached the dog. As mentioned before this behaviour could not be exhibited for the same activity in the control groups. The fact that no additional behaviours were seen in the control group suggest that the dog did contribute to the sessions, and that the children were able to focus on the dog. The lack of significant results from the frequency data and the trends shown by the durations suggest that the lower ability children within the SLD category are not very likely to benefit from group activities with a dog. No evidence of differences in behaviour due to the dog were apparent. However, all the activities in this study were aimed at producing interactions concerning tasks and skills (e.g. the number skills focused on counting skills, not feeding) that were not specifically dog-related. The indications of group cohesion being encouraged by the dog, and the finding that the children would approach the dog, apparently guiding her during the social activity, suggest that other activities may have been more suitable, for example, as during the previous study, playing games such as fetch, grooming the dog and walking her on a lead around the room. If there had been more regular fun-oriented sessions it may have been possible to ascertain whether these type of dog-related acitivities could have been of benefit to the lower ability children.

High Ability Groups

The children in the high ability groups showed much stronger effects from the dog's involvement in the activities. The same difference was found in the social activity as for the low ability group, where the children were more likely to physically approach the dog to include it in the activity. Again, no comparable behaviour could be shown by the control group, and all that this really indicates is that the children wanted to include the dog in the acitivity, and that the dog can be considered to have contributed to the sessions in some way. No other behaviours were found to be significantly different in the social activity, which is rather unexpected since much of the literature relating to children with special needs suggests that a visiting pet will increase social interaction (e.g. Redefer and Goodman, 1989; Condoret, 1983; Gonski, 1985), and this was the activity which most encouraged social interaction. However, this may have been due to the structured nature of this

activity, the emphasis on adult directions and the duration of a session being limited to ten minutes only.

For the number skills and writing skills activities the children were more likely to give appropriate physical responses to questions and requests from the adults, similar to Nathanson's (1989) study which found the children with learning disabilities gave more (but verbal) responses during dolphin-assisted sessions. Peacock's claim (in George, 1988) is also supported, that children are more likely to be cooperative in sessions with an animal. However, this effect was stronger in the number skills activity, which is thought to be due to the level of dog involvement i.e. high dog involvement increases the likelihood of appropriate behaviours. The finding that the children in the control group, during the number skills activity, were more likely to show the adults what they were doing or wanting to do concerning the activity is thought to be a result of the dynamics of the group being altered by the dog's presence: the children in the dog group had few opportunities to show the adult what they were doing as the adult was more successful in directing the children's physical actions.

So, over the long term few differences were seen between the groups aside from increased cooperation for the dog group during the number and writing skills activities, but little difference was seen between activities. However, analysis of the initial weeks, in the high ability groups, did suggest that the children show some different reactions to the dog's involvement in the different activities. This indicates that high dog involvement in the activities is favourable, allowing the children to focus on the activity, particularly when the dog is relatively new to the children. This is marginally supported in the long-term by the slightly stronger degree of cooperation in the numbers skills activity compared to the writing skills activity.

The main findings of this study were that low ability children were not helped by a dog's involvement in these types of activities, while high ability children did show more positive reactions: with higher levels of cooperation in the educational activities (number and writing skills) and a lack of significant results in a more 'fun' social activity (where little help seems to be needed in encouraging the children to join in). For all the activities, the lack of differences in social interaction between the groups is particularly interesting in that it contradicts the findings reported in much of the literature. However, this study does support the findings of the previous study involving children with Down's syndrome, which also found no significant increases in social interactions during sessions with a real dog. None of the literature, though, specifically relates to children with learning disabilities and it may be that the lack of differences in social interaction are due to the population

under study, who do not specifically have communication or social behaviour difficulties. Another explanation for this lack of difference in social interaction may be due to the type of activities that were carried out, with the adults guiding the sessions and encouraging the children to focus on performing a task.

The activities in this study are quite limited in what they investigate and the opportunities that they offer the children in terms of spontaneous behaviour. However, the findings of this study suggest that a highly interactive activity (the social activity) that is emphasised by its fun component, with the adults being less restrictive and directive than during more educational actitivities, does not require assistance in the form of a dog. Educational activities, which are probably less appealing to and more stressful for the children, can be enhanced by a dog's involvement. It is these types of activities, where children are reticent in approaching the tasks, where a dog may be most appreciated by staff and children alike. Therefore, it would be most beneficial to direct future research towards determining the types of activities in which a dog can be an improving factor , the ways in which a dog can be utilised, and the tasks and activities where individual children need the most help.

CONCLUSION

For educational activities a high degree of dog involvement is likely to result in initial and persistent positive behavioural effects for children with severe learning disabilities, of reasonably high abilities. For children of lower abilities more dog-specific activities may be required to elicit an increase in appropriate behaviours.

CHAPTER 5

STUDY 3
THE EFFECTS OF A VISITING DOG ON THE MOTIVATION TO PERFORM PHYSICAL EXERCISES, FOR YOUNG CHILDREN WITH CEREBRAL PALSY

STUDY 3

THE EFFECTS OF A VISITING DOG ON THE MOTIVATION TO PERFORM PHYSICAL EXERCISES, FOR YOUNG CHILDREN WITH CEREBRAL PALSY

INTRODUCTION

The first study indicated that a visiting PAT dog affects the interactive behaviour of Down's syndrome children with severe learning disabilities (SLD), compared to an imitation toy dog, when the dog was an integral part of all sessions with all activities revolving around the dog. The second study included activities where the dog was involved to varying degrees. Children were seen in groups rather than individually and were of more diverse abilities (within the SLD category). The results of this second study suggested that working with children individually is more controllable and probably of more advantage to the children. Older children, or those of higher abilities were found to be more likely to benefit from activities involving a dog. The degree of dog involvement was also found to affect the behaviour of the children, such that the greater the dog's involvement in a task the more cooperative the children were.

Both of these first two studies looked at the effects of the dog when it was part of an activity (to varying degrees), and where the experimenters/therapists required cooperative and interactive behaviour concerning that activity. The dog may have acted as an internal reward for the children, if they perceived it as such, but the experimenters did not suggest that the dog was a reward or additional motivator for the children. For example giving the dog a biscuit for doing as they were asked **was** the activity and not an explicit reward. The children were **not** asked to do things unrelated to the dog and then given the opportunity to play with the dog as a reward. The purpose of this third study is to investigate the effects that a dog's presence may have on activities that are not focused on the dog, but when the dog is used as a 'motivator' and potential reward. Children with physical disabilities, but without learning disabilities were chosen, as it was seen in previous studies that children of higher intellectual abilities (within SLD) were more likely to gain from dog involvement, and this would allow the study to focus on motivation and performance , in a population that has few or no learning problems (the oldest child in this study was thought to suffer from learning disabilities but this had not been formally assessed). The hypothesis of this study was

that a dog's involvement in an obstacle course would increase children's motivation and performance on individual tasks.

METHOD

PARTICIPANTS AND EXPERIMENTERS

This study involved 5 children at a pre-school centre for Cerebral Palsy (CP) sufferers (see Chapter 2 for information concerning CP; see Appendix 12 for nature of individual's CP and information about each individual). The centre concentrates on teaching motor skills through conductive education. The ages of the children ranged from 2 years 3 months to 4 years 10 months (4 boys; 1 girl). David was the most severely physically disabled child in the group; he had great difficulty in controlling any body movements and attempted to speak only a few words (which were very difficult for others to understand). David understood instructions and would attempt to follow them, and he was also friendly and happy to be in close contact with other people. Andrew and Ryan were both communicative young boys; they could only use their legs if assisted and needed encouragement to perform tasks to the best of their ability. Imogen was the only girl in the group and was also the most physically able, with only one side of her body affected. She was also communicative, friendly and keen to cooperate and learn new tasks. Nathan, the oldest child in the group, was considered, by the staff of the centre, to have learning disabilities, although this had not been formally assessed. Nathan had a lack of muscle control over most physical movements but could walk unassisted, although he needed encouragement to balance his body and learn to move 'normally'. Three therapists ('conductors') (all female, 25, 22 and 20 years of age) who usually worked with the children were involved in the study. The Pets as Therapy (PAT) dog was a 4 year old agility-trained, entire, Border Collie bitch, given a clean bill of health by a veterinary surgeon shortly before the study. The dog owner was present at all sessions and the dog was present at one of the two sessions every week. Verbal permission for each child to be included in the study was gained from parents, who were also asked for information about pets at home and other contact the children may have had with dogs (see Appendix 12).

DESIGN

This study followed a repeated measures design with each child attending sessions with and without the dog. This method was chosen in order to demonstrate how the individual children reacted differently to the two situations when exposed to them regularly. Although general improvement in the skills was expected over the ten week study, it was not thought that this would be largely affected by the dog (i.e. repeatedly doing these exercises is the main factor influencing long-term physical gains). The purpose of the dog was to affect behaviour and motivation only **during** the sessions in which it was involved, therefore a repeated measures design was considered appropriate.

SETTING AND APPARATUS

Sessions with and without the dog were carried out in the activities room at the centre. This room was familiar to all the children who had been attending the centre for several months or more. A small camcorder, operated by the experimenter (a 26 year old female) was used to record all sessions on videotape.

PROCEDURE

In the two sessions each week, the children were required to follow an obstacle course of three tasks:

steps up and down
pulling themselves along a **bench**
stepping through a floor **ladder**

One session each week involved the PAT dog and one did not. The day of the week that the dog visited was alternated every week to control for any 'day' order effect (for example, the children might have been more tired at the end of the week). The order of the tasks on the obstacle course was alternated every week, serving to control for order effects within each session (since again, the children might have suffered from fatigue or boredom after they had done one or more tasks on the obstacle course). The steps and ladder tasks exercised the lower limbs, while the bench task exercised the upper limbs. Since two consecutive lower limb tasks would increase the effects of tiredness it was decided that the upper limb task should always separate the other two. Thus the order of the tasks was either steps-bench-ladder or ladder-bench-steps. The children attempted the

obstacle course in the same order every session i.e. subject 1 went first each week, subject 2 second etc..

The children were encouraged in **all** sessions (with and without the dog) to perform the tasks to the best of their ability; this encouragement included guidance, praise and reminders of play-time at the end of the obstacle course.

Sessions with the PAT dog:

In an attempt to increase the children's motivation and as a prompt, the dog completed the task first, while the child watched, and then the dog waited for the child at the end. The therapists reminded the children that the dog was waiting for them and that they could do the task as well as the dog; the children were told throughout that if they did the tasks properly they could give the dog a pat when they reached her, play with her and/or give her a biscuit at the end. As this study involved a different population of children (difficulties pertaining to Cerebral Palsy rather than Severe Learning Disabilities) it was considered appropriate to include one task (the bench) in which the dog was an active part of the task, allowing for a comparison between tasks that did and did not involve the dog. For the 'bench' task the dog would go first ('to demonstrate') and then come back to the beginning and the child and dog would do the task at the same time, using two benches next to one another - i.e. the therapist would pretend that the child and dog were 'having a race' to see who would finish first.

Sessions without the PAT dog:

When the dog was not present the children would be shown a toy which would be placed at the end of the task, or they were reminded that at the end of the course they could play with the toys or do another 'fun' activity that had been chosen for that day, e.g. make fruit salad, share out a large chocolate egg, collect stickers.

Behaviour modification is not a technique used by this pre-school centre, where the staff are teaching the children sets of skills. Therefore no single behaviours could be reinforced using behaviour modification. As a result the dog cannot be considered as a positive reinforcer (the dog is not presented as a reward immediately after a desired behaviour), but is referred to in general terms of acting as a potential motivator and a focus of activities after the obstacle course has been successfully completed. This is the pre-school's standard technique, using toys and play activities during and after training sessions.

BEHAVIOURAL MEASURES

All sessions were recorded on videotape and behavioural data extracted using ethograms and The Observer version 3.0 (Noldus Information Technology, 1993).

One of the main objectives for the therapists whilst taking the children through these tasks is to direct the children's gaze and attention to the task and to encourage suitable posture. So, on the steps and the ladder the children would be looking just ahead of their feet. Placing a reward at the end of these tasks means that if the children look at the reward their gaze is in approximately the right direction and their head in the correct position for good posture on those tasks. On the bench, it is desirable for the children to lift their heads to look at either the task or reward. So, measures were taken of what the children were looking at (the task/reward or other). In addition, measures relating to the children's performance were used. Some of these measures looked at the children's behaviours: verbal and non-verbal communication from the child (concerning the task, the reward or other); but concentrated largely on the therapists's input on each task (the more motivated the children the less input would be required from the staff), verbalisations from the therapist: responses to the child's communication, instructions about the task, negative comments about the child's performance on the task, praise, general encouragement and encouragement with the reward as an incentive; total number of steps taken (for the bench - total number of pulls), number of steps that were: instructed verbally, corrected verbally, started physically, corrected physically or fully manipulated by the therapist. The total time taken to complete each task was also recorded (see Appendix 13 for definitions). A note was also kept of children losing their balance, falling over and being steadied by the therapist.

By the end of the study it was apparent that the therapists felt that the dog was influential in the children's behaviour outside of the time spent on the tasks. In order to investigate this it was decided that the videotapes could be reanalysed and the therapists' and children's behaviour before and after each task recorded. Immediately before each task it was recorded whether the therapist gave instructions about what the child should do on that task (e.g. "Remember to put your feet flat") and whether they reminded the child about the reward (dog or other, depending on session type) they would receive at the end of the task/obstacle course. Immediately after each task it was recorded whether the therapist praised or criticised the child for their performance on that task, and whether they interacted with the child about the reward. Whether the child responded to the reward or not was also noted.

OTHER MEASURES

The therapists were asked to record on a scale of 1 to 5 (see Appendix 14) how well they felt each child had performed on each task, considering their current abilities, since as the children's abilities improved the therapists would expect greater performance.

After the study had been completed the therapists attended a semi-structured interview concerning the problems and benefits they felt had been encountered over the course of the study. The dog owner was also asked to respond to a number of questions concerning the effects she felt the study may have had on the children and the dog.

ANALYSIS OF DATA

Prior to the study it was planned that the data from the children would be combined and then analysed. However, over the course of the study it became clear that this group of children varied widely in their abilities and single-case analysis would be more appropriate in order to clarify the effects that the dog was having on each child. In addition the tasks were also considered to be different in the skills and demands that they made on each child. Therefore, whenever possible each child's performance on each task was considered separately.

RESULTS

The results are presented for each task separately. Within each task the results of the observations during, before and after each task for each child are detailed. Staff assessments of performance and comments during interviews are subsequently described considering the obstacle course as a whole.

BEHAVIOURS OBSERVED DURING EACH TASK

Initially the data was inspected visually. Some of the behaviours were of a very low frequency and as a result composite variables were created. The following variables were included in analysis:

Looking at the task/reward (frequency and percentage duration of looks);
Looking at other (frequency and percentage duration of looks);

note: percentage durations rather than total durations were used, because total durations would be directly affected by the time taken to complete the task.

Communication by the child (concerning any subject);

Encouragement from the therapist (including responses to the child's communication, praise, general encouragement and encouragement with the reward as an incentive);

Directions from the therapist (instructions about any aspect of the task, negative comments about the child's performance on the task);

Total number of steps taken (for the bench - total number of pulls)

Number of **steps/pulls** that the therapist: instructed verbally (specific instructions)
corrected verbally
started physically
corrected physically
fully manipulated

The three therapists that guided the children through the tasks, did not always work with the same children in every session (the therapist-child combination was dependent on the circumstances of each session). Two therapists would work with David on each task, while all the other children worked with one of the three therapists on any one task. Therapist was a random factor not accounted for in the design of the study, therefore multifactor ANOVA (factors: dog, therapist) was carried out on the high frequency and composite variables for each child on every task. The data was rank transformed (RT) before analysis. Aligned Rank Transformations could not be used to investigate dog*therapist interactions as the factor 'therapist' was not balanced, and investigating these interactions was not incorporated into the design of the study. However, dog*therapist interactions were extracted during RT ANOVA; this is not the ideal statistical procedure for examining interactions (see Chapter 4) and does not allow for examination of the direction of differences found. However, it does provide some indication as to whether different therapists might have differentially affected the children's responses to the dog. Tables 5.1 and 5.2 provide examples of the ANOVAs performed.

Table 5.1 An example of the RT ANOVA carried out on all variables for children who worked with one out of the three therapists on each task: RT ANOVA table for Andrew's frequency of looks to other on the bench task. (shaded areas highlight the F-ratio and p-values examined).

Source	Sum of Squares	DF	Mean Square	F-ratio	P-value
dog	209.45	1	209.45	15.66	.002
therapist	58.44	2	29.22	2.18	.155
dog*therapist	57.75	2	28.88	2.16	.158
Residual	160.50	12	13.38		

Table 5.2 An example of the RT ANOVA carried out on all variables for David who worked with pairs of therapists on each task: ANOVA table for time taken to complete the bench task (shaded areas highlight the F-ratio and p-values examined).

Source	Sum of Squares	DF	Mean Square	F-ratio	P-value
dog	27.08	1	27.08	8.61	.022
therapist pair	90.72	2	45.36	14.43	.003
dog*therapist pair	30.72	1*	30.72	9.77	.017
Residual	22.00	7	3.14		

** although three combinations of therapist pairs (1&2: 1&3; 2&3) worked together through the whole study, only two combinations (1&2 and 1&3) occurred in both dog and no dog sessions. Therefore when examining interaction effects one degree of freedom is lost and only the two combinations can be compared.*

Figures 5.1-5.13 show the significant dog effects that were found for each child on each task. Dog*Therapist interactions were also examined, in order to investigate whether variables were affected by the therapist-dog combination for different children and tasks. Tables 5.3, 5.5 and 5.7 summarise the variables found to have a dog effect, and Tables 5.4, 5.6 and 5.8 those that have a significant dog*therapist interaction effect.

BEHAVIOURS OBSERVED BEFORE AND AFTER EACH TASK

The nominal data obtained from these categories was considered to be too limited for separate analysis on each child. Therefore, for each task the data from all five children was combined. This

allowed for examination of the general effects of the dog on the therapists and children. In order to account for the therapist effects, the dog and no dog sessions were balanced for child and therapist. Chi-square values were then calculated.

THE BENCH TASK

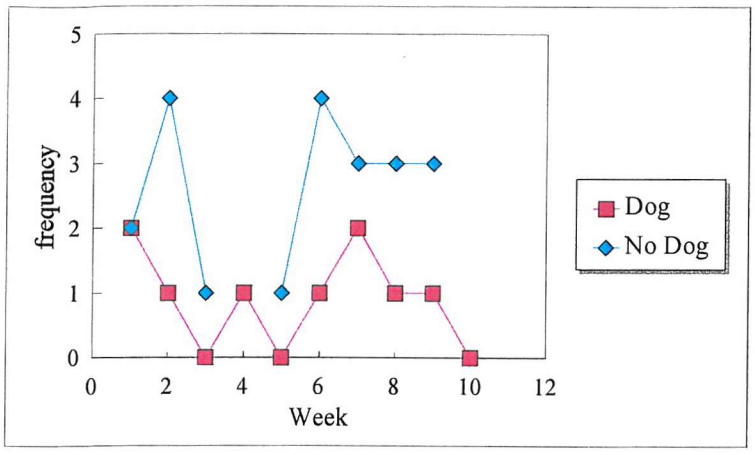
Table 5.3. Variables found to differ significantly between conditions - Bench Task
F-scores and p-values are presented with Figures 5.1-5.9

ANDREW	DAVID	IMOGEN	NATHAN	RYAN
frequency of *looks to other* ($p<0.005$) percentage duration of looks to other ($p<0.01$) number of pulls instructed verbally ($p<0.05$)	time taken to *complete task* ($p<0.05$) frequency of looks to task/reward ($p<0.05$)	time taken to *complete task* ($p<0.01$)	frequency of *encouragements* ($p<0.005$) frequency of looks to task/reward ($p<0.001$)	frequency of *directions given* ($p<0.05$)

Table 5.4. Variables found to have significant dog*therapist interactions - Bench Task

ANDREW	DAVID	IMOGEN	NATHAN	RYAN
Not significant	time taken to complete task ($F_{(1,7)} = 9.78$; $p<0.05$) frequency of looks to other ($F_{(1,7)} = 26.25$; $p<0.005$) frequency of looks to task/reward ($F_{(1,7)} = 13.52$; $p<0.01$)	Not significant	time taken to complete task ($F_{(2,12)} = 3.99$; $p<0.05$)	Not significant

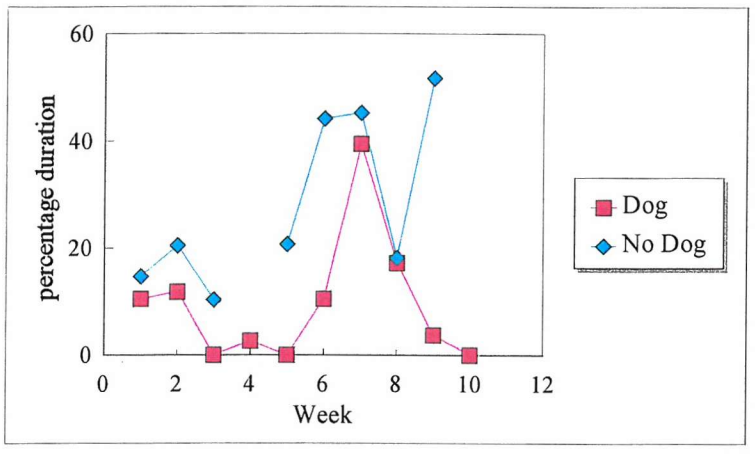
Figure 5.1 Andrew: Frequency of looks to other on the bench task



MEDIANS:
Dog 1
No Dog 3

F(1,12) = 15.66;
p <0.005

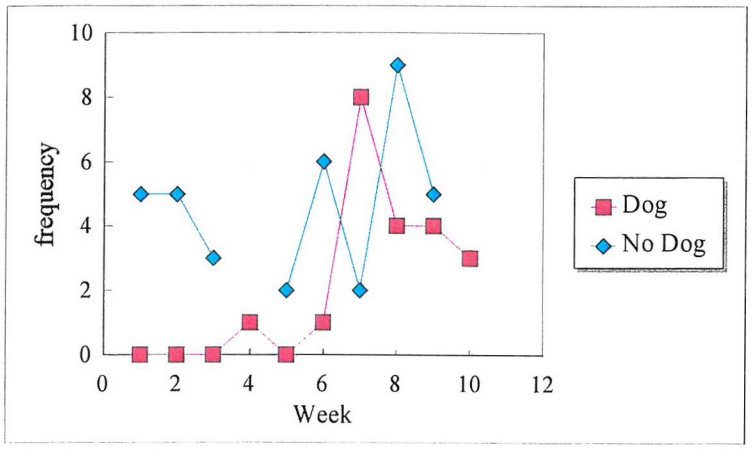
Figure 5.2 Andrew: Percentage duration of looks to other on the bench task



MEDIANS:
Dog 7.1
No Dog 20.55

F(1,12) = 9.62;
p<0.01

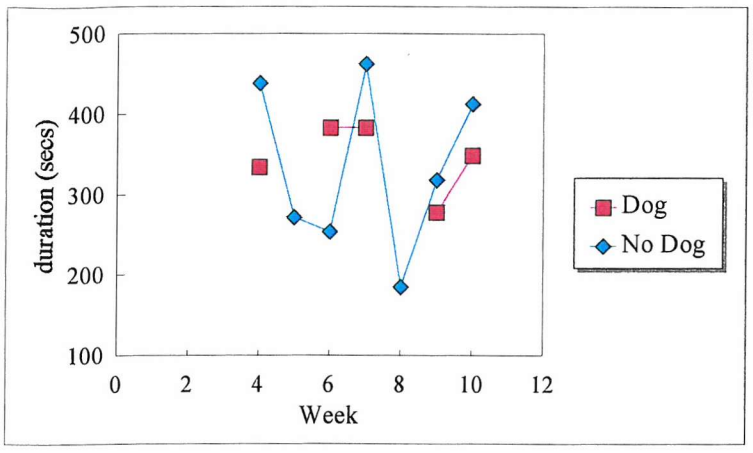
Figure 5.3 Andrew: Frequency of specific instructions given by staff on the bench task



MEDIANS:
Dog 1
No Dog 5

F(1,12) = 6.15;
p<0.05

Figure 5.4 David: Time taken to complete the bench task

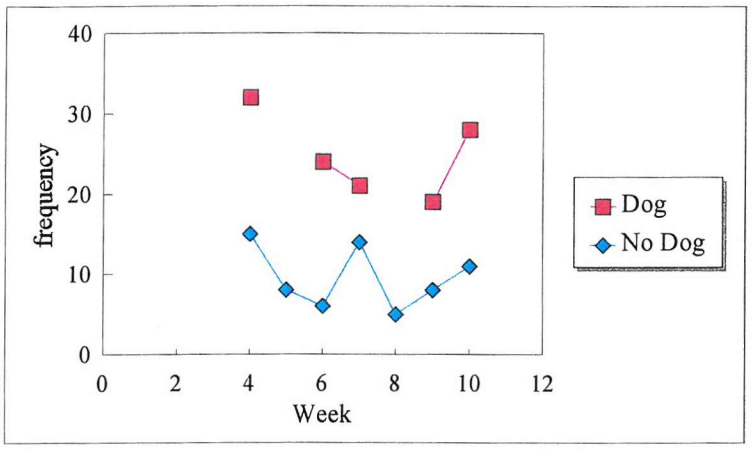


MEDIANS:

Dog	349
No Dog	318

$F(1,7) = 8.62$;
$p < 0.05$

Figure 5.5 David: Frequency of looks to the task and reward on the bench task

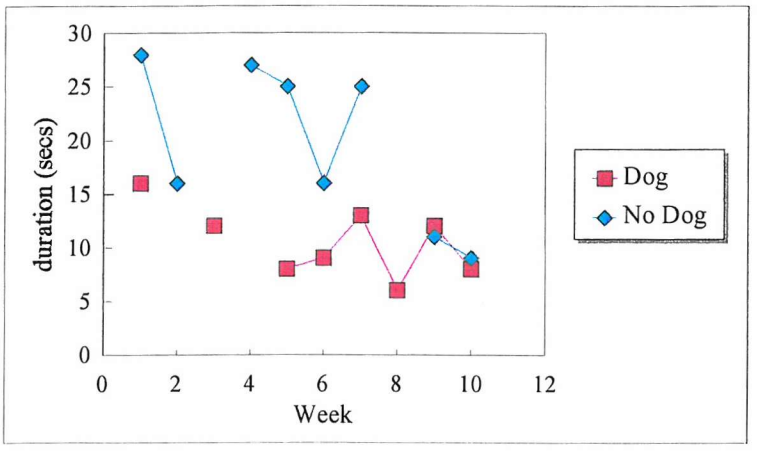


MEDIANS:

Dog	24
No Dog	8

$F(1,7) = 7.20$;
$p < 0.05$

Figure 5.6 Imogen: Time taken to complete the bench task

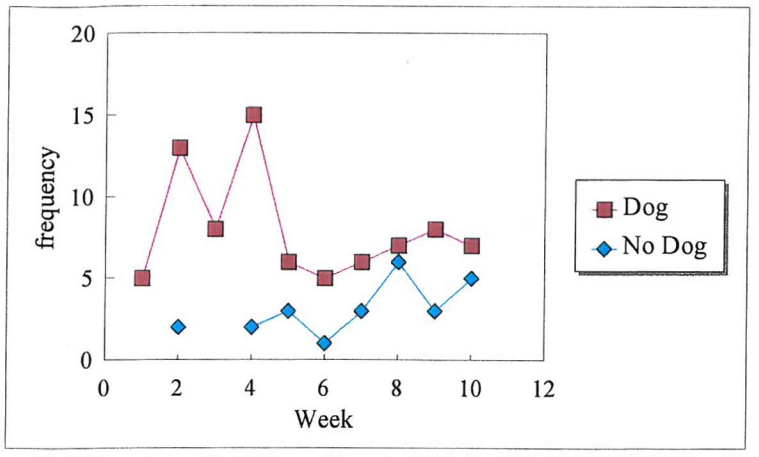


MEDIANS:

Dog	10.5
No Dog	20.5

$F(1,10) = 14.85$;
$p < 0.01$

Figure 5.7 Nathan: Frequency of looks to the task and reward on the bench task

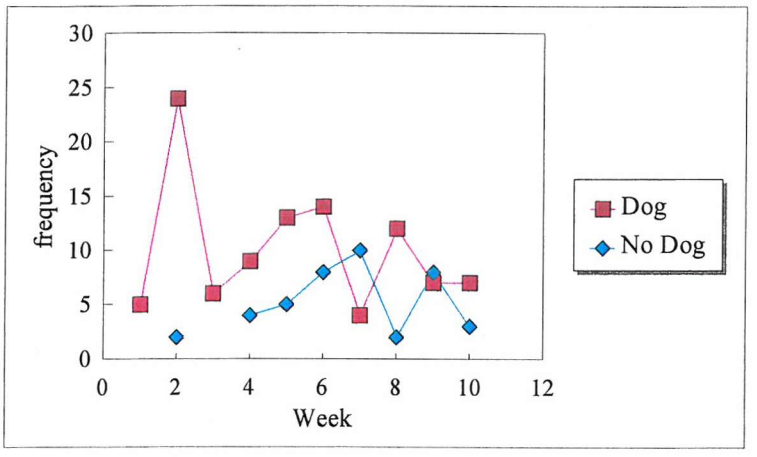


MEDIANS:

Dog	7
No Dog	3

$F(1,12) = 23.60$;
$p < 0.001$

Figure 5.8 Nathan: Frequency of encouragements from staff on the bench task

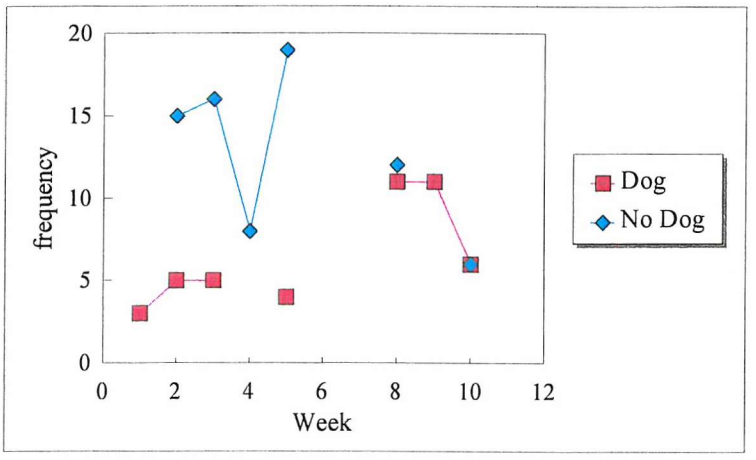


MEDIANS:

Dog	8
No Dog	4.5

$F(1,12) = 8.47$;
$p < 0.05$

Figure 5.9 Ryan: Frequency of directions given by the staff on the bench task



MEDIANS:

Dog	5
No Dog	13.5

$F(1,7) = 6.67$;
$p < 0.05$

Andrew

Looks to other (frequency and percentage duration) were significantly higher in the sessions without the dog, suggesting that Andrew was distracted from the task and reward to a greater degree when the dog was not there. Relevant to this is the significantly higher frequency of specific instructions needed in the no dog condition. When the child is distracted from the task the therapist may try and remind him what he should be doing and say, for example, "Pull".

No significant dog*therapist interactions were found., suggesting that Andrew (while on the bench) responded consistently to the dog irrespective of the therapist that was working with him.

David

The time that David took to complete the task appears to be relatively stable over dog sessions, compared to no dog sessions which showed marked variation from week to week. The median values indicate that it took David longer to complete the task when the dog was there, examination of means also shows this difference but to a much lesser degree (345 seconds with the dog and 334 without the dog). The variability and overlap from the data for dog and no dog sessions makes it very difficult to place any importance on this finding. In addition, it is difficult to interpret this particular variable for David as the extent of his disabilities meant that the therapists would control most of his movements when he was having difficulties (and would give him more opportunities to complete movements by himself when he was showing a lot of motivation and energy). Therefore, a slower time could either be due to the therapists allowing him to make the movements himself (once he had indicated the intention that he was going to try very hard to pull himself with minimum help) i.e. showing high motivation, or it could be that he was less motivated to complete the task. However, this result does suggest that he was more consistent when the dog was there, which in itself could be considered a reaction to the dog.

When David was on the bench his natural posture meant that he would be looking at 'other' for most of the time, although the therapists would encourage him to look at the task and the reward in all sessions. The finding that David looked to the task or reward more frequently during dog sessions indicates that he was more likely to respond to this encouragement when the dog was there, although this direction of looking was not sustained for any length of time (no significant differences were found between percentage durations).

Time taken to complete the task and frequency of looks to task or reward also show a significant dog*therapist interaction, supporting the idea that the differences between therapists are influential in the effects that the dog can have on these measures, for David (who receives a great deal of therapist assistance and guidance). Frequency of looks to other is also affected by the dog-therapist pairing, but this is in a similar direction as frequency of looks to task or reward (i.e. those therapists that encourage him to look at the task or reward are thereby increasing the number of times that he returns his gaze to other, when he rests his head again).

Imogen

Imogen was significantly faster on the bench during dog sessions and this was thought to be the result of her having a 'race' with the dog to complete the task, increasing her motivation to finish the task quickly. No significant dog*therapist interactions were found, suggesting that Imogen also responded consistently to the dog, irrespective of the therapist she was working with.

Nathan

Nathan made significantly more looks towards the task or reward during the dog sessions. As with David, Nathan had a tendency to look towards 'other', and the therapists would encourage him to look at the task or reward. Frequency of encouragements from the therapist was also significantly higher with the dog suggesting that there may be a relationship between these two variables. This data does not indicate whether it is because the therapists thought that Nathan was more likely to respond when the dog was there and it made it more acceptable for them to repeatedly encourage him or whether his performance and motivation was lower when the dog was present. However, the fact that Nathan looked more often towards the task and the reward when the dog was there indicates that the dog may have had a positive effect that the therapists were taking advantage of.

The length of time that it took Nathan to complete the bench task was found to have a significant dog*therapist interaction effect. The therapists may have differentially affected the dog's influence on motivating Nathan to complete the task.

Ryan

Ryan received significantly more directions from the therapists when the dog was not involved in sessions. This result may suggest that he did not concentrate so hard when the dog was not present, or it may be that the therapists were distracted from giving directions when the dog was there. However, this second suggestion seems less likely as no significant dog*therapist interactions were found, and from the information gathered it seems that the therapists were responding to and utilizing the dog differently, so a distraction such as this would not be expected to be so uniform across all therapists.

Behaviours observed before and after each task - Bench Task:

The bench was always the middle task on the obstacle course and as a result of the layout of the course, there was little opportunity for the children to interact with the reward after completing the bench. This interaction was usually postponed until completion of the final task.

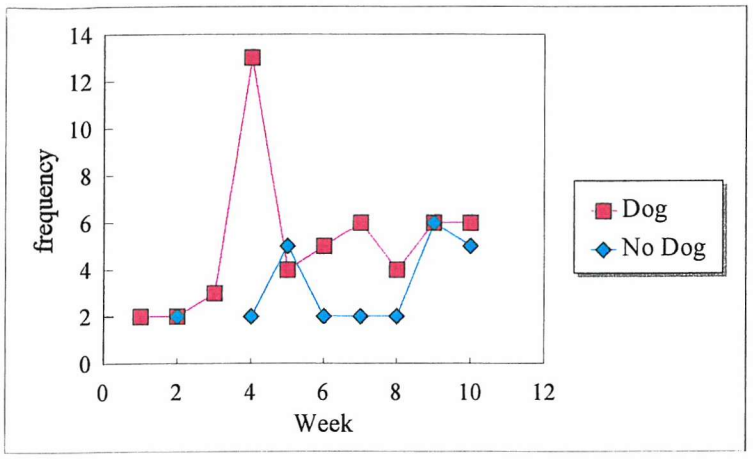
Before the bench task the therapist was more likely to refer to the reward when it was the dog (χ^2=12.865, $p<0.001$). The therapists may have found it easier to remember the reward if it was the dog, or thought it more worthwhile to remind the children that they could have a race with the dog and/or play with her later.

THE LADDER

Table 5.5. Variables found to differ significantly between conditions - Ladder Task
F-scores and p-values are presented with Figures 5.10-5.11

ANDREW	DAVID	IMOGEN	NATHAN	RYAN
Not significant	Not significant	Not significant	frequency of looks to task/reward ($p<0.05$)	communication by child ($p<0.01$)

Figure 5.10 Nathan: Frequency of looks to the task and reward on the ladder task

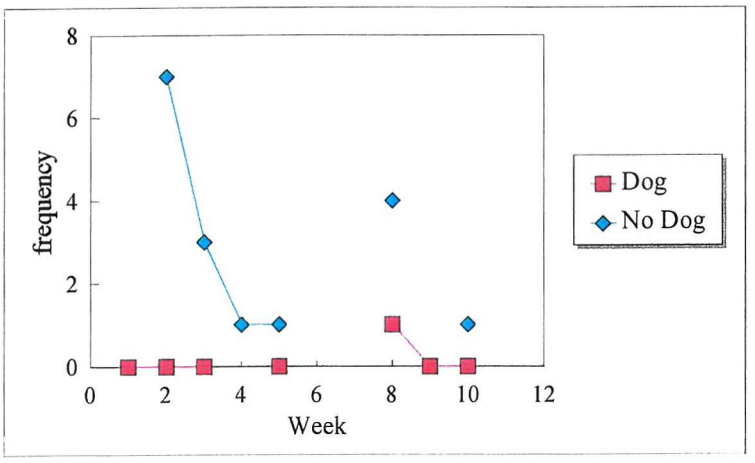


MEDIANS:

Dog	4.5
No Dog	2

$F(1,12) = 4.78$;
$p < 0.05$

Figure 5.11 Ryan: Frequency of communication by the child on the ladder task



MEDIANS:

Dog	0
No Dog	2

$F(1,7) = 21.29$;
$p < 0.005$

Table 5.6. Variables found to have significant dog*therapist interactions - Ladder Task

ANDREW	DAVID	IMOGEN	NATHAN	RYAN
number of steps corrected verbally ($F_{(2,12)} = 6.15$; $p<0.05$)	number of steps fully manipulated ($F_{(1,7)} = 11.57$; $p<0.05$)	Not significant	Not significant	Not significant

Andrew, David and Imogen

Andrew, David and Imogen did not show any significant differences in their behaviour or the therapists' behaviour towards them between dog and no dog sessions. However, dog*therapist interactions were found for the number of Andrew's steps corrected verbally and number of steps fully manipulated for David. This again suggests that the children (or the therapists' reactions to the children) were somehow affected differently by the dog depending on the therapist. Imogen did not show any significant dog*therapist interactions.

Nathan and Ryan

Nathan and Ryan were the only two subjects to show dog effects and then only one variable for each child was found to be significant, and these are rather difficult to interpret. Nathan was found to look more often at the task or reward, although this difference appears from the graphs to be largely driven by a single session (week 4). However, it may be that again the dog provided more incentive for Nathan to look at the task or the dog. Ryan was found to communicate more when the dog was **not** there, in contrast to what might have been expected from previous studies (e.g. Studies 1 & 2; Condoret, 1983; Gonski, 1985; Levinson, 1969, Redefer & Goodman, 1989) which suggest that a dog will increase social interaction. However, closer examination of the data shows that all these communications were about other (i.e. not the task or the reward). There were eighteen occurrences of these communications, one of which occurred during a dog session. Out of the seventeen communications that occurred when the dog was not there, six were about the dog (which was not present), suggesting that this increased communication during no dog sessions was an indication of Ryan's distraction away from the task, partly due to the other sessions involving the dog. This does imply a certain amount of interest in the dog, but may warrant the caution that sudden absence of the

dog from sessions may cause problems with some children. Neither Nathan's nor Ryan's sessions were found to show any significant dog*therapist interactions.

Behaviours observed before and after each task - Ladder Task:

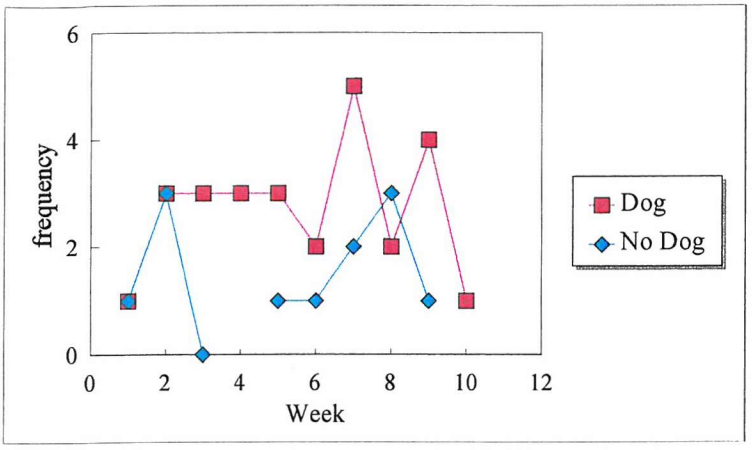
The ladder task was either the first or last task on the obstacle course and in both cases there were opportunities for interaction with the reward after completion of that task. Before the task the therapist was more likely to give instructions when the dog was **not** there (χ^2=8.167, p<0.005) and more likely to refer to the reward when it was the dog (χ^2=29.348, p<0.001). This suggests that the therapists are putting a different emphasis on the approach to the task depending on whether the dog is there or not. After the task the therapist was more likely to give a positive comment about the task when the dog was **not** there (χ^2=4.696, p<0.05), suggesting that there may be some distraction away from performance when the dog is present. However, the children were more likely to respond to the reward when it was the dog (χ^2=5.718, p<0.05) illustrating that the children were more interested in the dog than the toys or other activities. So, these findings suggest that performance on the ladder task, which requires a great deal of concentration and focusing their gaze on the task, may have been impaired when the dog was present.

THE STEPS

Table 5.7. Variables found to differ significantly between conditions - Steps Task
F-scores and p-values are presented with Figures 5.12-5.13

ANDREW	DAVID	IMOGEN	NATHAN	RYAN
communication by child (p<0.05)	Not significant	Not significant	percentage duration of looks to other	Data was not analysed as the task was not attempted several times due to difficulties with new leg splints

Figure 5.12 Andrew: Frequency of communication by the child on the steps task

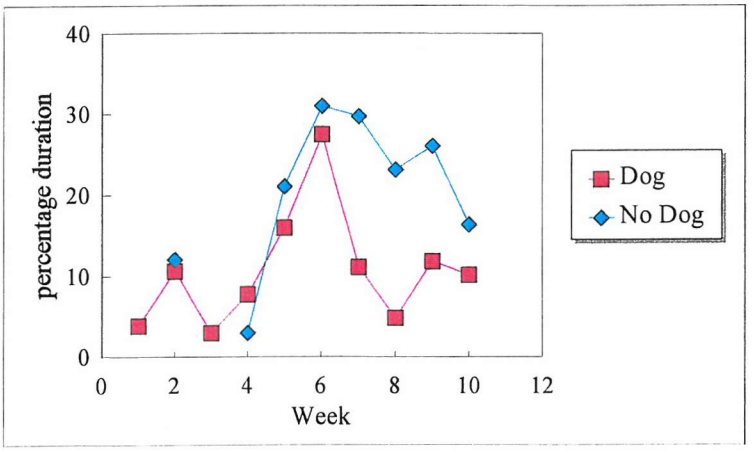


MEDIANS:

Dog	3
No Dog	1

$F(1,12) = 5.09$;
$p < 0.05$

Figure 5.13 Nathan: Percentage duration of looks to other on the steps task



MEDIANS:

Dog	10.35
No Dog	22.05

$F(1,12) = 5.99$;
$p < 0.05$

Table 5.8. Variables found to have significant dog*therapist interactions - Steps Task

ANDREW	DAVID	IMOGEN	NATHAN	RYAN
frequency of looks to other ($F_{(2,12)} = 4.17$; $p<0.05$)	Not significant	Not significant	Not significant	Data was not analysed as the task was not attempted several times due to difficulties with new leg splints

David and Imogen

David and Imogen did not show any significant differences in their behaviour, or the therapists' behaviour, between sessions with and without the dog. No significant dog*therapist interactions were found either.

Andrew

Significantly more comments were made by Andrew when the dog was there and closer examination of the data shows that most of these comments concerned the dog. This illustrates his interest in the dog eliciting a desirable increase in his communication, although it may also indicate that the dog is acting as a distraction from the demands of the task (possibly reducing concentration or perhaps providing a positive distraction from the physical efforts required). This increase in communicative behaviour supports previous and other studies (e.g. Studies 1 & 2; Condoret, 1983; Gonski, 1985; Levinson, 1969; Redefer & Goodman, 1989). A significant dog*therapist interaction was also found, for frequency of looks to other. So the different therapists may have been able to utilize the dog to varying degrees to attract Andrew's attention and direct his gaze.

Nathan

The percentage duration of Nathan's looks to other was significantly higher in no dog sessions, suggesting that he was more distracted during these sessions, with the dog helping to direct his gaze towards itself and the task. No significant dog*therapist interactions were found.

Behaviours observed before and after each task - Steps Task:

Before the task the therapist was more likely to refer to the reward when it was the dog (χ^2=6.136, p<0.05). Again, this may have been due to the therapists finding it easier to remember the dog or feeling it was more worthwhile to mention than the toys. The number of instructions given before the task was not affected. After the task the therapist was more likely to give a positive comment when the dog was there (χ^2=10.507, p<0.005) and was more likely to refer to the reward if the dog was there (χ^2=3.835, p=0.05), suggesting that the dog was encouraging good performance on the task (perhaps, just in the final stages of the task, when the children were coming down the steps towards the dog). After the task the children were more likely to respond positively to the reward if the dog was there (χ^2=20.167, p<0.001), this again supports the evidence that the children found the dog of interest.

STAFF ASSESSMENTS OF EACH CHILD'S PERFORMANCE ON EACH TASK

As with the behaviours observed *during* the study each child's performance on each task was considered separately. Mann-Whitney tests were carried out to investigate whether the staff thought that the children's performance was different between sessions with and without the dog.

Andrew was the only child to show a significant difference on performance scores and that was for the bench task only (Z=-1.99, p<0.05), on which he was more likely to be given a higher score for the bench when the dog had been present.

These results suggest that although the therapists and children were affected by the dog's involvement in sessions (as shown by the observed variables), this was not considered by the therapists to affect the children's overall performance on the tasks. This probably indicates that the differences observed were too small to affect a 5-point scale encompassing all aspects of performance.

STAFF INTERVIEW AFTER THE STUDY HAD BEEN COMPLETED

When interviewed the staff reported that they were happy with the study and thought that the dog had some positive effects on them and the children. They described occasions when all the children would call for the dog just before she arrived (a group activity that was thought to be beneficial for

these children). They thought the children were more enthusiastic to do the obstacle course when the dog was there. They did not consider there to be any problems or disadvantages with the dog being present, although for the purposes of the study children had to complete the whole obstacle course individually (2 children could not be on different tasks at the same time) and this was considered to be boring for the children that were waiting (although they were occupied with other activities). The staff felt that the children were more motivated when the dog was there and that they had to put in less effort to motivate the children. Overall, the staff felt that this type of dog-assisted activity was worthwhile and felt that it was beneficial for staff and children (see Appendix 15).

DOG OWNER QUESTIONNAIRE GIVEN AFTER THE STUDY HAD BEEN COMPLETED

The dog owner reported that the dog did not suffer any problems (either short- or long-term) due to the study, and thought that the dog was enthusiastic and enjoyed the sessions. The dog owner thought that the dog had contributed to sessions in which she was involved and also felt that the children were disappointed that she did not have the dog with her in no dog sessions (see Appendix 16).

DISCUSSION

A number of practical and methodological problems were encountered over the course of the study. The obstacle course had to be set up for all the children before they arrived, therefore if one of the five children had missed a session the sequence of dog/no dog and ladder/steps first was altered and could not be changed. This meant that presentation of conditions did not necessarily comply with the original methodological design and could therefore have affected the results. Similarly, therapist assisgnment to different children was dependent on staff presence and commitments. Although therapist was not a factor that was integrated into the design of the study, this lack of balance was not ideal.

The performance required of the children, on each task, called for the training of a set of skills rather than a single reinforcable behaviour. The staff therefore incorporated the dog into their standard skills training techniques. This meant that the dog could not act as a reinforcer for specific behaviours as this would have disrupted and changed the style of the established training programme. However, it was considered that the dog may act as a motivator for the children, in

much the same way as (only potentially stronger than) the prospect of toys or play-time later in the day. It was hoped that these effects on motivation could be measured using ethograms of general behaviour and performance, focusing mainly on therapist input. Both performance and motivation are extremely difficult concepts to quantify and this study was not entirely successful in pinpointing their positive and negative aspects. There may be several reasons why the therapist would give unusually high levels of encouragement, for example, i) the child is doing much better than usual, so the therapist is pleased and enthusiastic, or ii) the child is doing much worse than usual and the therapists feels that the child needs more encouragement than normal. So the positive comments from the staff concerning their perceptions of the children's increased motivation and their (the therapists') reduction in effort required to motivate the children are important in suggesting that the dog did act as a positive addition to sessions. Information from the staff during tasks would help give a clearer picture of the dog's impact on the children's behaviour and would indicate the way forward in modifying the assessment of observations. Despite these problems the measures used did give some indication of the dog's influence on sessions.

Direction of gaze was differentially affected in the three tasks. For the bench task, three out of the five children showed significant effects on their looking behaviour, showing less distraction away from the task and reward when the dog was present. Out of the two subjects that did not show these effects, Imogen was the most able child and completed tasks quickly in all sessions, so was less likely to show significantly different performance, and Ryan showed little interest in the dog throughout the study (his family keeps six dogs at home, which may have influenced his reactions). Ryan would probably not be an ideal candidate for this kind of dog-assisted therapy, although familiarity with dogs might be of benefit in other situations.

The ladder and steps tasks each showed one occurrence of changes in looking behaviour, for Nathan only. The dog repeatedly attracted Nathan's gaze for brief periods, in all the tasks, illustrating the individual differences that are apparent in such a small group of children, and again highlighting the importance of dog-assisted therapy being selected for specific children and specific purposes.

The results from this study clearly show that a dog's involvement in a task, or interaction/play with a dog being used as a motivator has different effects depending on the individual child and the type of task. The bench task showed differences in the child/therapist behaviours for all the children. Although different variables were affected it does suggest that the dog's involvement in the task significantly increased the likelihood or strength of dog effects. This supports the findings of study

2. In contrast, the ladder and the steps tasks showed dog effects for only two children in each case (Nathan and Ryan on the ladder; Andrew and Nathan on the steps).

Overall performance on the tasks was not greatly affected by the dog's involvement. This is reflected in all the measurements taken over the course of the study (behaviours observed and staff assessments). For all the tasks, the therapists were more likely to refer to the reward before the task, if it was the dog. This possibly correlates with the comments made by the staff after the study, that having the dog there made things easier for the staff, with the dog being a reward that was easily incorporated by the staff. The children's interest in the dog was high (seen in some of the behaviours observed during the tasks, children's responses after completion of the task and comments from the staff after the study), even to some extent for Ryan who showed the least interest. The staff reported that the children showed more enthusiasm and motivation to do the obstacle course when the dog was there but this was not found to be reflected in their actual performance on each task.

The therapists also reported that they had to contribute less when the dog was present, in terms of encouraging and motivating the children on the tasks. Some evidence of this was apparent from the bench task, for each child: David may have been taking longer in order to complete some movements himself, Imogen was quicker when the dog was there (reducing therapist input), Andrew was given fewer specific instructions and Ryan was given fewer directions (general instructions). In contrast Nathan received more encouragements, but these are seen as more positive than instructions and directions (encouragements are telling the children that they are doing well and can succeed, instructions are just telling the child what to do). However, there was very little evidence to support this on the ladder and steps, particularly the ladder where less praise was given relating to performance when the dog was present. The importance of careful selection of therapist and child is also highlighted by this study, with these choices being determined by the goals and objectives of the dog-assisted activities programme.

The significant dog*therapist interaction effects found suggest that the dog-therapist balance does influence the impact of dog and no dog sessions on the child/therapist behaviours during tasks. Again, this seems to affect individual children differently, demonstrating that the behaviours are affected due to the triad of interactions between child, therapist and dog. However, due to the unbalanced order of therapist-child matching (and the fact that this aspect was not incorporated into the experimental design), it cannot be inferred how or why some therapists may have been able to utilize the dog in some ways and others not. Redefer and Goodman (1989) suggest that the therapist

is the vital component in this type of work, emphasising that the dog is not the therapist. The results found here clearly support this idea that different therapists will have different influences on the behaviour of children, when a dog is present compared to when it is not present.

The dog does not appear to act as a reward or motivator for tasks which do not directly involve the dog (when the dog is merely serving as a 'reward' for good performance). Whether this is related to the age of the children, or the type/difficulty of the tasks cannot be ascertained from this study and further investigation would be required. This project strongly supports the suggestion made in study 2,that high dog involvement in tasks is extremely important when introducing a dog to young children with disabilities. It also suggests that a dog *might* act as a distraction from other objectives if the dog is not an integral part of the activity. However, it is possible that if the children had a period of time before the study that was purely focused on playing and interacting with the dog, they would develop a stronger association between the dog and positive/fun activities, and they would also have more ideas about whether they would like to, for example, play fetch or feed the dog as their reward for performing well on a task.

Although high dog-involvement in activities seems to be of importance, this does not mean that the skills required of the task can only be dog-related. For example in this study, on the bench task the dog is highly involved but the actual subject of the task is not the dog and the skills being taught are not dog-related, the dog has just been incorporated as a part of the task. So, it may be possible to utilise other activities that are teaching skills not specifically about dogs but that can involve a dog to a large degree. This need for high levels of dog involvement in activities for the dog to have a significant effect does restrict the usefulness of dogs being introduced into the disabled child's environment, but it also suggests a general direction for future research and practice in this area.

CHAPTER 6

STUDIES 4a & 4b
STUDIES USING SINGLE-CASE EXPERIMENTAL DESIGNS TO INVESTIGATE THE EFFECTS OF DOG-ASSISTED ACTIVITIES ON THE BEHAVIOUR OF CHILDREN AND YOUNG ADULTS WITH SPECIAL NEEDS

STUDY 4a: YOUNG ADULTS WITH SEVERE LEARNING DISABILITIES

STUDY 4b: YOUNG CHILDREN WITH AUTISM

STUDIES 4a & 4b

STUDIES USING SINGLE-CASE EXPERIMENTAL DESIGNS TO INVESTIGATE THE EFFECTS OF DOG-ASSISTED ACTIVITIES ON THE BEHAVIOUR OF CHILDREN AND YOUNG ADULTS WITH SPECIAL NEEDS

INTRODUCTION

The studies already described in this thesis have shown that there is a general effect of increased interaction from children during dog-assisted activity sessions, when compared to control activity sessions. This is demonstrated by the similar conclusions from the studies on children at particular schools/institutions (Studies 1 and 2, and Czech Project), suggesting a 'robustness' to the findings. There is some indication that different activities may be differentially affected by the inclusion of a dog (Study 2); and there is also a possible beneficial effect on more specific skills such as physical exercises (Study 3). At the same time Studies 2 and 3 demonstrated the great individual differences and variation within apparently homogenous groups (same classes at the same school/centre). Grouping data from a number of participants that have quite distinct needs and abilities increases the risk of overlooking potentially valuable information about an intervention. It was therefore considered appropriate to confirm the findings of the previous studies and at the same time develop an approach that could be adapted for different individuals. Therefore it was proposed that using single-case experimental designs would provide detailed information about an individual's behaviour, but would also allow an overview of effects that are apparent across a number of individuals, which could demonstrate the clinical application of the findings from previous studies.

The issue of affecting interaction is one of the most reported aspects of dog-assisted activities, but there are different components within the concept of 'interactions' and these may need to be targeted when carrying out an intervention or activity. In addition there may be other skills or needs outside the sphere of interactions which can be targeted through dog-assisted activities (the enhancement of interactions between an individual and a therapist can obviously assist in the teaching/acquisition of skills). The focus for each subject's individual project (described in this chapter) was their interaction during sessions, plus other specific skills. Sessions were therefore tailored to suit each

individual, with an underlying design (e.g. presentation of conditions) and method (e.g. guidelines for encouraging appropriate behaviour).

All the children/young adults included in these single-case design studies were recommended by a Clinical Psychologist as being in need of improved interactive skills, with some additional areas that could be improved, which were different for each individual.

The issue of suitable methodology that was also practical and not excessively time-consuming was also considered. Checklists and/or behaviour scales were used to quickly assess behaviour seen during sessions. In addition, individual's characteristics and the effect this may have on their reactions to dog-assisted activities were briefly examined.

The single-case studies in this chapter are initially grouped into two sections defined by the different single-case experimental methods used:
i) three young adults with severe learning disabilities living at a residential centre, and
ii) two young children with autism living at home but receiving respite care
Within each section the specific results are discussed and an overall impression of the findings from that group is given.
The final section describes the possible effects of individual characteristics on responses to the dog-assisted activities, the application of the methods used, and an overall discussion of the findings from these single-case projects.

STUDY 4a

YOUNG ADULTS WITH SEVERE LEARNING DISABILITIES

METHOD

PARTICIPANTS AND EXPERIMENTERS

This study involved three young adults at a residential centre for children and young adults with severe learning disabilities and challenging behaviour. They were recommended as suitable candidates for animal-assisted activities by the Clinical Psychologist on their health team. The three young adults were 20 -21 years of age and had idiosyncratic complications/difficulties in addition to learning disabilities (see Table 6.1). Mark was physically very weak and used a wheelchair. He had virtually no speech but would sometimes use a picture board to indicate his choice of activities and used gestures and noises to indicate needs or desires. Lisa, although partially paralysed, could walk and move around when requested; she was also verbally communicative and would initiate interaction with other people. Thomas, was ambulant and non-communicative (he could only sign 'please' when prompted) but could understand simple directions accompanied by sign language and gestures. Thomas's main form of communication was to become aggressive when he did not want to do something. Thomas spent much of his day exhibiting two repetitive behaviours: rocking (one foot in front of the other and shifting his weight rhythmically) and groaning (a deep growl or a higher pitched moaning). The experimenter was a 27 year old female who had experience of working with therapy dogs and children with special needs; the experimenter guided all sessions. A member of staff from the residential centre was always present during sessions (for safety reasons) and would interact with the young adults and the experimenter in a situation-appropriate manner. All members of staff involved in these sessions were female and were aged between 20 and 50 years. The Pets as Therapy (PAT) dog was a 4 year old Flat-coat Retriever/Old English Sheepdog cross-breed neutered bitch, given a clean bill of health shortly before the study.

Table 6.1 Information about each individual and aims of their individual AAA programmes

	Sex and Age	Disability additional to SLD	Specific aims and targets
Mark	Male; 21 years	Down's syndrome, terminal heart condition	encourage interest in any participative activity
Lisa	Female; 21 years	partial hemiplegia	encourage use of partially paralysed arm
Thomas	Male; 21 years	Down's syndrome, autism, challenging behaviour	reduce disruptive, aggressive and stereotypic behaviour

DESIGN

As a direct result of their individual differences it was considered appropriate to undertake single-case experiments. An ABAB design with several sessions within each treatment block was considered to be the most suitable for this study; members of staff expressed some concern about the continuity of each type of session, feeling that these individuals could not cope with repeated changes in the presentation of conditions. It was noted that routine is a fundamental aspect of their lives at the residential centre. An ABAB design allowed staff to inform the young adults what to expect before the experimenters arrived at the centre. It was also anticipated that ill health and other activities would interfere with the schedule of sessions and therefore predetermined alternation of conditions would have posed many practical problems. A repeated measures design or random assignment of conditions might have resulted in different individuals having different types of session on the same day. It was anticipated that this could cause some confusion for the young adults if for example they saw the dog but then attended a control session, and that might affect their behaviour during sessions. Having blocks of A and B allowed them the opportunity to settle into a familiar pattern for the sessions.

In conjunction with the referring Clinical Psychologist individual aims and targets for each individual were identified (see Table 6.1), in addition to the common aims of increasing social interaction and cooperative behaviour with an adult who is directing activities. Phases A (control) and B (dog) will be referred to as C_1 and C_2 (first and second control phases) and D_1 and D_2 (first and second dog phases).

SETTING AND APPARATUS

Sessions with and without the dog were carried out in a 'living room' that was in a separate building from that where the young adults were based during the daytime (Thomas had a bedroom in this building and would be there for the evening and nighttime). These buildings were separated by an uncovered outdoor path.

All sessions were recorded on videotape using a small camcorder which was fixed to a tripod in an inaccessible corner of the room.

PROCEDURE

Approval from the region's Ethics Committe was obtained before the study was carried out. Consent was obtained from the parents or guardians of all individuals involved in the study (see Appendix 17). The experimenter visited the centre every weekday for sixteen weeks and would carry out one fifteen minute session for each young adult on every visit, if this was possible. Ill-health and alternative commitments meant that some sessions were missed by the young adults. If any of the young adults did not want to attend the session, they were encouraged but not forced to attend.

Activities were selected that would require interactive behaviour from the young adult and would allow for directions and suggestions from the experimenter. In addition the activities all required the young adults to physically manipulate objects and/or make a selection from a choice of similar objects (e.g. different coloured balls). During sessions, both control and dog sessions, each individual was encouraged to participate in the activities and interact with the adult directing the sessions. In addition, the target behaviours (detailed in Table 6.1) were focused on by the experimenter. Lisa was always encouraged or reminded to use her right hand. Thomas was differentially reinforced, using a tangible reinforcer (a favourite food), in order to encourage positive and appropriate behaviours and to reduce disruptive and stereotypic behaviours. Mark was encouraged to ask for what he wanted and to be made comfortable. The activities for control phases (C1 and C2) and dog phases (D1 and D2) are described in Table 6.2.

Table 6.2 Details of AAA and control activities

Participant	Control Activities	Activities with the dog
Lisa	Indoor skittles (choosing colours; grasping, aiming and throwing a ball) Steering a radio-controlled cat on to different-coloured mats (choosing colours and using the hand-held controls to move the cat).	Sponge balls thrown for the dog to fetch (choosing colours; grasping, aiming and throwing a ball) Placing coloured biscuits in matching coloured bowls for the dog to eat (choosing and matching colours; grasping biscuits and moving around the room to find the correct bowl)
Mark	Skittles and radio-controlled cat (as Lisa)	Choosing coloured biscuits and feeding them to the dog.
Thomas	Indoor skittles (identifying colours as requested by adults; grasping, aiming and throwing a ball) Throwing coloured bean bags on to matching target mats (matching colours, grasping, aiming and throwing bean bag)	Sponge balls thrown for the dog to fetch (identifying colours as requested by adults; grasping, aiming and throwing a ball) Placing coloured biscuits in matching coloured bowls for the dog to eat (matching colours, grasping and placing correctly)

Additional activities (e.g. snap) were offered in the first two sessions of C_1 but were rejected by all subjects. All the activities were available during control sessions but the young adults only showed interest in the ones that are described in Table 6.2. Additional activities were also offered in the first two sessions of D_1 (e.g. brushing the dog), but were of less interest to the young adults than those described. They were made available during all dog session but were not requested by the young adults.

BEHAVIOURAL MEASURES

All sessions were recorded on videotape and behavioural data extracted using ethograms and the Observer (version 3.0) software (Noldus Information Technology, 1993).

The ethogram was developed from those used in previous studies and focused mainly on communicative and physical responses to the experimenters' questions and requests as well as the young adult's initiations towards the experimenter and the activity (see Figures 6.1 & 6.2).

Figure 6.1 Dendrogram to Illustrate the Hierarchical Ethogram Used to Record Responsive Behaviours

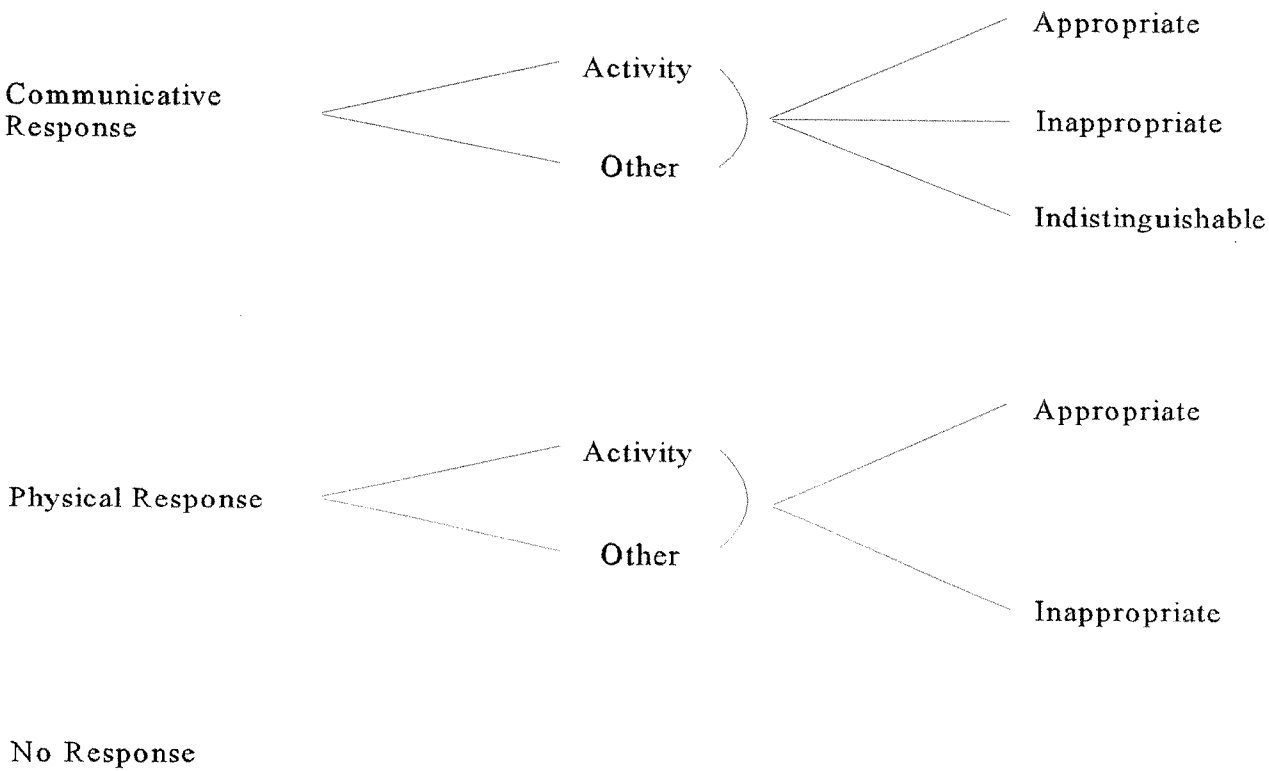
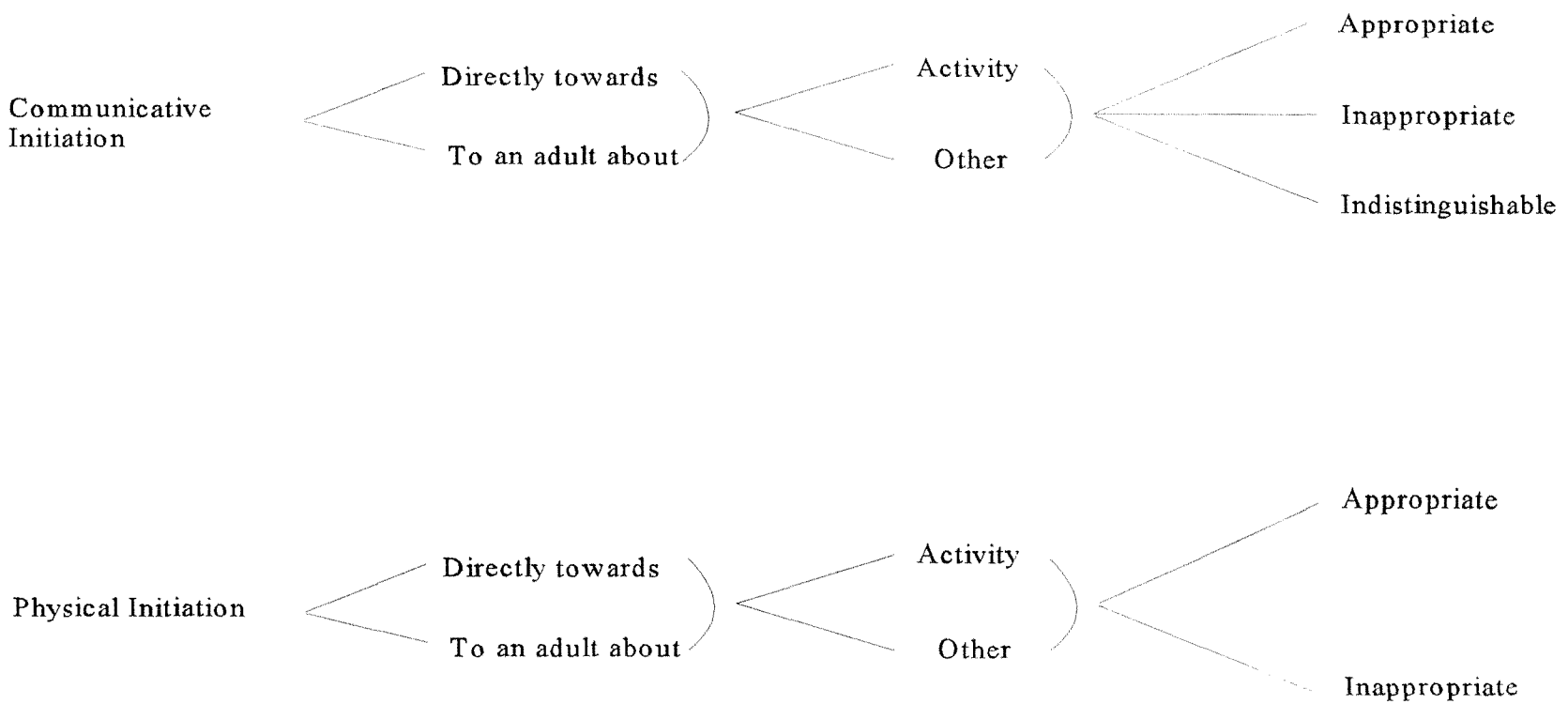


Figure 6.2 Dendrogram to Illustrate the Hierarchical Ethogram Used to Record Initiation Behaviours



In addition behaviours such as use of the right hand (for Lisa) and problem behaviours (for Thomas) were included (see Appendix 18 for full description of ethogram and definitions of behaviours).

OTHER MEASURES

Before the study began several members of staff were asked to complete a 'character checklist' (see Appendix 19) for each of the young adults, in order to ascertain whether any obvious characteristics (e.g. difficulties communicating with adults) might affect an individual's response to animal-assisted activities. In addition a checklist was completed by staff concerning the individual's general behaviour before the study began (see Appendix 19). After each session the member of staff that was present was asked to complete a checklist (see Appendix 20) referring to the individual's behaviour during that session. The purpose of this checklist was to investigate staff responses to this type of intervention and research, and to gain some indication of their assessment of sessions.

RESULTS

The results from the behavioural measures are presented for each young adult separately. The staff checklists completed before the study and after each session are considered at the end of this section.

STATISTICAL ANALYSIS IN SINGLE-CASE RESEARCH

Statistical tests are increasingly being used in single-case research (Kazdin, 1982), despite the controversy surrounding this use of statistics (see Kazdin, 1982; Edgington, 1992). Kazdin (1982) suggests that statistics are particularly useful for single-case designs in relatively new areas so that small changes are not ignored. Traditionally 'visual inspection' has been the main form of analysis for single-case experiments but the unreliability of this method has been demonstrated (e.g. Busk and Marascuilo, 1992). Edgington (1992) points out that single-case experiments are response-guided and are therefore incompatible with randomization and subsequent statistical testing. Edgington proposes that randomization tests are "the only statistical tests that are valid in the absence of random sampling". However the requirement of random assignment of phases does not fit with an ABAB design. Kazdin (1982) suggests alternative statistical tests that can be implemented as long as certain criteria are met (for a detailed table of the tests and criteria see Kazdin, (1982 pp246-247). The use of t- and F-tests is recommended to detect changes between

phases as long as the data does not show serial dependency (data points must be independent i.e. have uncorrelated error terms) and the number of observations in each phase must be equal. In addition Kazdin suggests the split-middle technique where linear trend lines (lines of best-fit) are plotted and "statistical evaluation has been recommended by projecting the linear trend line of baseline into the intervention phase. A binomial test is applied to see whether the number of data points in the intervention phase fall above (or below) the projected line of the baseline". For this split-middle technique observations should be equally spaced intervals in each phase.

Due to subject's ill-health, timetabling of other activities and staffing problems at the residential centre, the number of sessions in each phase could not be adequately predicted or controlled, so as many data points as possible were collected for each phase. This resulted in different numbers of sessions in each phase and unequal intervals between sessions, plus there was the inability to randomly assign phases; all of these factors contributed to exclude all suggested statistical analyses. However, the split-middle technique was considered to be useful as a descriptive statistic to visually illustrate the level and trend of the data, the application of the suggested inferential statistic (the binomial test) was also considered possible from the fact that the unevenly spaced observations would actually increase the noise of the data and reduce the possibility of Type I errors. One argument, not mentioned by Kazdin, against the binomial test is the projection of the linear trend line. This method is susceptible to incorrect conclusions due to a variety of non-linear trends and constraints in the responses (e.g. 'floor' and 'ceiling' effects). Furthermore, Kazdin does not describe any method for comparing phases in addition to A_1 and B_1 (in this case C_1 and D_1). Despite its absence from the single-case research literature the Robust Rank Order test (Siegel & Castellan, 1988) was examined and considered appropriate (and more suitable than the binomial test) for the analysis of the data from this study to investigate differences between C_1 and D_1; D_1 and C_2. The Robust Rank Order test is a nonparametric test that calculates scores based on the number of values in a different condition that precede each score, taking into account the number of data points in each condition. A Wilcoxon Signed Rank Test was used to confirm that there were no significant differences between D_1 and D_2. In order to confirm the expected discrepancies between the binomial test and the Robust Rank Order Test for comparison of C_1 and D_1, both tests were carried out. The binomial test was thought to be susceptible to both Type I and Type II errors due to the extrapolation of the linear trend calculated. This may be due to the fact that comparison of levels is not a part of this test and a stable baseline must be assumed (which cannot be done in this study). Significant results from the binomial test are presented to illustrate the problems described, but they are not interpreted; for the purposes of the discussion of results the Robust Rank Order Test is used.

VIDEO-RECORDED BEHAVIOUR

Mark

No statistical analysis was carried out on Mark's data, as the number of times he attended sessions during C_1 and C_2 was too few. However, a Fisher's Exact Test was carried out on the number of times he attended versus the number of times he refused to attend sessions (absence due to ill-health was not included in this test). Mark refused to attend control sessions significantly more often ($p<0.05$) than dog sessions (see Table 6.3). This indicates a greater interest in the dog activities, fulfilling the aim of encouraging interest in a participative activity.

Although no further statistical analysis was carried out, visual analysis provides some indication of the types of behaviour that were occurring regularly. The low number of control sessions affects the interpretation of the impact of the dog sessions, compared to control sessions, particularly at the level of single behaviours. However, graphs (Figures 6.3-6.7) of frequent behaviours are shown to illustrate the rate of interactive behaviour across sessions. Both physical and communicative responses about the activity appear to be more frequent during D_1 and D_2, as do physical initiations towards the activity. Levels of not responding to questions and requests are similar across phases; this is an unusual finding compared to other individuals studied (this and previous studies). This may be an idiosyncratic finding characteristic of Mark - that he will ignore the adult(s) just as often, whether the dog is there or not. However, it is possibly just a reflection of the higher interaction rate, where more questions are being asked.

In conclusion, dog-assisted activities had a significant effects on Mark's willingness to attend sessions that were away from his usual day-room and involved other people. As a result of this finding the actual behaviours that occurred during sessions are of less importance but it is important to note that most of the behaviour was appropriate and indicated a positive approach towards the sessions. With the aim of encouraging interest in a participative activity the dog activities were considered to have a significant impact compared to a range of other interactive activities.

Table 6.3 Mark: Attendance of Sessions and Refusal to Attend Sessions
(sessions missed due to ill-health or other commitments are not included)

	Control C1 + C2	Dog D1 + D2
attended	5*	12*
refused to attend	12	4

Fisher's Exact Test (two-tailed): p= 0.015
* 1 session not observed due to equipment failure

Figure 6.3 Mark: Video recorded behaviour - appropriate communicative responses about the activity. C1, C2 = first and second blocks of sessions without the dog. D1, D2 = first and second blocks of sessions with the dog.

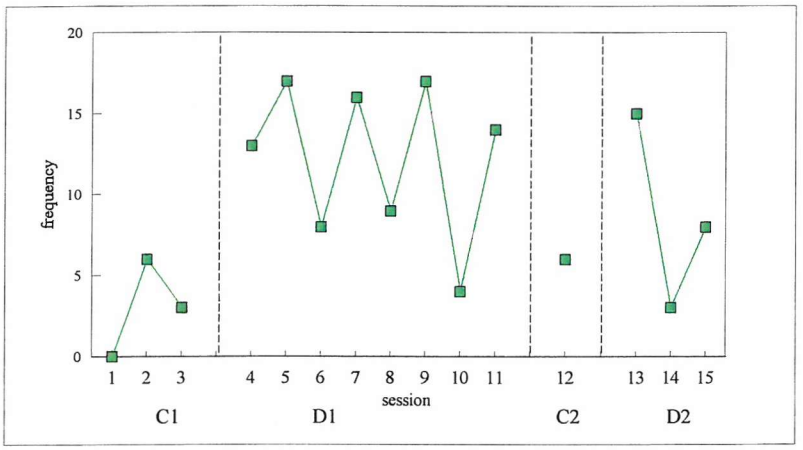


Figure 6.4 Mark: Video recorded behaviour - appropriate physical responses about the activity. C1, C2, D1, D2 - see Figure 6.3

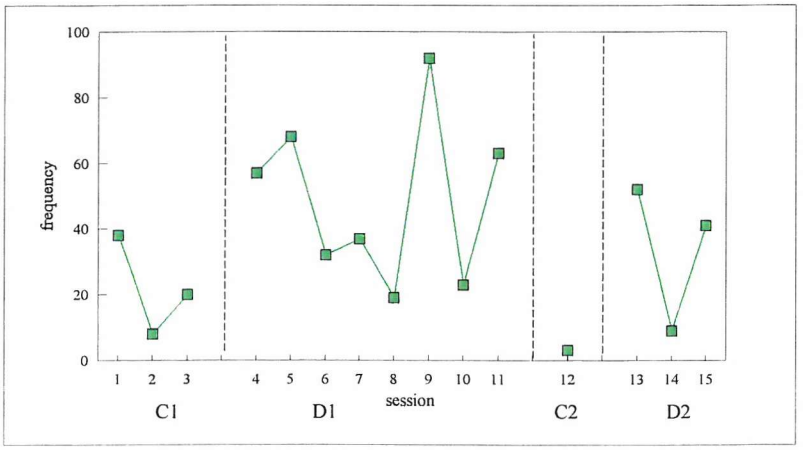


Figure 6.5 Mark: Video-recorded behaviour - not responding to the adults' questions and requests. C1, C2, D1, D2 - see Figure 6.3

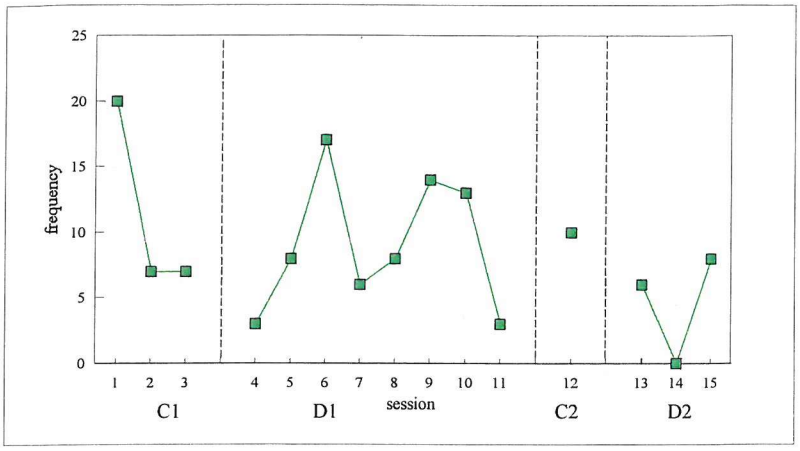


Figure 6.6 Mark: Video-recorded behaviour - appropriate physical initiations towards the activity. C1, C2, D1, D2 - see Figure 6.3

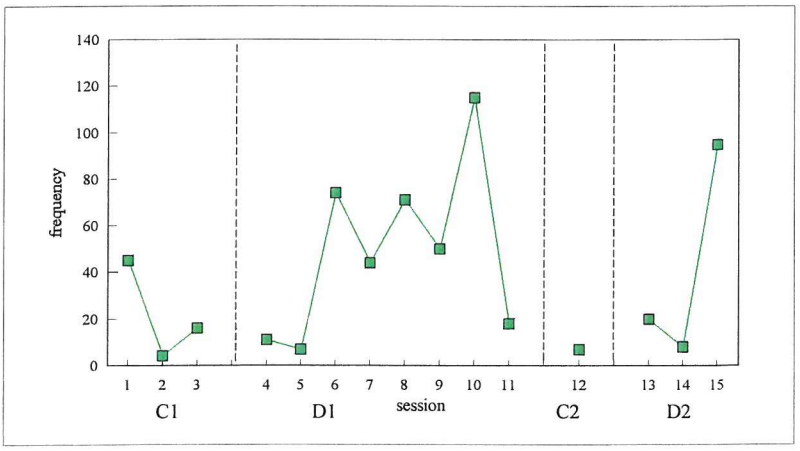
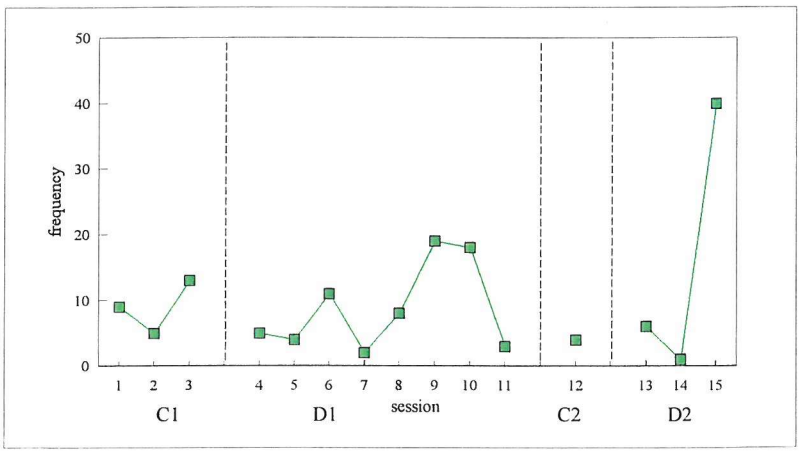


Figure 6.7 Mark: Video-recorded behaviour - laughing.
C1, C2, D1, D2 - see Figure 6.3



Lisa

A descriptive summary of Lisa's behaviour is shown in Figures 6.8-6.15. Phases C_1 and D_1 were compared, as were phases D_1 and C_2 using the Robust Rank Order test. Phases D_1 and D_2 could not be compared statistically due to the small number of data points in D_2, although visual analysis does provide some indication as to the similarities between the two dog phases.

Both control phases were significantly lower ($p<0.01$) than the first dog phase for appropriate communicative responses concerning the activity, indicating that Lisa was more willing to talk positively about what was going on in the dog sessions. Although there are too few data points to compare the two dog phases, the second phase of dog sessions indicates a return to this higher level of communicative responses. In addition communicative responses that could not be distinguished or interpreted by the adults were significantly higher ($p<0.01$) when moving from C_1 to D_1; this may reflect an increased level of excitement or lack of concentration when the dog was introduced, but it is still an indicator of an increased level of attempted interaction with the adult that is asking questions. There is some indication ($p<0.1$) that the control phases included more inappropriate communicative responses from Lisa, supporting the idea that the dog encouraged an interest and willingness that the control activities did not. The rate of ignoring the adults questions and requests was significantly lower in the first dog phase when compared with both the first ($p<0.025$) and second ($p<0.01$) control phases, again suggesting a greater willingness to respond during the sessions. The first and second dog phases appear to show a similarly low level of not responding to the adult, indicating a robust finding. It should also be noted that the increase in control sessions after a phase of dog sessions appears to be higher than in the original control sessions and may indicate an additional negative effect of withdrawing the dog sessions. This drawback should be considered when implementing dog-assisted activity programmes.

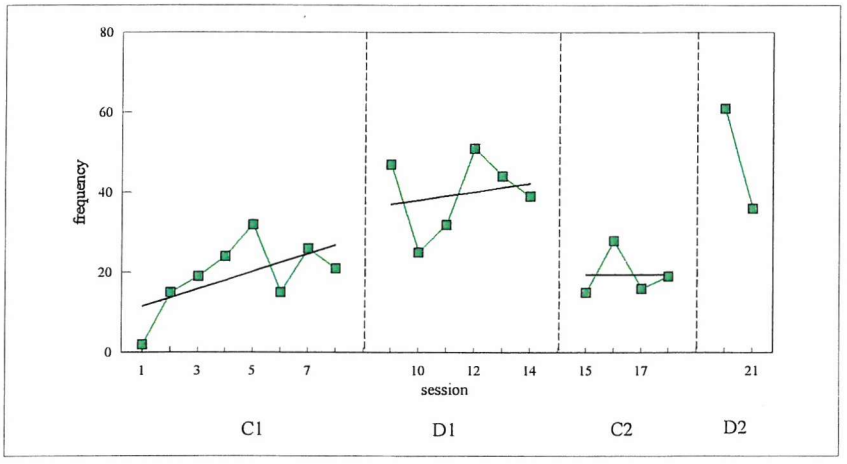
Appropriate physical initiations towards the activity are significantly higher ($p<0.01$) in both control phases when compared with the first dog phase. This demonstrates Lisa's intense focusing on the control activity (mainly the radio controlled cat) to the exclusion of other behaviours. This suggests that the control activity was of great interest to Lisa but when examining other behaviours it also indicates that it did not encourage interaction with people.

A significantly higher level ($p<0.025$) for Lisa's use of her right hand was seen during D_1 compared to C_1 and this level of use appears to be maintained into the next control phase (C_2) and the second

dog phase (D_2). There is also some indication that Lisa's affect was enhanced by the first phase of dog sessions, where she laughed slightly more often than during the first control phase ($p<0.1$) and significantly more often than the second control phase ($p<0.01$). This may have been a novelty effect but it does indicate a positive response to the introduction of the dog sessions.

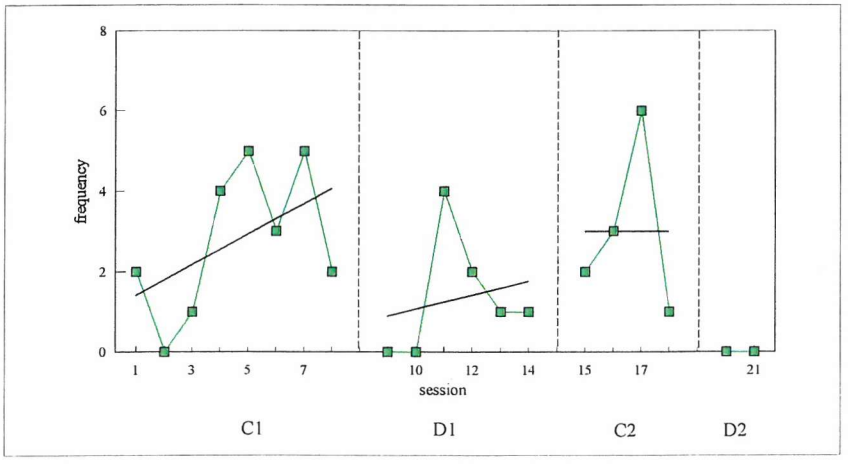
Overall, Lisa responded well to both dog and control sessions, with an emphasis on greater levels of interaction with the adults during dog sessions. Although her level of interest in the dog might not have been as high as that of the control activities, the dog seemed to stimulate more cooperative behaviour. As far as the use of her right arm was concerned this was seen to increase when the dog was introduced and was maintained throughout subsequent sessions both with and without the dog.

Figure 6.8 Lisa: Video-recorded behaviour - appropriate communicative responses about the activity. C1, C2 = first and second blocks of sessions without the dog. D1, D2 = first and second blocks of sessions with the dog.



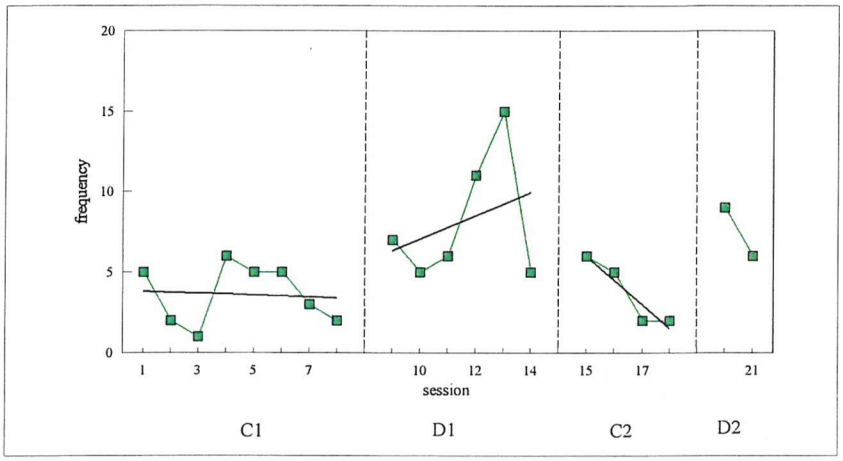
Comparing phases	Test	Test Result and Significance Value	
C1 with D1	*(Robust Rank Order)*	U = 7.579	p<0.01
	(Binomial)	*3+ 3-*	*NS*
D1 with C2	*(Robust Rank Order)*	U = 6.9	p<0.01

Figure 6.9 Lisa: Video-recorded behaviour - inappropriate communicative responses about the activity. C1, C2, D1, D2 - see Figure 6.8.



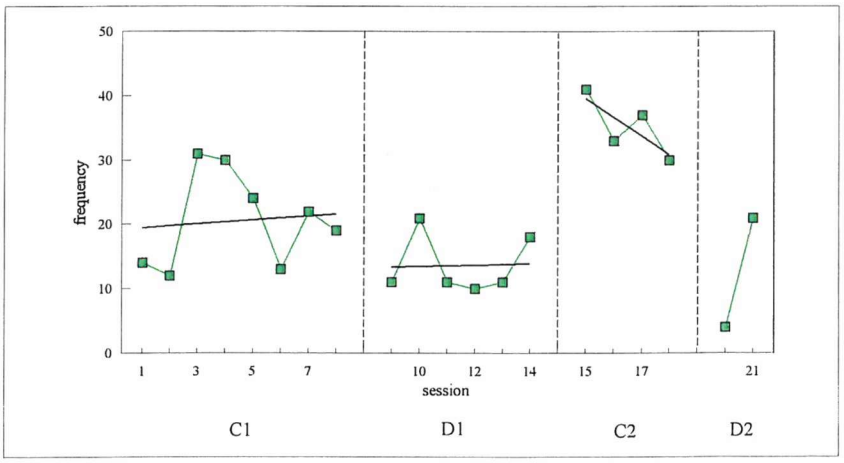
Comparing phases	Test	Test Result and Significance Value	
C1 with D1	*(Robust Rank Order)*	U = 1.501	p<0.1
	(Binomial)	*0+ 6-*	*p<0.05*
D1 with C2	*(Robust Rank Order)*	U = 1.644	p<0.1

Figure 6.10 Lisa: Video-recorded behaviour - indistinguishable responses about the activity.
C1, C2, D1, D2 - see Figure 6.8



Comparing phases	Test	Test Result and Significance Value	
C1 with D1	*(Robust Rank Order)*	U = 4.355	p<0.01
	(Binomial)	*6+ 0-*	*p<0.05*
D1 with C2	*(Robust Rank Order)*	U = 0.476	NS

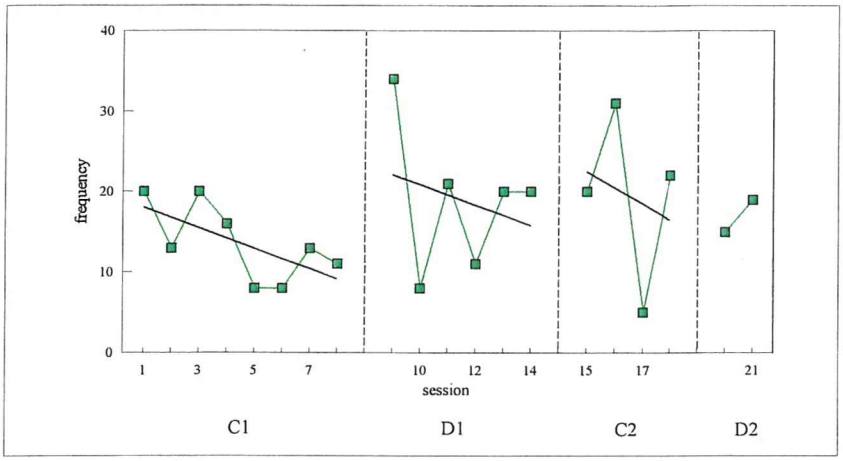
Figure 6.11 Lisa: Video-recorded behaviour - not responding to adults' questions and requests.
C1, C2, D1, D2 - see Figure 6.8



Comparing phases	Test	Test Result and Significance Value	
C1 with D1	*(Robust Rank Order)*	U = 3.120	p<0.025
	(Binomial)	*0+ 6-*	*p<0.05*
D1 with C2	*(Robust Rank Order)*	U = 8.493*	p<0.01

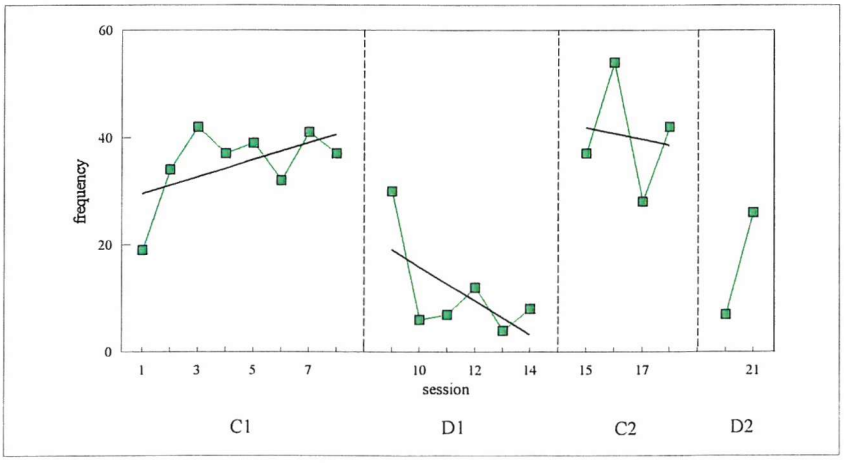
* all values in one phase higher than the other phase. In order to calculate a U score, one rank in the lower group is given the value 1 rather than 0, therefore producing a conservative estimater of U.

Figure 6.12 Lisa: Video-recorded behaviour - indistinguishable communicative initiations.
C1, C2, D1, D2 - see Figure 6.8



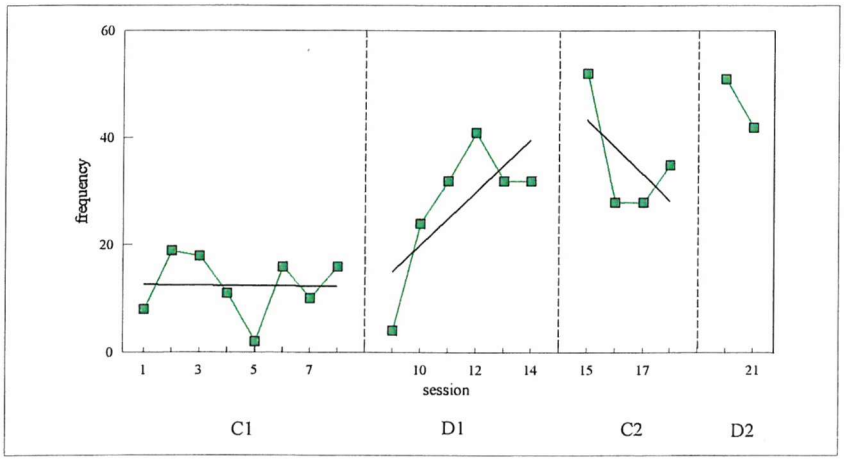
Comparing phases	Test	Test Result and Significance Value	
C1 with D1	*(Robust Rank Order)*	U = 1.287	NS
	(Binomial)	*6+ 0-*	*p<0.05*
D1 with C2	*(Robust Rank Order)*	U = 0.186	NS

Figure 6.13 Lisa: Video-recorded behaviour - appropriate physical initiations towards the activity.
C1, C2, D1, D2 - see Figure 6.8



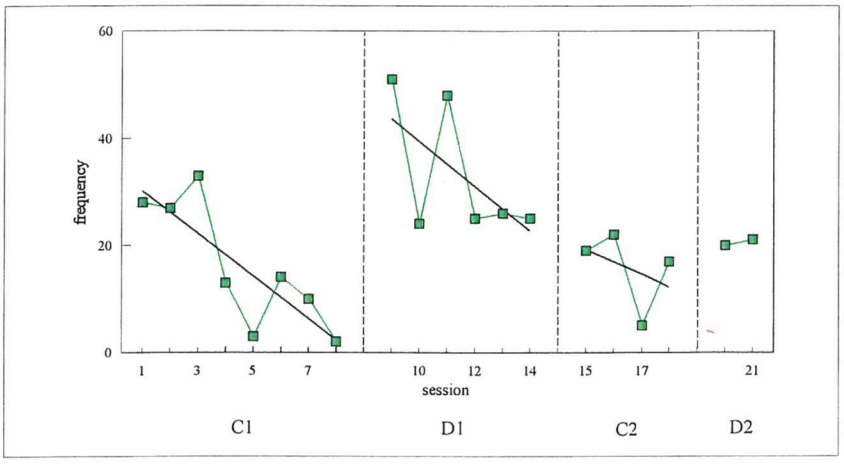
Comparing phases	Test	Test Result and Significance Value	
C1 with D1	*(Robust Rank Order)*	U = 14.0	p<0.01
	(Binomial)	*0+ 6-*	*p<0.05*
D1 with C2	*(Robust Rank Order)*	U = 6.9	p<0.01

Figure 6.14 Lisa: Video-recorded behaviour - using her right hand.
C1, C2, D1, D2 - see Figure 6.8



Comparing phases	Test	Test Result and Significance Value	
C1 with D1	*(Robust Rank Order)*	U = 2.462	p<0.025
	(Binomial)	*5+ 1-*	*NS*
D1 with C2	*(Robust Rank Order)*	U = 0.590	NS

Figure 6.15 Lisa: Video-recorded behaviour - laughing.
C1, C2, D1, D2 - see Figure 6.8



Comparing phases	Test	Test Result and Significance Value	
C1 with D1	*(Robust Rank Order)*	U = 1.68	p<0.1
	(Binomial)	*6+ 0-*	*p<0.05*
D1 with C2	*(Robust Rank Order)*	U = 8.693*	p<0.01

* all values in one phase higher than the other phase. In order to calculate a U score, one rank in the lower group is given the value 1 rather than 0, therefore producing a conservative estimate of U.

Thomas

A descriptive summary of Thomas's behaviour is shown in Figures 6.16 - 6.28. The Robust Rank Order test was used to compare phases C_1 and D_1, D_1 and C_2. A Wilcoxon Signed Rank test was used to compare D_1 and D_2. In order to carry out this Wilcoxon Signed Rank test the number of data points in D_1 was reduced to the first seven sessions (matching the number of sessions in D_2). Despite the variation in Thomas's ability to stay involved in the sessions for the full 15 minutes, calculation of rates of behaviour (i.e. frequency of behaviour ÷ duration of session) was considered inappropriate, as the aim of every session was to encourage as much interactive behaviour as possible and his leaving the session was one way he could prevent this outcome.

Thomas's behaviour was quite erratic over the sessions, but this was not considered unusual for him, by his carers. This variability increases the difficulties associated with visually interpreting the data but owing to the greater number of sessions (9 for C_1, D_1 and C_2; 7 for D_2) it was possible to statistically compare all phases.

The amount of time that Thomas could be encouraged to stay in the room where sessions were carried out varied over the course of the study. Thomas stayed in the room for significantly longer during the first dog phase than either the first control phase ($p<0.01$) or the second control phase ($p<0.05$), and the first and second dog phases did not significantly differ in terms of time spent in the room. This indicates a preference for the dog-assisted activities. There is a ceiling effect for this variable - maximum session length was 15 minutes - this would have affected the significance tests by making them more conservative. However, to confirm this interpretation of the data, a Fisher's exact test was carried out on the number of sessions that Thomas remained in the room for the full fifteen minutes or left the room early, comparing control phases with dog phases (see Table 6.4). The results of this second analysis, show that Thomas was significantly more likely to remain for the whole session when the dog was present ($p<0.01$) and support the original interpretation that Thomas had a preference for the dog-assisted activities.

Description of Thomas's responsive and initiation behaviours refers to physical actions, as communicative behaviour was very rare. Thomas was less likely to ignore questions or requests during the dog sessions (C_1 - D_1, $p<0.01$; D_1 - C_2, $p<0.05$) and the two dog phases were not significantly different. This suggests a robust finding that the dog sessions reduced this 'ignoring behaviour'. In addition the number of times that he would respond appropriately to a request was

significantly greater ($p<0.01$) during D_1 than C_1 and close to significance ($p<0.1$) when compared to C_2. This may indicate that the dog increased his overall level of appropriate responses, with a slight decline when the dog was removed (C_2). Again the two dog phases were not significantly different indicating that the dog's influence did not change over the period of the study. Thomas appeared to respond appropriately more often to requests about things other than the activity during the second phase of control sessions ($p<0.05$). This would be in response to a request such as sit down, or stop doing that, and indicates that more requests that were not directly relevant to the activity were felt necessary by the adults. It was not recorded whether these types of request were just as frequent during dog phases and were ignored by Thomas. However this type of request was kept to a minimum and the frequency of responses to them can be seen in Figure 6.18 to be at a maximum of six times in a session. This low frequency also warrants caution when interpreting this result.

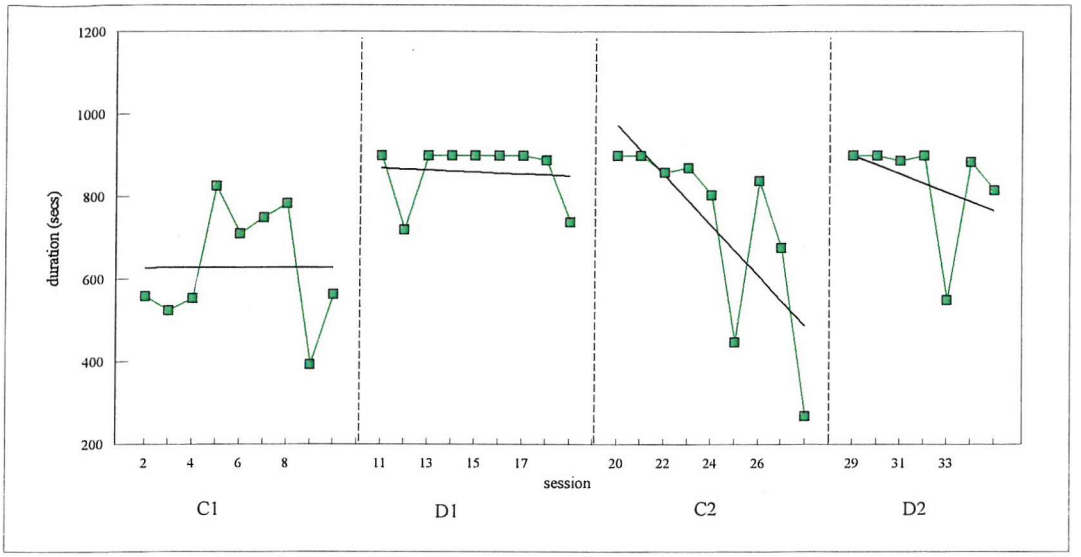
Appropriate initiations towards the activity were significantly higher ($p<0.01$) during the first dog phase than the control phases and again this higher level was maintained through the second dog phase, with no significant difference between D_1 and D_2. Increases in these initiations suggests a greater level of interest in the dog activities.

Inappropriate responses were seen to significantly increase over the first three phases (i.e. $C_1<D_1<C_2$) ($p<0.01$) which may just be an indication of the increase in attempts to respond and therefore increasing all types of behaviour. However when considering the whole behavioural repertoire during sessions the impression is that the withdrawal of the dog (C_2) encourages more inappropriate responses while only slightly diminishing appropriate responses, suggesting a minor negative impact, based on introducing some problem behaviours but not eradicating appropriate behaviours that have been learned during dog sessions. In addition inappropriate initiations to the activity also increased ($p<0.01$) during the second control phase. Again frequencies are low, but as this finding indicates that withdrawal of the dog may negatively affect subsequent sessions it should be noted as an important factor that should be considered when introducing dog-assisted activities. However, it is also possible that these inappropriate behaviours may have just been an indication of boredom or frustration with the control activities which was not seen over the course of the two dog phases. Angry behaviour was only really seen during the second control phase which was significantly greater ($p<0.025$) than during the first dog phase, and again may reflect annoyance at the withdrawal of the dog or just boredom with the particular activities presented.

The frequency of problem behaviours were also seen to be significantly different between phases: D_1 saw a reduction in rocking behaviour ($p<0.05$) from C_1, and licking his hands was significantly greater during C_2 than D_1 ($p<0.05$). These behaviours are not particularly frequent and the graphs indicate session-to-session variability. In addition, duration measurements were taken for two problem behaviours that are prominent in Thomas's everyday life - rocking and groaning. The amount of time that was spent during each session **without** these behaviours being performed was analysed. This measure (rather than how much time spent actually doing these behaviours) was used, as the aim of all sessions for Thomas was to encourage activity time without problem behaviours being shown. The fact that Thomas sometimes left sessions altogether was considered as similar to a problem behaviour and therefore percentage durations of these behaviours would be misleading. During the first dog phase Thomas spent significantly more time not rocking than during the first ($p<0.01$) or second ($p<0.025$) control phases. Similarly not groaning was of longer duration in the first dog phase than either the first ($p<0.01$) or second ($p<0.05$) control phase. Time spent not rocking and not groaning was not significantly different between the first and second dog phases indicating that the dog activities maintained a level of activity time without these problem behaviours when compared to control activities.

Overall, Thomas was more cooperative and interested during the dog sessions compared with the control sessions and this was sustained through both dog phases. This was not seen for control activities where the second phase showed increases in inappropriate behaviour and anger, possibly due to the control activities themselves or as a result of the dog activities being withdrawn. The return to similar behaviour in the second dog phase as the first suggests that the effects of the dog's presence were quite robust for this individual.

Figure 6.16 Thomas: Video-recorded behaviour - length of session. C1, C2 = first and second blocks of sessions without the dog. D1, D2 = first and second blocks of sessions with the dog.



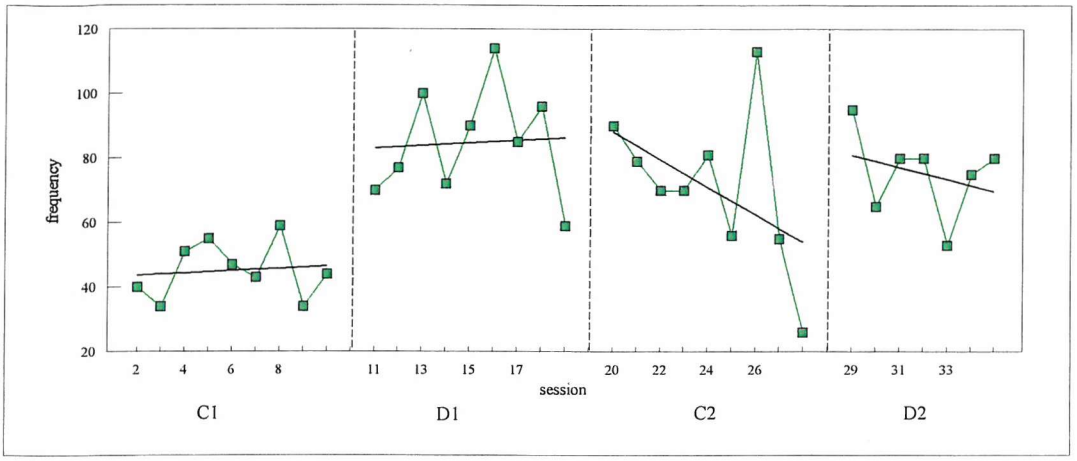
Comparing phases	Test	Test Result and Significance Value	
C1 with D1	*(Robust Rank Order)*	U = 6.572	p<0.01
	(Binomial)	*9+ 0-*	*p<0.005*
D1 with C2	*(Robust Rank Order)*	U = 2.09	p<0.05
D1 with D2	*(Wilcoxon Signed Rank)*	Z = -.944	p = .345

Table 6.4 Thomas: Length of sessions
(staying for the whole session (900 seconds) or leaving early)

	Control C1 + C2	Dog D1 + D2
stayed for the whole session	2	9
left the session early	16	7

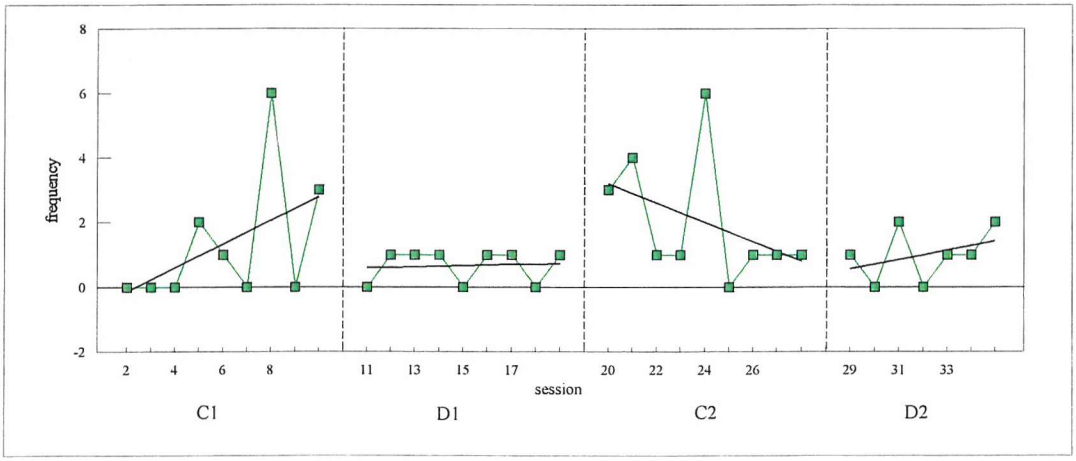
Fisher's Exact Test (two-tailed): p = 0.009

Figure 6.17 Thomas: Video-recorded behaviour - appropriate physical responses about the activity.
C1, C2, D1, D2 - see Figure 6.16



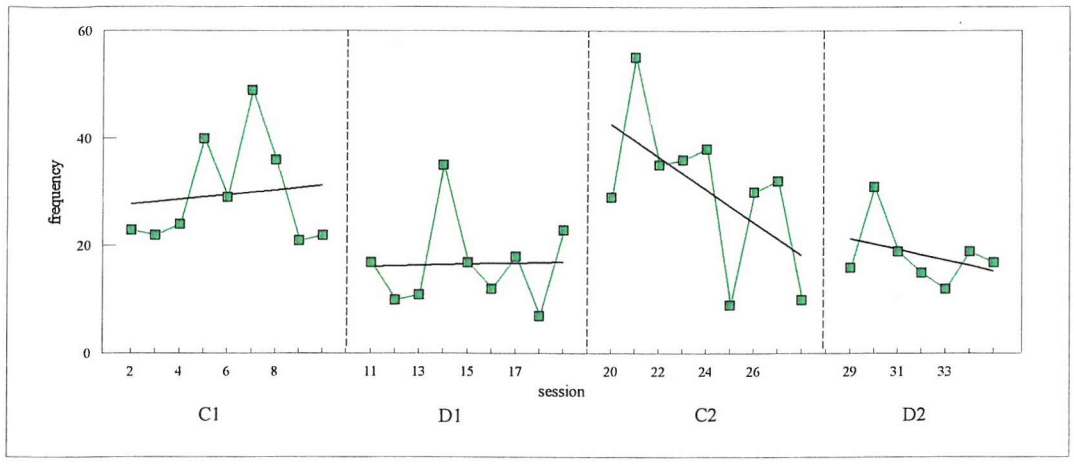
Comparing phases	Test	Test Result and Significance Value	
C1 with D1	*(Robust Rank Order)*	U = 41.227	p<0.01
	(Binomial)	*9+ 0-*	*p<0.005*
D1 with C2	*(Robust Rank Order)*	U = 1.487	p<0.1
D1 with D2	*(Wilcoxon Signed Rank)*	Z = -1.183	p = .237

Figure 6.18 Thomas: Video-recorded behaviour - appropriate physical responses about other.
C1, C2, D1, D2 - see Figure 6.16



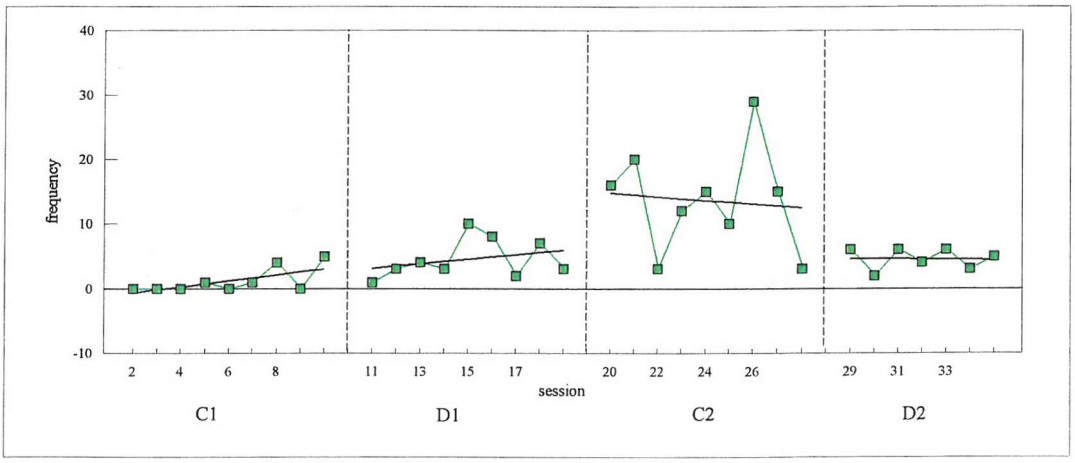
Comparing phases	Test	Test Result and Significance Value	
C1 with D1	*(Robust Rank Order)*	U = 0.063	NS
	(Binomial)	*0+ 9-*	*p<0.005*
D1 with C2	*(Robust Rank Order)*	U = 2.022	p<0.05
D1 with D2	*(Wilcoxon Signed Rank)*	Z = -.816	p = .414

Figure 6.19 Thomas: Video-recorded behaviour - not responding to adults' questions and requests. C1, C2, D1, D2 - see Figure 6.16



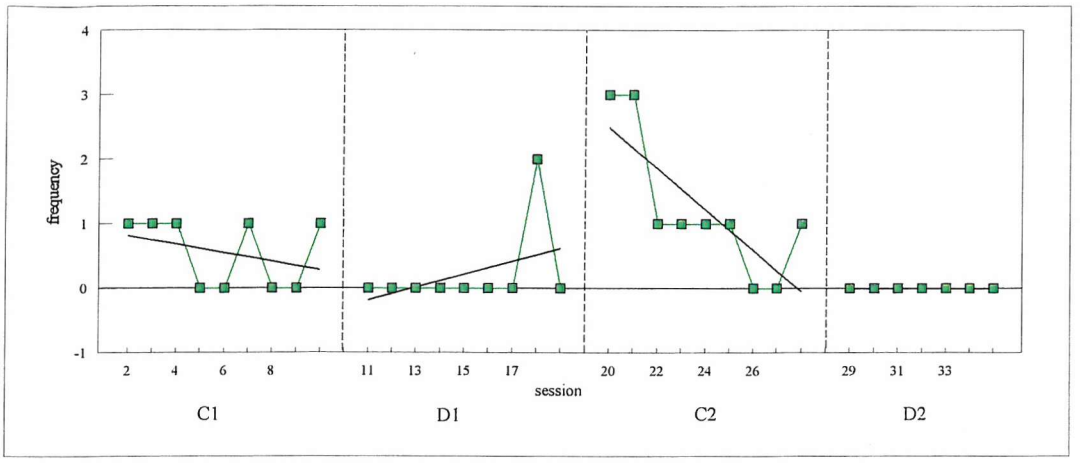
Comparing phases	Test	Test Result and Significance Value	
C1 with D1	*(Robust Rank Order)*	U = 4.265	p<0.01
	(Binomial)	*1+ 8-*	*p<0.05*
D1 with C2	*(Robust Rank Order)*	U = 2.011	p<0.05
D1 with D2	*(Wilcoxon Signed Rank)*	Z = -.339	p = .735

Figure 6.20 Thomas: Video-recorded behaviour - inappropriate physical responses about the activity. C1, C2, D1, D2 - see Figure 6.16



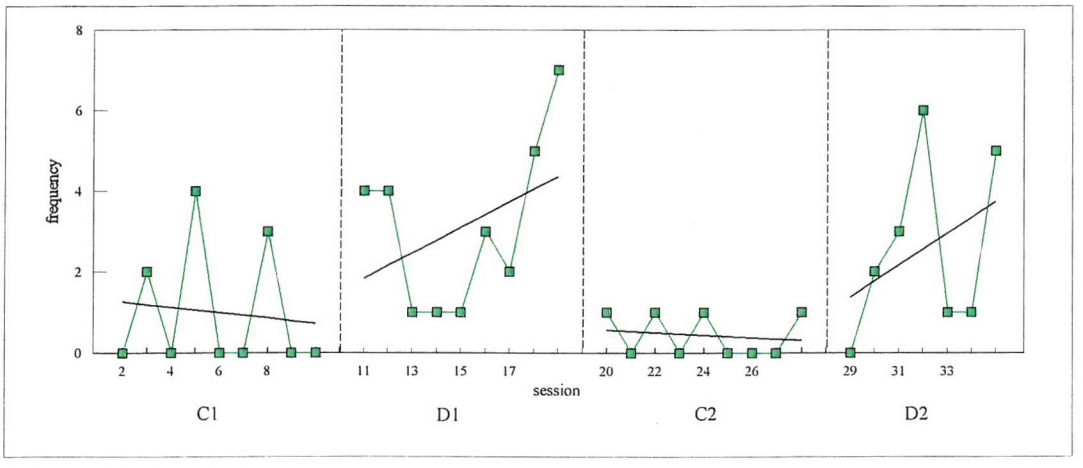
Comparing phases	Test	Test Result and Significance Value	
C1 with D1	*(Robust Rank Order)*	U = 3.350	p<0.01
	(Binomial)	*3+ 6-*	*NS*
D1 with C2	*(Robust Rank Order)*	U = 3.669	p<0.01
D1 with D2	*(Wilcoxon Signed Rank)*	Z = -.170	p = .865

Figure 6.21 Thomas: Video-recorded behaviour - inappropriate physical initiations towards the activity C1, C2, D1, D2 - see Figure 6.16



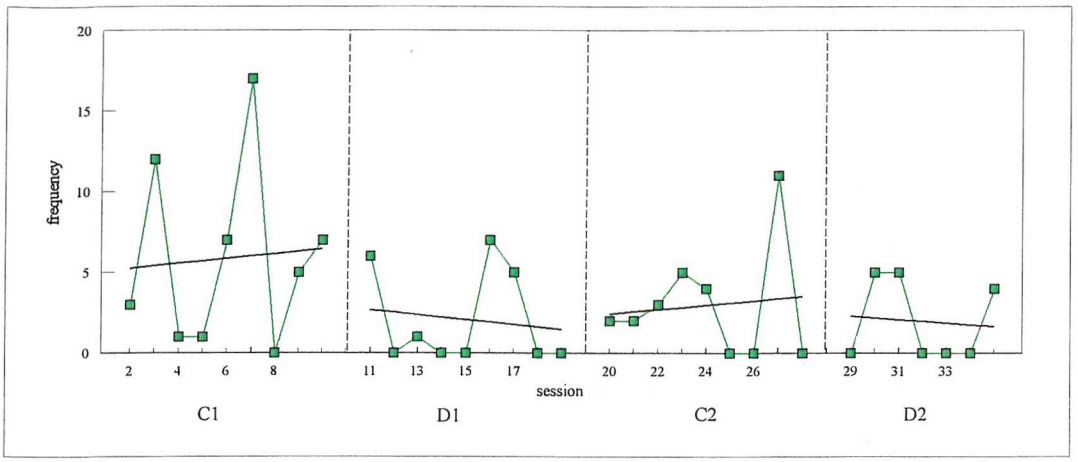
Comparing phases	Test	Test Result and Significance Value	
C1 with D1	*(Robust Rank Order)*	U = 1.579	NS
	(Binomial)	*5+ 4-*	*NS*
D1 with C2	*(Robust Rank Order)*	U = 2.96	p<0.01
D1 with D2	*(Wilcoxon Signed Rank)*	Z = 0.00	p = 1.00

Figure 6.22 Thomas: Video-recorded behaviour - appropriate physical initiations towards the activity. C1, C2, D1, D2 - see Figure 6.16



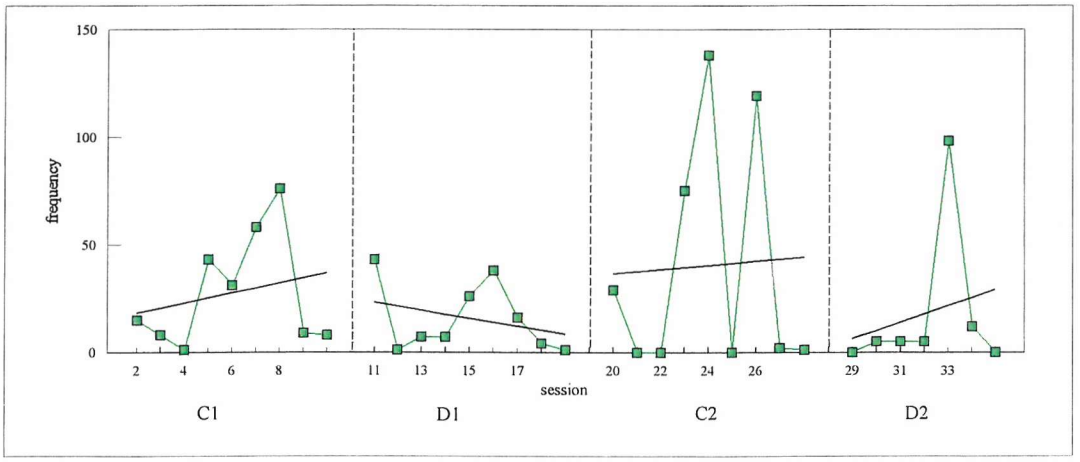
Comparing phases	Test	Test Result and Significance Value	
C1 with D1	*(Robust Rank Order)*	U = 3.112	p<0.01
	(Binomial)	*9+ 0-*	*p<0.005*
D1 with C2	*(Robust Rank Order)*	U = 8.009	p<0.01
D1 with D2	*(Wilcoxon Signed Rank)*	Z = -.318	p = .750

Figure 6.23 Thomas: Video-recorded behaviour - rocking.
C1, C2, D1, D2 - see Figure 6.16



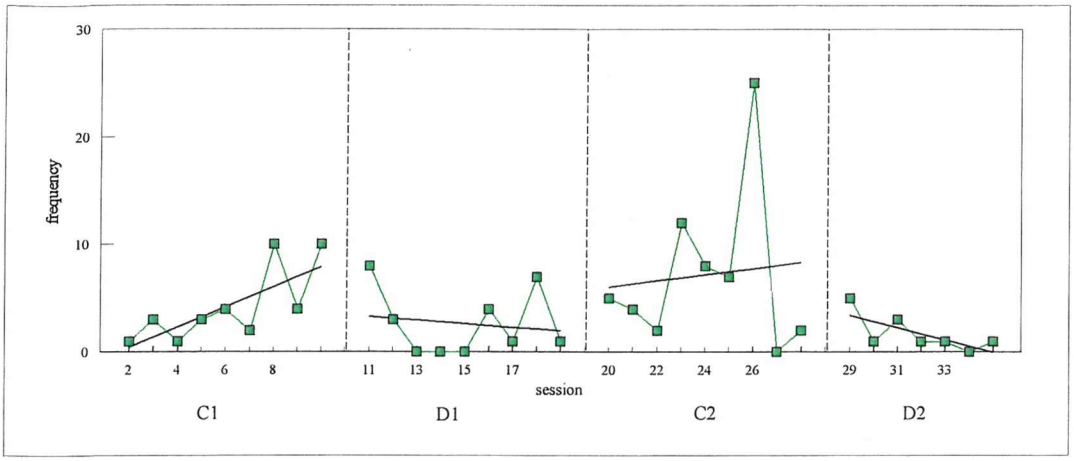
Comparing phases	Test	Test Result and Significance Value	
C1 with D1	*(Robust Rank Order)*	U = 2.101	p<0.05
	(Binomial)	*0+ 9-*	*p<0.005*
D1 with C2	*(Robust Rank Order)*	U = 0.557	NS
D1 with D2	*(Wilcoxon Signed Rank)*	Z = -.674	p = .500

Figure 6.24 Thomas: Video-recorded behaviour - clapping.
C1, C2, D1, D2 - see Figure 6.16



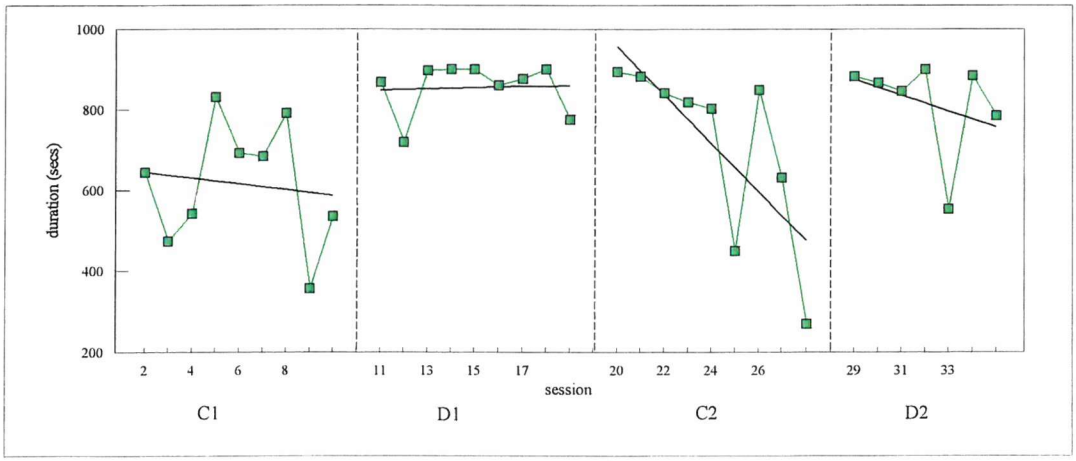
Comparing phases	Test	Test Result and Significance Value	
C1 with D1	*(Robust Rank Order)*	U = 1.196	NS
	(Binomial)	*1+ 8-*	*p<0.05*
D1 with C2	*(Robust Rank Order)*	U = 0.267	NS
D1 with D2	*(Wilcoxon Signed Rank)*	Z = -.677	p = .498

Figure 6.25 Thomas: Video-recorded behaviour - licking his hands.
C1, C2, D1, D2 - see Figure 6.16



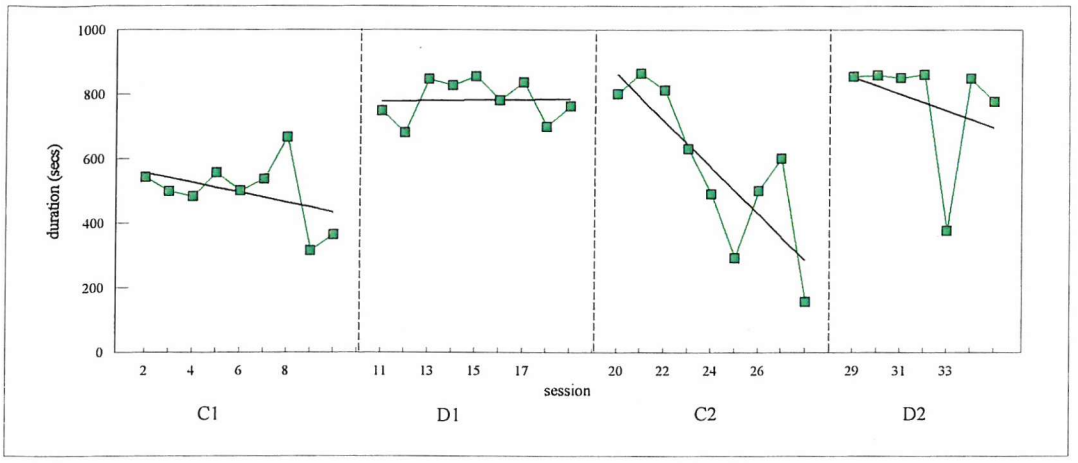
Comparing phases	Test	Test Result and Significance Value	
C1 with D1	*(Robust Rank Order)*	U = 1.310	p<0.1
	(Binomial)	*0+ 9-*	*p<0.005*
D1 with C2	*(Robust Rank Order)*	U = 1.789	p<0.05
D1 with D2	*(Wilcoxon Signed Rank)*	Z = -.632	p = .527

Figure 6.26 Thomas: Video-recorded behaviour - time spent not rocking.
C1, C2, D1, D2 - see Figure 6.16



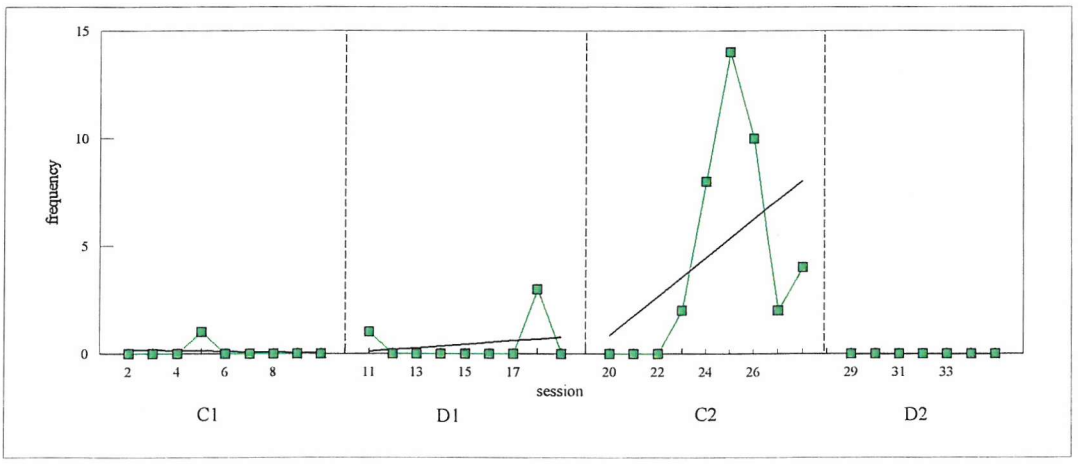
Comparing phases	Test	Test Result and Significance Value	
C1 with D1	*(Robust Rank Order)*	U = 9.055	p<0.01
	(Binomial)	*9+ 0-*	*p<0.005*
D1 with C2	*(Robust Rank Order)*	U = 2.346	p<0.025
D1 with D2	*(Wilcoxon Signed Rank)*	Z = -.507	p = .612

Figure 6.27 Thomas: Video-recorded behaviour - time spent not groaning
C1, C2, D1, D2 - see Figure 6.16



Comparing phases	Test	Test Result and Significance Value	
C1 with D1	*(Robust Rank Order)*	U = 29.104	p<0.01
	(Binomial)	*9+ 0-*	*p<0.005*
D1 with C2	*(Robust Rank Order)*	U = 2.011	p<0.05
D1 with D2	*(Wilcoxon Signed Rank)*	Z = -.676	p = .499

Figure 6.28 Thomas: Video-recorded behaviour - anger.
C1, C2, D1, D2 - see Figure 6.16



Comparing phases	Test	Test Result and Significance Value	
C1 with D1	*(Robust Rank Order)*	U = 0.600	NS
	(Binomial)		
D1 with C2	*(Robust Rank Order)*	U = 2.449	p<0.025
D1 with D2	*(Wilcoxon Signed Rank)*	Z = -1.00	p = .317

STAFF CHECKLISTS

Checklists were completed by the member of staff who was present for each session. Unfortunately different members of staff were available during these sessions and therefore inference should be accepted with caution when comparing the data from these questionnaires. However, it was considered worthwhile to investigate overall staff impressions (employing the same statistical procedures as used for examining video-recorded behaviour). It was considered appropriate to disregard the questions referring to specific behaviours and whether they were better or worse than everyday behaviour, as it became clear during the study that these questions were regularly misinterpreted by the staff (e.g. sometimes making the comparison of better/worse to usual behaviour outside the sessions and sometimes comparing to other sessions). Before the study began several members of staff were asked to complete a general information checklist that covered very similar questions to those on the checklist completed after each session, it was therefore also possible to gain an impression of how the staff thought that the behaviours involved were affected in comparison to general behaviours before the project.

Mark

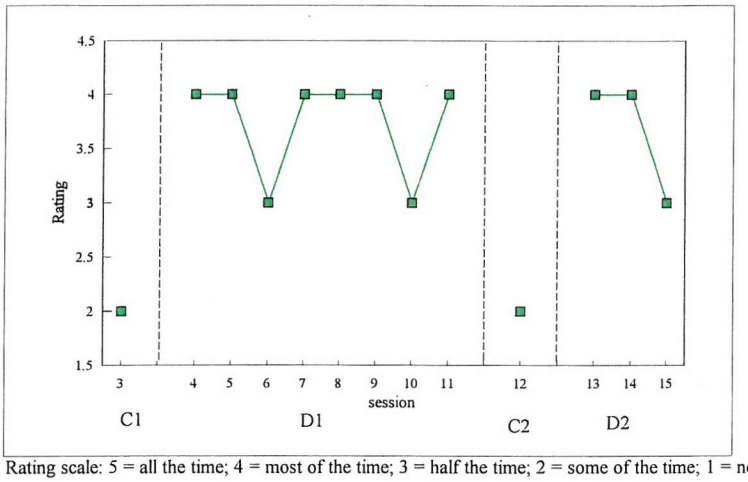
Visual inspection of graphs generated from the staff checklists data support the idea that Mark responded to questions and requests more often during dog sessions, as well as showing a greater interest and more enjoyment during dog activities. These were the only items that were consistent across phases (see Figures 6.29 - 6.31).

Comparing the information about general behaviour before the study with that gathered after sessions (Figure 6.32) it can be seen that dog sessions produced reports of greater responding (between "half and most of the time") compared to control sessions and generally ("sometimes"). The rate of initiations, however, was not reported as being different between any of these conditions (generally, dog or control sessions). Difficult behaviour was lower in both dog phases and one of the control phases when compared to general, but this difference is small. Mark's interest in what was going on around him was higher than normal during dog sessions and lower than normal during control sessions. Uncooperative behaviour was less than usual during the last three phases of the study (D_1, C_2, D_2), but again this difference is very small with "sometimes" being the greatest amount of uncooperative behaviour reported. The reasonable amount of interaction with people was comparable between general and dog sessions, but was slightly lower during control sessions.

Overall the dog sessions appear to encourage a greater level of responsive behaviour compared to usual and a slightly higher level of interest, and maintain a reasonable level of interaction with others. The control activities show a lower level of interest than usual and perhaps reduce interaction a little.

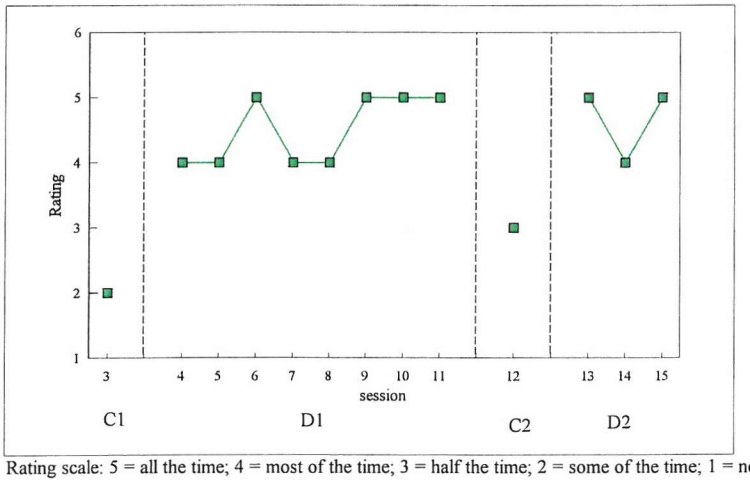
The staff checklists completed after sessions reflect Mark's interest in the dog activities as seen by the observed behavioural measures. The comparison with staff reports of his general behaviour illustrate how different activities that require attention and effort from Mark produced contrasting effects on his behaviour not only between the activities but also with his general behaviour as seen before the activities were introduced.

Figure 6.29 Mark: Staff checklist ratings for the item "Did he respond to questions and requests?". C1, C2 = first and second blocks of sessions without the dog. D1, D2 = first and second blocks of sessions with the dog.



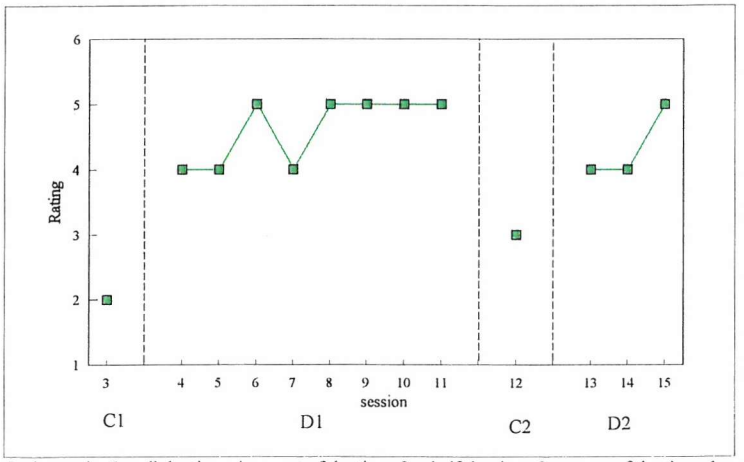
Rating scale: 5 = all the time; 4 = most of the time; 3 = half the time; 2 = some of the time; 1 = not at all

Figure 6.30 Mark: Staff checklist ratings for the item "Was he interested in /attending to the activities?" C1, C2, D1, D2 - see Figure 6.29



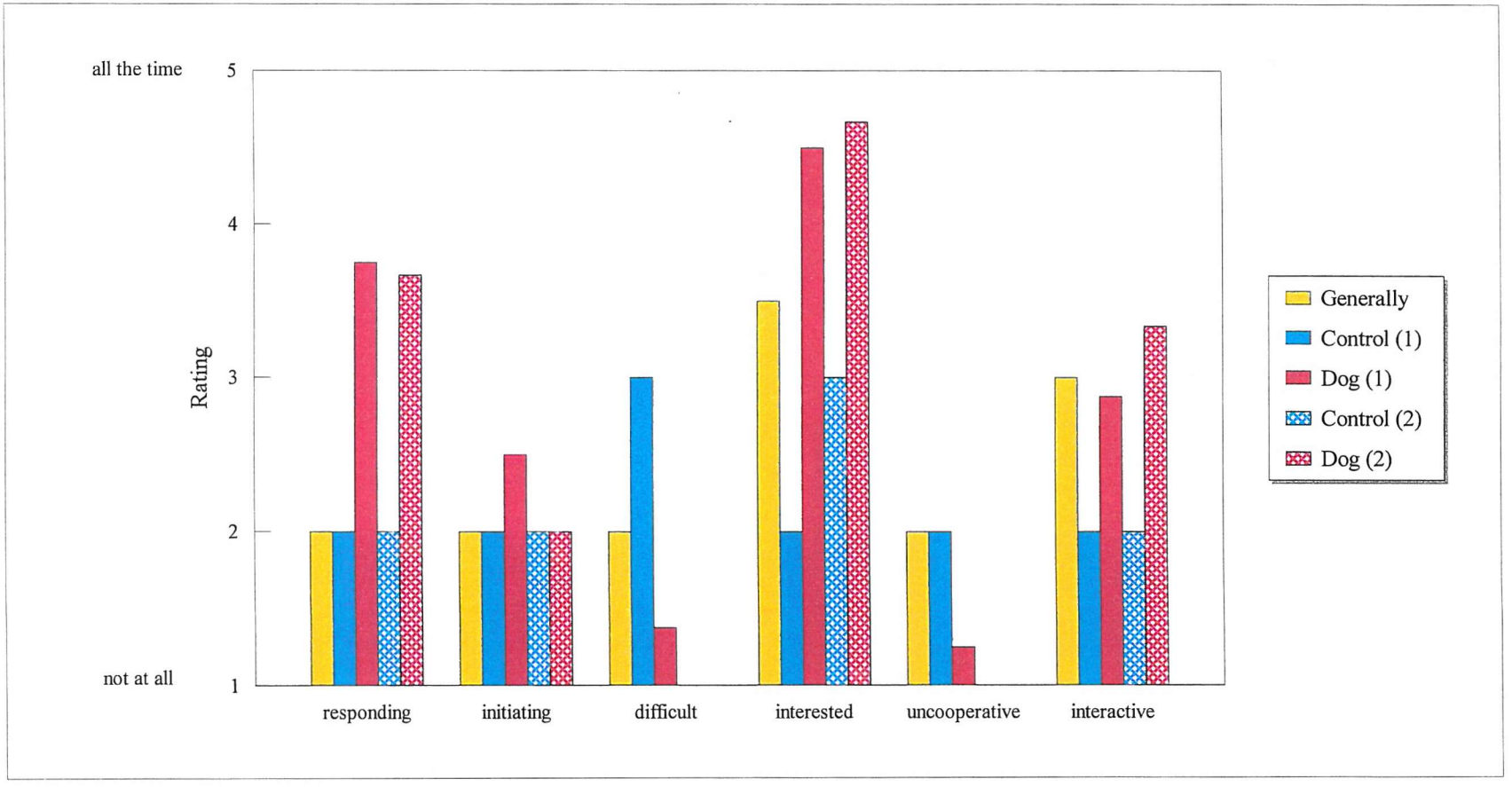
Rating scale: 5 = all the time; 4 = most of the time; 3 = half the time; 2 = some of the time; 1 = not at all

Figure 6.31 Mark: Staff checklist ratings for the item "Do you think he enjoyed the session? C1, C2, D1, D2 - see Figure 6.29



Rating scale: 5 = all the time; 4 = most of the time; 3 = half the time; 2 = some of the time; 1 = not at all

Figure 6.32 Mark: Average scores from staff checklist ratings of general behaviour before the study and during sessions.

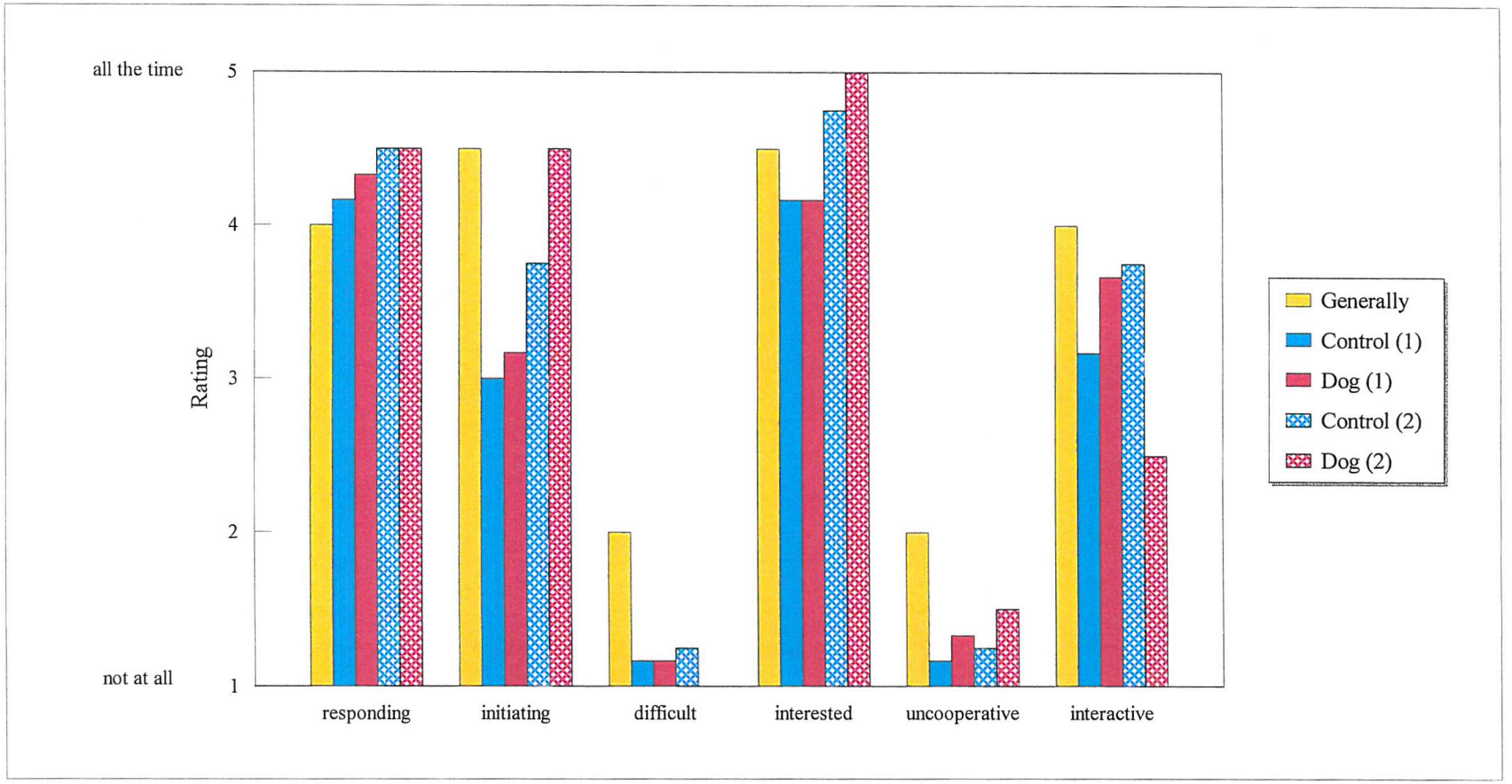


Lisa

No significant differences were found from the staff checklist data. The behavioural measures taken indicate quite specific differences rather than general ones and it may be that the questions on the checklist were too broad, or it may be that this reflects Lisa's overall positive reactions to both the control and dog activities. This finding does illustrate the importance of behavioural observation in order to determine small changes that may not be reported by staff.

Checklists relating to general behaviour before the study and behaviour during sessions stay within a small range for all behaviours discussed (Figure 6.33). Indicating that the activities presented could be considered as additional activities for Lisa that will not markedly alter her behaviour but will maintain her usual levels of interaction and interest. Two behaviours that show a slight difference between general reports and those made after sessions is her difficult and uncooperative behaviour which is lower after all sessions compared to general. This again supports the impression that Lisa responded positively to both the control and the dog activities.

Figure 6.33 Lisa: Average scores from staff checklist ratings of general behaviour before the study and during sessions.



Thomas

The staff checklists revealed a number of significant differences between phases (for graphs and significance values see Figures 6.34 - 6.39). This data generally supports the behavioural measures recorded. Responding to questions and requests was thought to be higher during the first dog phases than either the first ($p<0.01$) or second ($p<0.05$) control phases, and the two dog phases did not yield significantly different results. Thomas was thought to be more interested in the first phase of dog sessions than the first phase of control sessions ($p<0.05$) and slightly more so than the second control phase ($p<0.1$). Again this level of interest in the dog sessions was not significantly different between the two dog phases. Staff also reported an increase in interaction moving from the first control phase to the first dog phase ($p<0.05$). In addition Thomas was reported to be more uncooperative during the first ($p<0.025$) and second ($p<0.05$) control phases compared to the first dog phase. The second dog phase showed slightly lower levels of uncooperative behaviour than the first dog phase ($z = -1.732$; $p = 0.083$), so both dog phases reduced Thomas's uncooperative behaviour with this reduction becoming greater over time.

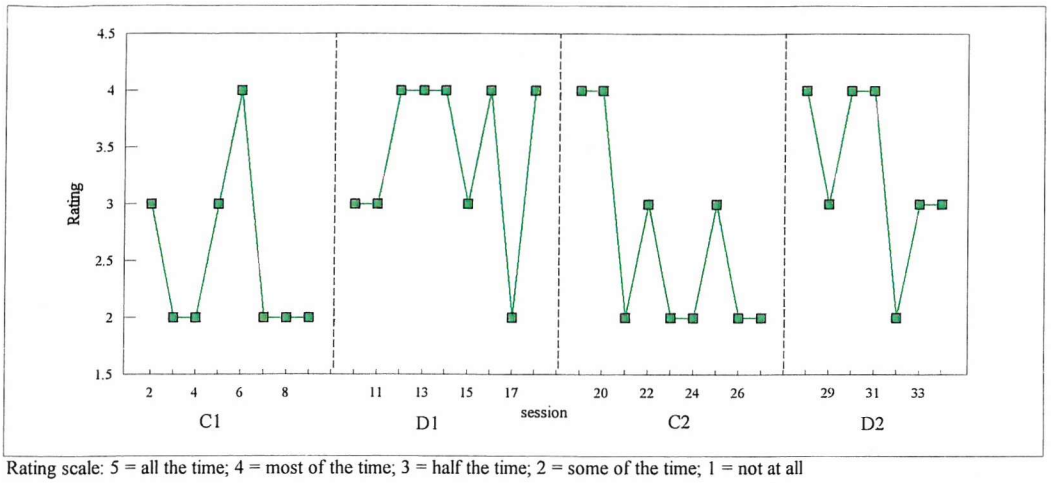
The data from these staff checklists indicate that the staff thought that the dog sessions were of some interest to Thomas and increased his responsive and interactive behaviour, as well as reducing uncooperative behaviour when compared to control activities. Additionally the staff reported that they enjoyed the first dog phase significantly more ($p<0.025$) than the first control phase, but this effect was not as strong for the second control phase ($p<0.1$). The second dog phase was not significantly different to the first, but there was some indication of a decrease in staff's reported enjoyment ($z = -1.667$; $p = 0.096$). So the dog sessions may provide something novel and increase enjoyment for staff when working with a client that is difficult and not a favourite amongst staff. Fewer sessions within a week may help maintain the enjoyment of dog sessions.

Comparing the general checklists completed before the study and those completed after sessions it can be seen that the difference in magnitude of responses is small but consistent between control and dog phases, with the general behaviours being close to one or other type of phase (Figure 6.40). The control activities produced a similar rate of responses as the general score, while the dog shows a higher rate. All activity phases are lower for initiations possibly because attention is already being given and does not need to be sought. Thomas's difficult and uncooperative behaviour was greater during control sessions than either dog sessions or generally. This is probably linked to the reports that he was more interested in the dog activities and generally on things going on around him than in

the control activities. All activity sessions reduced Thomas's reported interactive behaviour, but it is thought that this might be due to the fact that the activity sessions were directed by an adult and not him, but the dog sessions still seemed to encourage more interactive behaviour than the control sessions. Overall the dog sessions seemed to increase responsive behaviour compared to usual but otherwise showed similar rates of behaviour as generally. The fact that an activity that required attention and responsiveness from Thomas did not increase difficult or uncooperative behaviour is important, because it provides a learning situation that is not normally available to him.

The findings from the staff checklists relating to all three individuals show good comparisons with the behavioural measures observed, indicating the usefulness of developing checklists for individuals to monitor the impact of animal-assisted and other therapeutic activities. However, it was clear that not all of the specific behaviours measured by observation of videotapes would have been reflected by a general checklist and further research would be necessary in order to develop a more sensitive tool for future use with staff. This study suggests that even a diverse group of well-informed staff could provide reliable information about animal-assisted activity sessions.

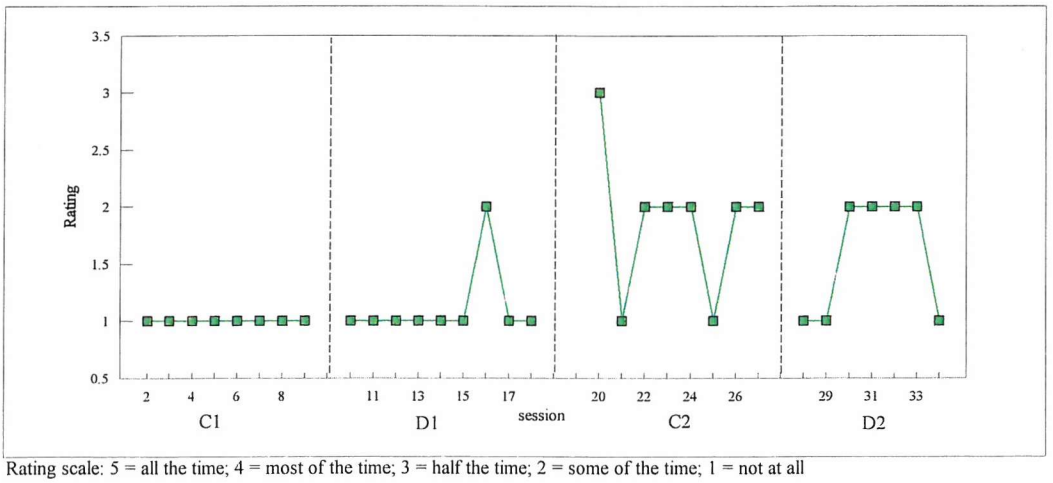
Figure 6.34 Thomas: Staff checklist ratings for the item "Did he respond to questions and requests?". C1, C2 = first and second blocks of sessions without the dog. D1, D2 = first and second blocks of sessions with the dog.



Rating scale: 5 = all the time; 4 = most of the time; 3 = half the time; 2 = some of the time; 1 = not at all

Comparing phases	Test	Test Result and Significance Value	
C1 with D1	*(Robust Rank Order)*	U = 2.936	p<0.01
D1 with C2	*(Robust Rank Order)*	U = 2.058	p<0.05
D1 with D2	*(Wilcoxon Signed Rank)*	Z = -.816	p = .414

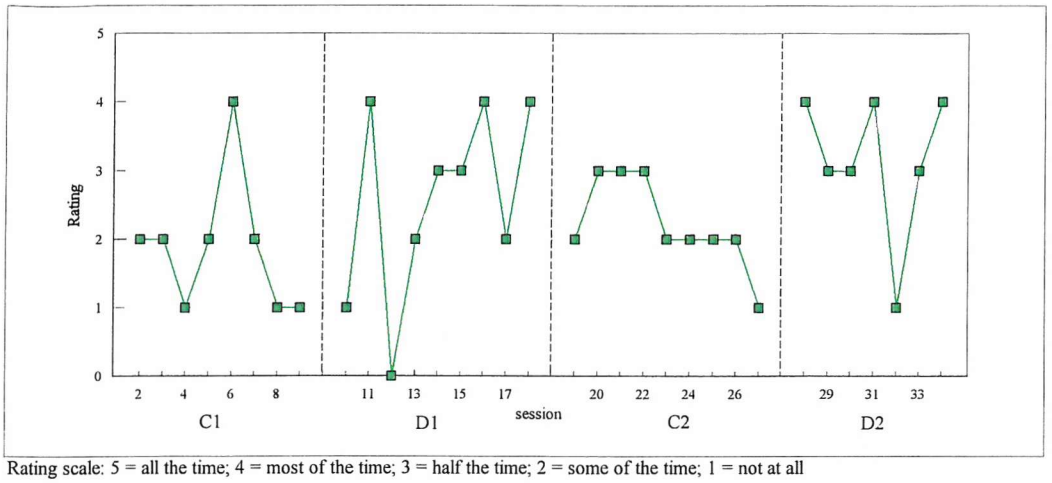
Figure 6.35 Thomas: Staff checklist ratings for the item "Did he initiate communication about the activities?". C1, C2, D1, D2 - see Figure 6.34



Rating scale: 5 = all the time; 4 = most of the time; 3 = half the time; 2 = some of the time; 1 = not at all

Comparing phases	Test	Test Result and Significance Value	
C1 with D1	*(Robust Rank Order)*	U = 0.707	NS
D1 with C2	*(Robust Rank Order)*	U = 1.941	p<0.05
D1 with D2	*(Wilcoxon Signed Rank)*	Z = -1.342	p = .180

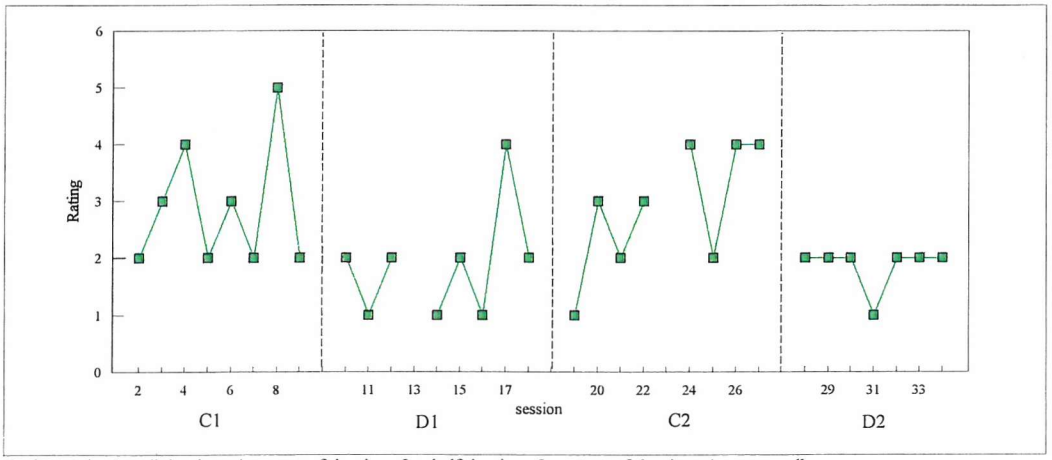
Figure 6.36 Thomas: Staff checklist ratings for the item "Was he interested in/attending to the activities?" C1, C2, D1, D2 - see Figure 6.34



Rating scale: 5 = all the time; 4 = most of the time; 3 = half the time; 2 = some of the time; 1 = not at all

Comparing phases	Test	Test Result and Significance Value	
C1 with D1	*(Robust Rank Order)*	U = 1.912	p<0.05
D1 with C2	*(Robust Rank Order)*	U = 1.34	p<0.1
D1 with D2	*(Wilcoxon Signed Rank)*	Z = -.552	p = .581

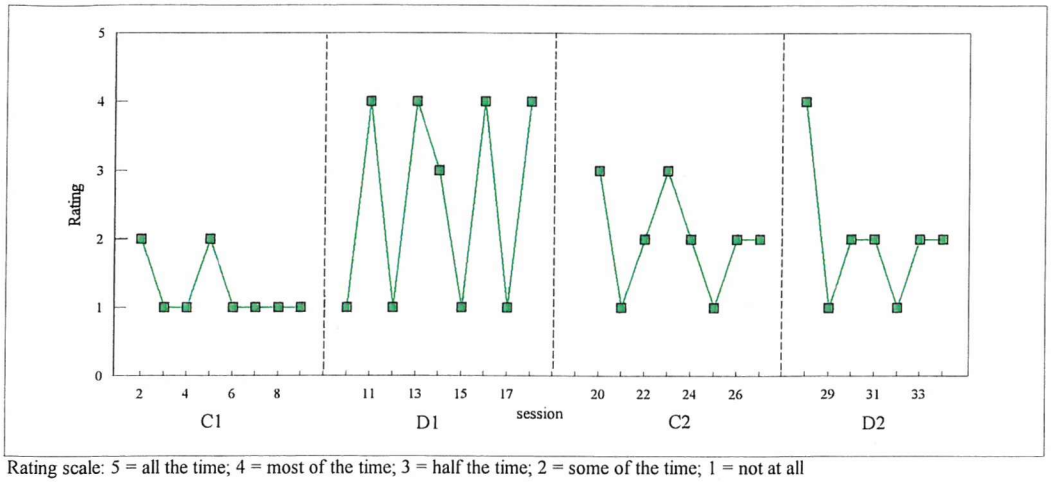
Figure 6.37 Thomas: Staff checklist ratings for the item "Was he uncooperative during the session?" C1, C2, D1, D2 - see Figure 6.34



Rating scale: 5 = all the time; 4 = most of the time; 3 = half the time; 2 = some of the time; 1 = not at all

Comparing phases	Test	Test Result and Significance Value	
C1 with D1	*(Robust Rank Order)*	U = 2.356	p<0.025
D1 with C2	*(Robust Rank Order)*	U = 1.912	p<0.05
D1 with D2	*(Wilcoxon Signed Rank)*	Z = -1.732	p = .083

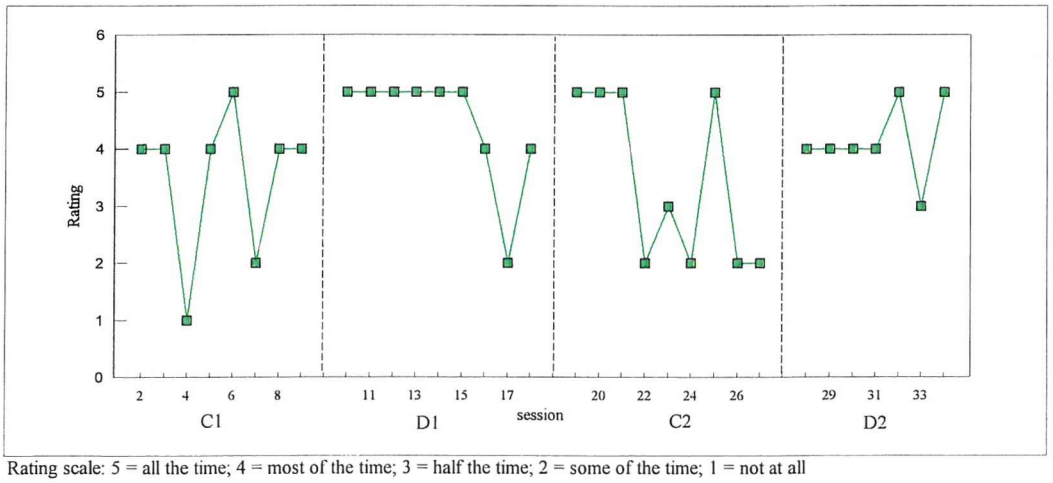
Figure 6.38 Thomas: Staff checklist ratings for the item "Was he interacting with you about the activities during the session?". C1, C2, D1, D2 - see Figure 6.34



Rating scale: 5 = all the time; 4 = most of the time; 3 = half the time; 2 = some of the time; 1 = not at all

Comparing phases	Test	Test Result and Significance Value	
C1 with D1	*(Robust Rank Order)*	U = 1.835	p<0.05
D1 with C2	*(Robust Rank Order)*	U = 0.618	NS
D1 with D2	*(Wilcoxon Signed Rank)*	Z = -.769	p = .442

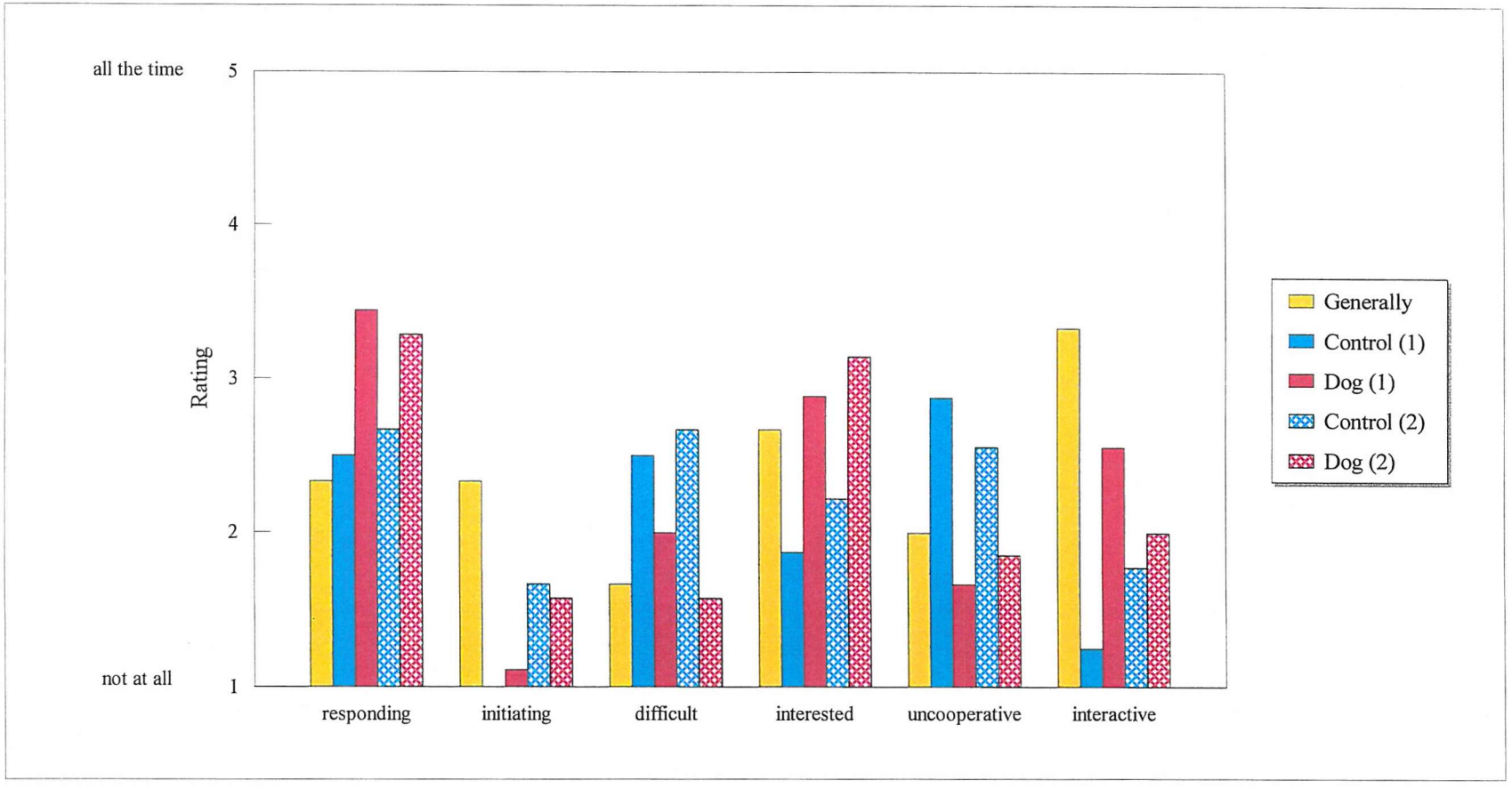
Figure 6.39 Thomas: Staff checklist ratings for the item "Did you enjoy the session?"
C1, C2, D1, D2 - see Figure 6.34



Rating scale: 5 = all the time; 4 = most of the time; 3 = half the time; 2 = some of the time; 1 = not at all

Comparing phases	Test	Test Result and Significance Value	
C1 with D1	*(Robust Rank Order)*	U = 2.317	p<0.025
D1 with C2	*(Robust Rank Order)*	U = 1.305	p<0.1
D1 with D2	*(Wilcoxon Signed Rank)*	Z = -1.667	p = .096

Figure 6.40 Thomas: Average scores from staff checklist ratings of general behaviour before the study and during sessions.



DISCUSSION

As predicted, the three individuals in this study showed somewhat idiosyncratic reactions to the introduction of dog-assisted activities in comparison to control activities. While there was an overall positive effect of the dog activities on all three's interactions with the adults that were present during sessions, it is largely the specific behaviours that are affected differentially rather than the general effect of increases in appropriate interaction.

Mark had some communication skills and was able to clearly refuse to attend many control sessions. Direct comparison between control and dog sessions was therefore difficult but it is clear that the dog had a significant impact on encouraging Mark to attend sessions that would require interaction with adults. Visual inspection of the data suggests that he would also interact more during these sessions (with higher response and initiation rates). One behaviour that was surprisingly similar between control and dog sessions was the rate of ignoring the adults' questions and requests, however this may have been the result of the higher interaction rate during dog sessions (i.e. more questions being asked in a longer sessions), but it may be that Mark will ignore a certain number of questions irrespective of the type of activities he is involved in. The staff checklists also indicated that the dog sessions were something that could interest Mark and provide an enjoyable activity that would encourage interaction with other adults.

Lisa was the most communicative and interactive individual of the three and she responded well to both the control and the dog sessions. As a result the impact of the dog-assisted activities was detectable but minimal for Lisa and this is reflected by the lack of differences between sessions as reported by the staff. However, the behavioural measures do indicate that Lisa was more responsive to the adults' interaction attempts during dog activities, while the control activities reduced her willingness to interact, indicating that other activities will focus her attention, but the dog-assisted activities will focus her attention **and** increase interaction with other people. This is seen by increased verbal response rates and lower levels of ignoring the adults during dog sessions. The first introduction of the dog was also the point where Lisa increased the use of her right hand and an increase in laughter also indicates a positive initial response to the dog activities. The dog activities were considered useful for targeting appropriate interactive behaviour and encouraging use of her 'paralysed' arm.

Thomas had very limited communication skills and would use difficult behaviour in order to achieve certain things, for example, he would leave the room when he didn't want to do something and would sometimes become aggressive. The dog activities had an effect on many of Thomas's behaviours, compared to control activities. Thomas would stay in the room for longer during dog sessions, he responded appropriately more often, was less likely to ignore questions and requests and showed more appropriate initiations towards the activities (indicating a stronger interest in the dog activities). In addition Thomas spent more time in the dog sessions without rocking or groaning (the two repetitive behaviours that Thomas exhibits for much of his day). All of these behavioural effects were considered to be extremely positive for Thomas. The staff checklists supported the findings from these behavioural measures but also indicated that these dog activities provided more enjoyable sessions for staff working with Thomas.

For both Lisa and Thomas who attended control and dog sessions without refusing to attend any sessions it was apparent that either the removal of the dog or the continuation of control activities that are well known to them could increase the rate of ignoring the adult (Lisa) or increase problem behaviours (Thomas). It would be useful to determine whether this was due to the removal of the dog or was a direct result of the control activities, and further research would allow the introduction of alternative activities in a second control phase in order to examine this.

Responsive behaviours were higher in dog sessions for all three individuals; communicative (Mark and Lisa) and physical (Mark and Thomas). Ignoring the adults' questions and requests was also similarly affected, being lower in dog sessions for Lisa and Thomas (and if considered in relation to the duration of sessions the rate of not responding is also lower for Mark). Otherwise single behaviours were affected differently for individuals and this highlights the importance of considering idiosyncrasies and targeting intervention strategies accordingly. The significance of many of these behaviours could have been lost in an experimental group design and the findings described highlight the value of a single-case experimental approach.

So for all three individuals it can be seen that the dog activities did provide significant benefits for the young adults themselves and possibly for the staff working with them as well. This study illustrates the importance of considering individual's needs when introducing dog-assisted activities. The sessions for each young adult were quite different, with different targets and focus on behaviour and the results demonstrate the positive effects of this approach.

STUDY 4b
YOUNG CHILDREN WITH AUTISM

METHOD

PARTICIPANTS AND EXPERIMENTERS

This study involved 2 young boys (ages 3½ and 5 years) with autism and challenging behaviour (see Chapter two for information about autism). They were recommended as suitable candidates for animal-assisted activities by their Clinical Psychologist. Charlie, the 5 year old, regularly used Makaton sign language and symbol cards in order to communicate. Tyrone, the 3½ year old, could use one or two signs but his communication skills were very limited and he had some problems in understanding the signs and speech used by others. The experimenter was the same 27 year old female as for the first part of this chapter, who had experience of working with therapy dogs and children with special needs, the experimenter guided all sessions. The mother of the 3½ year old boy assisted with all of his sessions. The Pets as Therapy (PAT) dog was the same 4 year old Flat-coat Retriever/Old English Sheepdog cross-breed neutered bitch as for the first part of this chapter, given a clean bill of health shortly before the study.

DESIGN

For both children a repeated measures design was considered the most appropriate. Due to the different situations relating to these two children this basic design had to be adapted to suit them and their needs as well as their families (see Table 6.5).

Table 6.5 Design and aims of each individual's AAA programme

	Tyrone (3½ years old)	**Charlie** (5 years old)
Schedule of sessions	Attended two sessions a week, one with the dog and one without. The order of dog and control sessions was alternated to accommodate order effects within week.	Attended four sessions a week; the first two were control sessions and the second two were dog sessions. This presentation was alternated to accommodate order effects within week.
Number of weeks	Seven weeks of observed sessions (two sessions lost due to poor health)	Two weeks - data not extracted (week 1 = 4 sessions (2 dog, 2 control), week 2 = 2 sessions (1 dog, 1 control)) Four weeks of observed sessions (four sessions lost due to absence or external interruptions during sessions)
Specific aims and targets	Improve communication using symbols. Increase interaction and cooperation with adult-directed activities.	Reduce challenging behaviour. Increase interaction and cooperation with adult-directed activities.

SETTING AND APPARATUS

Tyrone attended sessions at home in the family 'living room' which was always cleared of distracting objects. This setting was requested by Tyrone's mother who could not leave the home unattended, but wanted to be involved in the sessions. Charlie attended sessions at a local residential centre; a small room was used that contained as few distracting components as possible (i.e. no decorative pictures or ornaments). This room had a door opening to the outside and there was a gate on the doorway in order to slow down any attempts to leave the room. Both children had a 'schedule board' which had photographs of the current activity (i.e. scheduled activity) pinned on it, to indicate to them what activity they should be doing. This is part of a TEACHH system of education which both boys used either at school or home.

A small camcorder was used to record the sessions for both children. Charlie's sessions were recorded by hand, with a 28 year old male operating the camera but not becoming involved in the sessions. During Tyrone's sessions the camera had a wide-angle lens fitted and was clamped to a high shelf in the corner of the room.

PROCEDURE

Approval from the region's Ethics Committee was obtained prior to the study being carried out. Consent was obtained from the parents of each boy involved in the study (see Appendix 17). For both children the sessions were approximately 30 - 40 minutes long, but this was variable as it was attempted to keep the children's attention on each activity for as long as possible. Similar activities were chosen for each child but they were adapted to suit the abilities and needs of the individual (see Table 6.6).

Table 6.6 Details of AAA and control activities

Participant	Control Activities	Activities with the dog
Tyrone	Choosing a symbol card to indicate choice of colour ball. Throwing the ball to an adult. Matching buttons with symbol cards. Selecting appropriate colour or shape as requested by adults. Threading the buttons on to a string. Matching symbol cards of body parts to his own body and adults'.	Choosing a symbol card to indicate choice of colour ball. Throwing the ball for the dog to fetch. Matching biscuits with symbol cards. Selecting appropriate colour or shape as requested by adults. Feeding the biscuits to the dog. Matching symbol cards of body parts to his own body, the dog's and adults'.
Charlie	Choosing and finding a coloured ball as requested by the adult. Signing to make a choice of colour. Throwing the ball to the adult. Selecting appropriate colour and shape of button as requested by the adult. Signing to make a choice of colour. Threading the buttons on to a string. Matching symbol cards of body parts to his own body and the adult's. Other activities if required e.g. books, jigsaws.	Choosing and finding a coloured ball as requested by the adult. Signing to make a choice of colour. Throwing the ball for the dog to fetch. Selecting appropriate colour and shape of biscuit as requested by the adult. Signing to make a choice of colour. Feeding the biscuits to the dog. Matching symbol cards of body parts to his own body, the dog's and the adult's Other activities if required e.g. books, jigsaws.

BEHAVIOURAL MEASURES

All sessions were recorded on videotape and behavioural data extracted using ethograms and the Observer (version 3.0) software (Noldus Information Technology, 1993). The ethogram was developed from those used in previous studies and focused mainly on communicative and physical responses to the experimenter's requests as well as the children's initiations towards the experimenter and the activity (see Figures 6.41 and 6.42). Measures of vocalisations, affect and the duration of scheduled activities were also taken (see Appendix 21 for details). In addition an ethogram focusing on 'autistic' behaviours was designed (see Appendix 22), based on the individual characteristics of these two children and the "Real Life Rating Scale" developed by Freeman and colleagues in 1986, plus behaviours described by other researchers (Hauck et al, 1995; Althaus et al, 1994; Howlin & Rutter, 1987). This ethogram also included measures of what the child was focused on (i.e. the current activity or something else), whether he was physically close to the adults and how active he was.

OTHER MEASURES

Before the study began the Clinical Psychologist was asked to complete a character checklist (see Appendix 19) in order to investigate the possible characteristics that might affect individuals' responses to animal-assisted activities. In addition Freeman et al's (1986) Real Life Rating Scale was complete by the experimenter after sessions (Charlie only) and after extracting data from the video tapes for (i) the interactions ethogram, and (ii) the autistic behaviours ethogram (both Charlie and Tyrone). The Real Life Rating Scale produces a score of 'autistic behaviour' where classic autistic behaviours (e.g. whirling) gain a positive score and appropriate social behaviours gain a negative score. The scale is divided into sub-scales and an overall score is calculated from these (see Appendix 23 for details of behaviours). Many of the behaviours commonly associated with autism, for example stereotypic motor behaviour or focusing on irrelevant stimuli are maladaptive because they are incompatible with interactive social processes and can interfere with learning. Such behaviours often serve to promote the child's isolation and make it very difficult for others to gain and manipulate the child's. Therefore measures of these behaviours are highly relevant when examining interactive behaviour.

The parents of both children were asked to answer a small number of questions concerning the effects of the animal-assisted activities that they had perceived at home.

Figure 6.41 Dendrogram to Illustrate the Hierarchical Ethogram Used to Record Responsive Behaviours

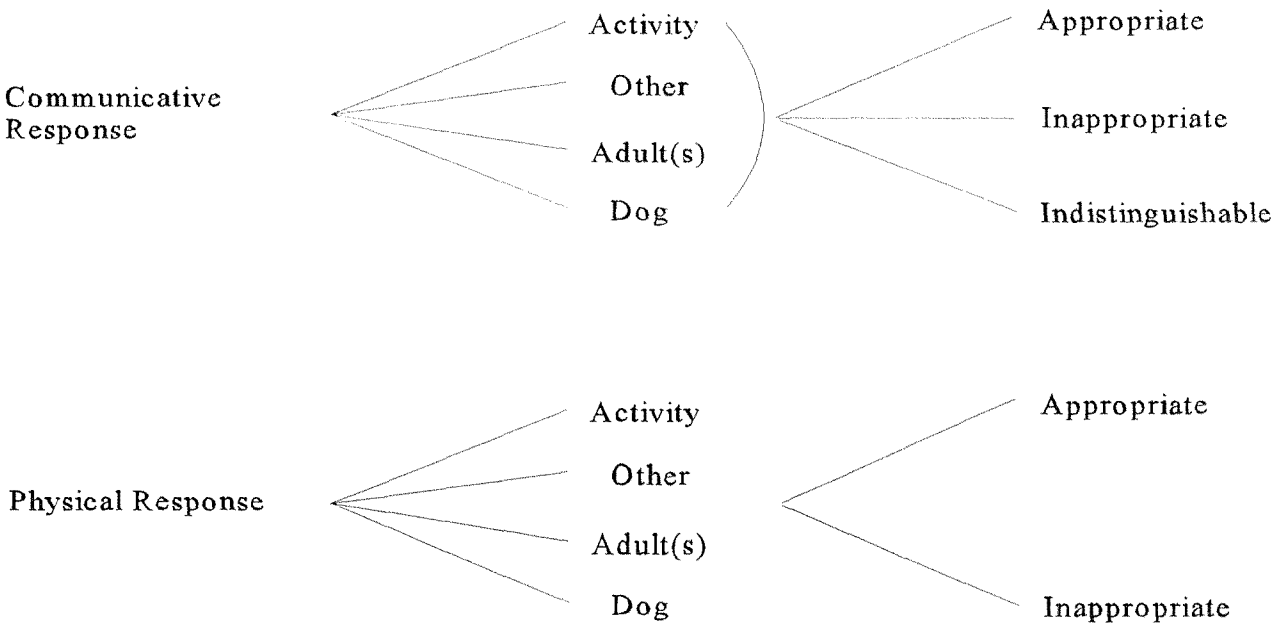
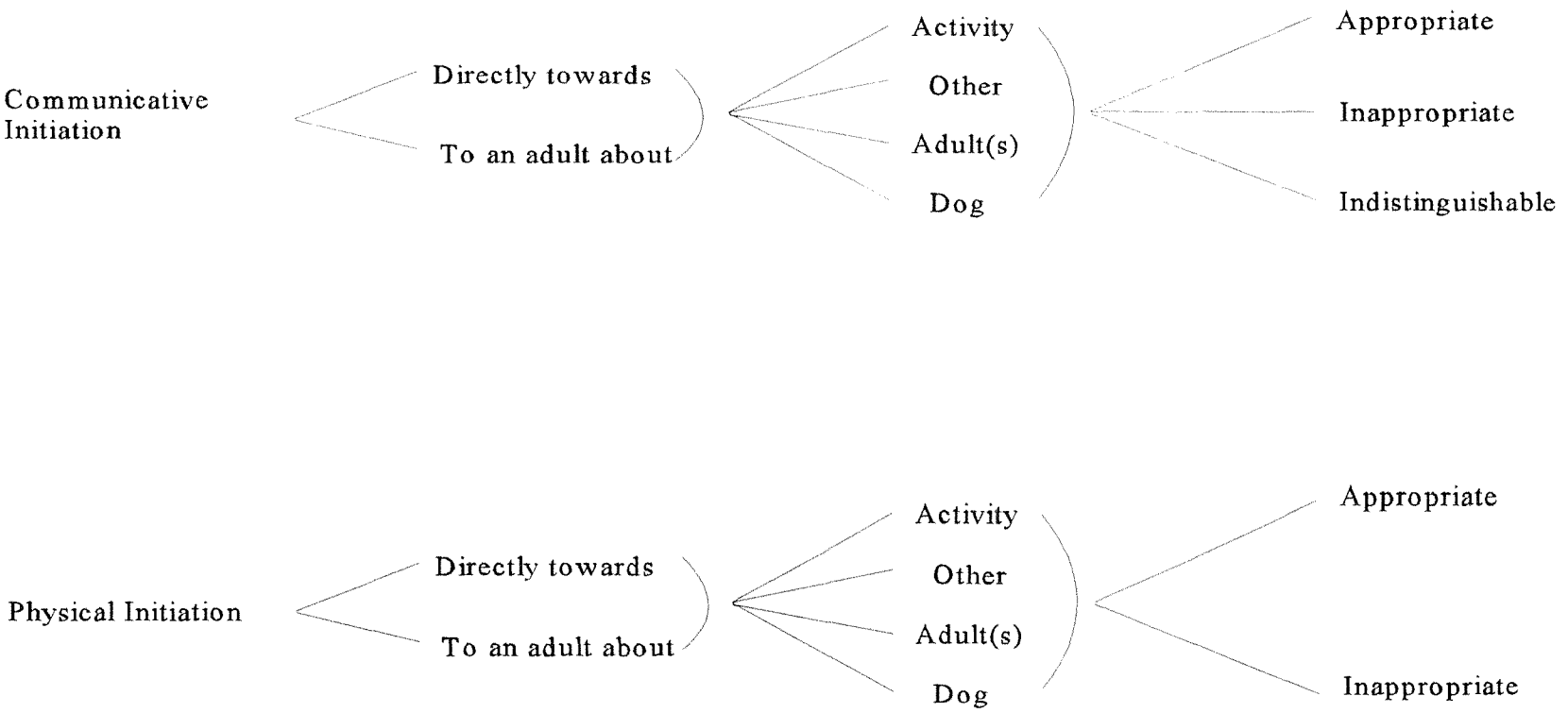


Figure 6.42 Dendrogram to Illustrate the Hierarchical Ethogram Used to Record Initiation Behaviours



RESULTS

The results from the behavioural measures for Tyrone and Charlie are presented separately, since the different characteristics of each child meant that some differences in the organisation of the data were necessary. For example, Tyrone would stay 'on task' steadily for both control and dog activities and therefore it is possible to look at the activities separately, whereas Charlie would rapidly move from task to task (therefore the number of times he started an activity were recorded). Despite the slight differences in organisation of the data the process of analysis is the same for both subjects. Certain autistic behaviours that were observed during sessions were incorporated into grouped variables for sensory-motor behaviours and sensory-response behaviours (following the same criteria as those used by Freeman et al, 1986).

As mentioned in the previous section of this chapter, statistical tests are increasingly being used in single-case research (Kazdin, 1982). The repeated measures design of these two experiments with alternating presentation of conditions (control and dog) precluded the use of randomization tests (which require random assignment of conditions). However, parametric tests (t and F-tests) would be suitable as long as the data did not show serial dependency (i.e. data points must be independent with uncorrelated error terms). In order to test for serial dependency, autocorrelations can be carried out. Having shown this lack of serial dependency it is then possible to carry out a t-test or ANOVA. Since it cannot be assumed that the data obtained from these studies was normally distributed the data was rank transformed (see Chapter four for explanation) and therefore autocorrelations testing for serial dependency (within each condition) were carried out on the rank transformed data rather than the raw data, before a rank transformed analysis of variance was carried out (RT ANOVA). Medians of the raw data are presented with the significant variables as they are considered to be more 'distribution free' than means.

AUTOCORRELATIONS ON RANKED DATA

Autocorrelations were carried out on all separate variables; lags 1 and 2 (preceding session effect and day of week effect respectively) were examined.

Tyrone

There were no autocorrelations at $p<0.05$ for the control sessions. However, two variables were autocorrelated in the dog sessions:

i) not responding to the adults' questions and requests, lag 1 (autocorr = -.853; SE = .323; Box-Ljung = 6.984; $p<0.01$) and lag 2 (autocorr = .559; SE = .289; Box-Ljung = 10.731; $p<0.01$)

ii) duration of biscuits/buttons activity, lag 1 (autocorr = -.814; SE = .323; Box-Ljung = 6.365; $p<0.05$) and lag 2 (autocorr = .543; SE = .289; Box-Ljung = 9.902; $p<0.01$)

Charlie

There were no autocorrelations at $p<0.05$ for the control sessions. Two variables were autocorrelated for lag 1 in the dog sessions:

i) frequency of starting the body parts cards activity, lag 1 (autocorr = -.661; SE = .323; Box-Ljung = 4.198; $p<0.05$)

ii) time spent in close proximity to the adults, lag 1 (autocorr = -.671; SE = .323; Box-Ljung = 4.328; $p<0.05$)

Considering the large number of variables that were included in this analysis four variables that were autocorrelated was not sufficient to reject the use of a parametric statistic. Therefore RT ANOVA was carried out on all variables and the issue of variables that were significantly different between conditions **and** autocorrelated will be discussed considering each variable. (Autocorrelation or serial dependency is thought to produce Type I errors).

VIDEO-RECORDED BEHAVIOUR

Tyrone

It was found that the control sessions and dog sessions did differ in terms of the frequency of behaviours shown by Tyrone. RT ANOVA showed a number of variables that were significantly different between conditions (see Figures 6.43 - 6.51). Sessions were significantly longer when the dog was present ($p<0.05$) indicating a stronger interest in the dog activities. He was significantly more likely to physically respond in an appropriate way to questions and requests about the activity during the dog sessions ($p<0.05$) and at the same time he was more likely to ignore questions and

requests during the control sessions ($p<0.05$). These results combine to indicate a greater willingness to cooperate during dog activities. In addition it was found that the duration of the biscuits/buttons activity was significantly longer ($p<0.01$) for the dog activity (biscuits). This suggests that the activity of sorting, matching and choosing colours and shapes is of much greater interest to Tyrone when it involves biscuits to feed to the dog compared to buttons for threading. The much greater duration of this activity does introduce the problem of whether the greater level of physical responses and lower level of ignoring the adults are driven by his interest in this one activity. However, closer examination of the data actually suggests that this is not the case: the level of not responding to the adult during dog sessions is consistently lower for the other two activities (ball and body parts cards) and is actually higher for the biscuits/buttons activity. This is obviously a result of the longer duration of this activity during dog sessions and suggests that this variable is consistently affected irrespective of the specific activity. Appropriate physical responses are consistently higher for dog sessions and this is accentuated during the biscuits/buttons activity. Again this suggests a consistent effect of the dog for all three activities. However, the total duration of the sessions being longer with the dog is driven by the longer duration of the biscuits activity (the other two activities are of similar duration in both conditions).

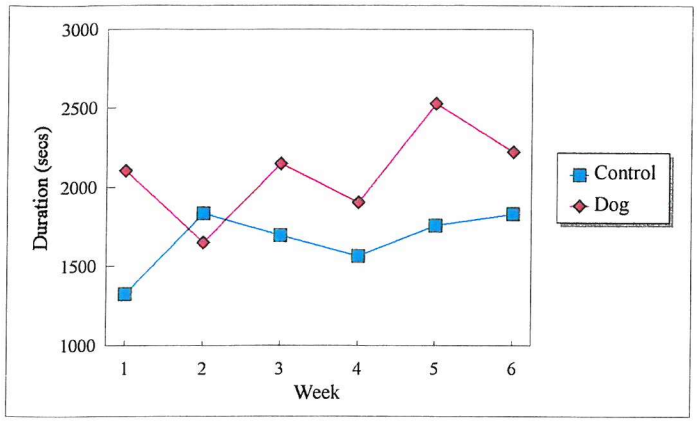
Whether Tyrone was attending to the scheduled activity, ignoring it or focusing on other things was also measured. Tyrone focused on the scheduled activity for significantly longer during dog sessions ($p<0.05$), and Figure 6.47 illustrates that the dog maintained a fairly steady level of focus while the control activities started at a similar level and then declined over the weeks. This is an important finding for illustrating the stability of Tyrone's responses to the dog. It should be noted though that visual examination of the data from the different activities does indicate that this result is largely driven by the longer duration of the biscuits activity in dog sessions. This suggests that some dog-assisted activities will have a greater effect of increasing the amount of time spent focusing on the activity. The variable of focusing on the dog is included (Figure 6.48) to demonstrate that the dog itself was only a minimal distraction and that it served the purpose of focusing the activities rather than providing an alternative focus of attention.

As part of the measurement of autistic behaviours, recordings were also made of whether Tyrone was near to the adults, his movement around the room and groups of typical autistic behaviours. It was found that the dog encouraged him to be physically closer to the adults guiding the activities ($p<0.01$) and he was also more likely to be sitting down ($p<0.05$). Again these two variables are directly affected by the longer duration of the biscuits activity. In spite of this, these two findings

suggest that the dog activity that elicited the most interest also encouraged cooperation and calmness. In light of this finding it is somewhat confusing that his sensory motor behaviours were significantly greater during dog sessions. However, if the variable 'bite object' is extracted the sensory motor group of behaviours is no longer significant. Bite object was a coding used when Tyrone bit the biscuit before feeding it to the dog.

The two variables that were autocorrelated in Tyrone's data were not responding to the adults, and duration of the biscuits/buttons activity (see Figures 6.45 and 6.46) within dog sessions. The graphs illustrate the alternating pattern from one dog session to the next, however, it is clear from the graphs that there is no overlap in frequencies between conditions, suggesting that these results are not due to Type I errors.

Figure 6.43 Tyrone: Video-recorded behaviour - total duration of the scheduled activity sessions.



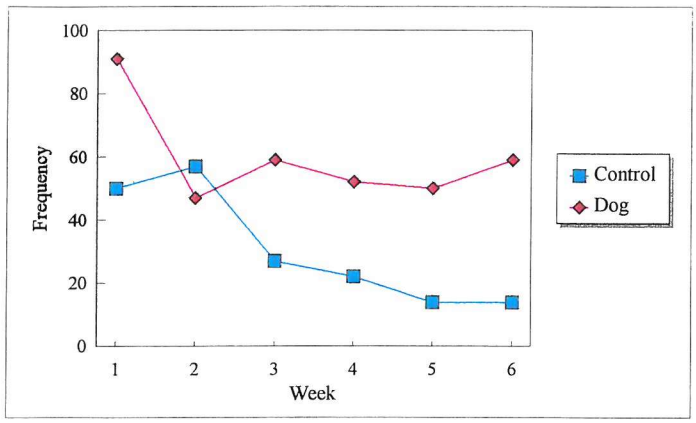
Medians

Control = 1785.0

Dog = 2116.3

RT ANOVA scores
$F(1,10) = 8.412$
$p<0.05$

Figure 6.44 Tyrone: Video-recorded behaviour - appropriate physical responses about the activity.



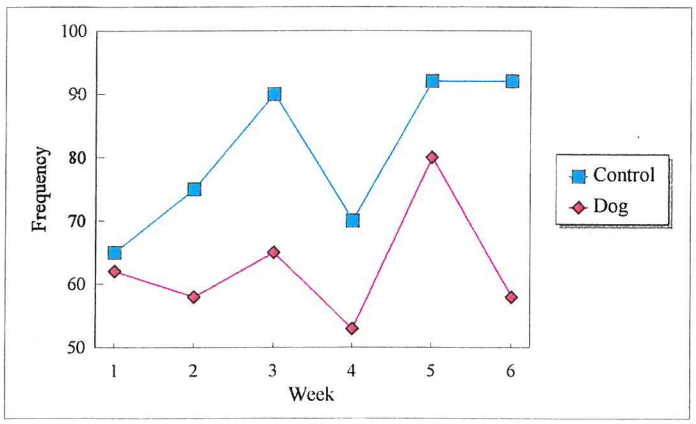
Medians

Control = 24.5

Dog = 55.5

RT ANOVA scores
$F(1,10) = 7.523$
$p<0.05$

Figure 6.45 Tyrone: Video-recorded behaviour - not responding to the adults' questions and requests.



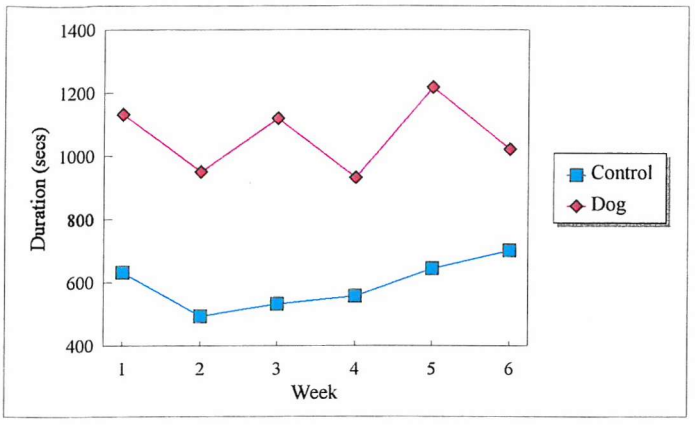
Medians

Control = 82.5

Dog = 60.0

RT ANOVA scores
$F(1,10) = 9.813$
$p<0.05$
* autocorrelated within dog sessions

Figure 6.46 Tyrone: Video-recorded behaviour - duration of the biscuits/buttons activity.



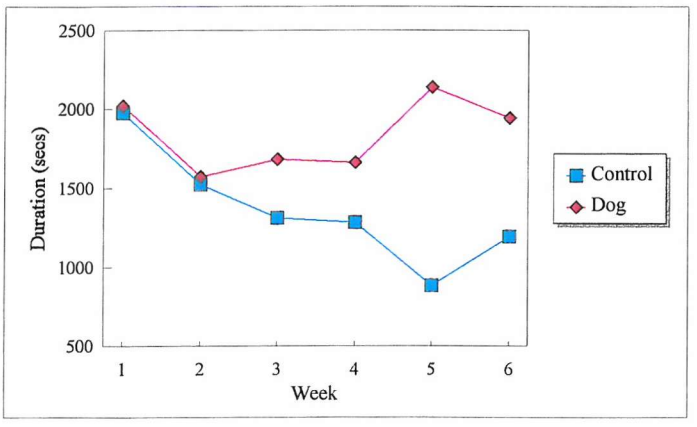
Medians

Control = 592.5

Dog = 1068.9

RT ANOVA scores
F (1,10) = 30.857
p<0.01
* autocorrelated within dog sessions

Figure 6.47 Tyrone: Video-recorded behaviour - time spent focused on the scheduled activity.



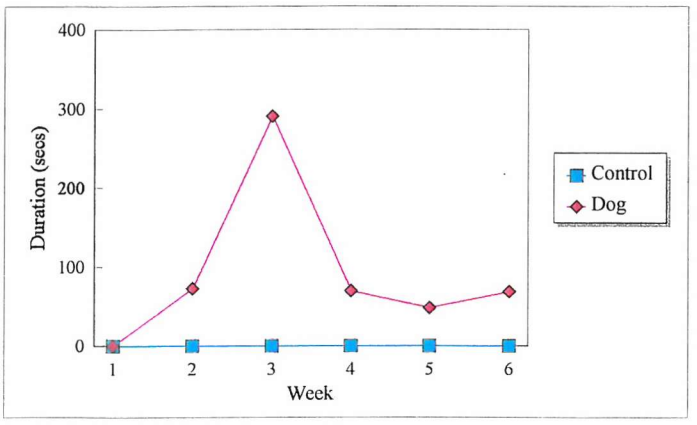
Medians

Control = 1296.7

Dog = 1813.3

RT ANOVA scores
F(1,10) = 8.412
p<0.05

Figure 6.48 Tyrone: Video-recorded behaviour - time spent focused on the dog.



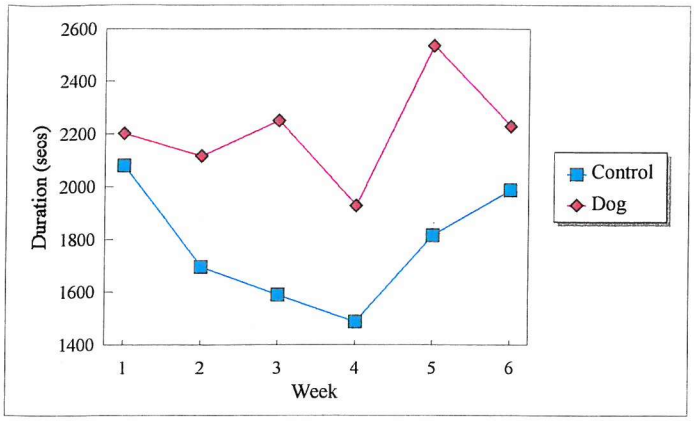
Medians

Control = 0.0

Dog = 69.3

RT ANOVA scores
F(1,10) = 18.75
p<0.01

Figure 6.49 Tyrone: Video-recorded behaviour - time spent in close proximity to the adults.



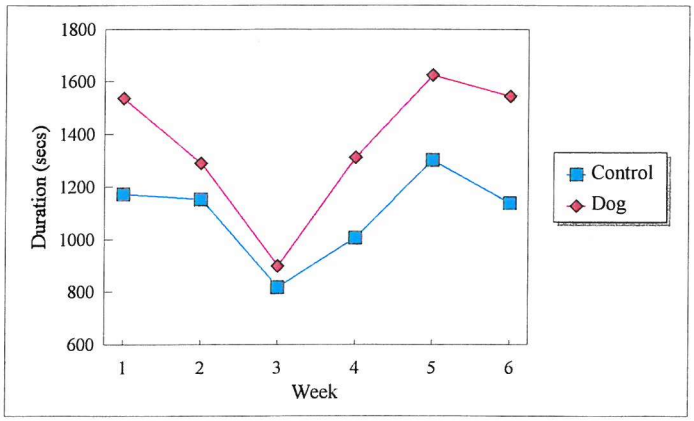
Medians

Control = 1756.1

Dog = 2215.6

RT ANOVA scores
$F(1,10) = 14.798$
$p<0.01$

Figure 6.50 Tyrone: Video-recorded behaviour - time spent sitting down.



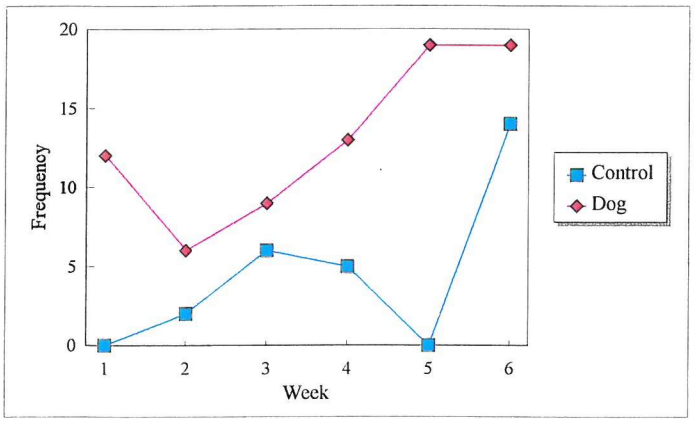
Medians

Control = 1146.2

Dog = 1425.0

RT ANOVA scores
$F(1,10) = 5.053$
$p<0.05$

Figure 6.51 Tyrone: Video-recorded behaviour - sensory-motor behaviours.



Medians

Control = 3.5

Dog = 12.5

RT ANOVA scores
$F(1,10) = 7.523$
$p<0.05$

Charlie

Analysis of Charlie's data also showed a number of behaviours that were significantly different between conditions (Figures 6.52 - 6.67). Charlie showed significantly higher levels of both appropriate communicative and physical responses to questions and requests about the scheduled activity ($p<0.01$). He also showed a greater willingness to cooperate during the dog sessions. Correspondingly a small but significantly greater number of inappropriate physical responses were seen during the control sessions ($p<0.01$). The finding that Charlie was more likely to make (appropriate) physical initiations towards the dog is significant as it cannot actually happen in control sessions but the rarity of this behaviour illustrates that the dog itself was not a great distraction but was providing an appropriate focus for the scheduled activities.

The duration of the ball activity was significantly longer ($p<0.05$) for the dog sessions, indicating Charlie's greater interest in this type of activity when a dog is involved. In addition both the frequency and duration of the biscuits/buttons activity was significantly greater ($p<0.01$) for the dog sessions. This suggests that the biscuits activity is another task that is more likely to sustain Charlie's interest than a comparable control task. In support of this it can also be seen that the frequency of starting jigsaws ($p<0.01$) and other activities ($p<0.05$) is significantly greater during control sessions, as is the duration of doing other activities ($p<0.05$). The scheduled activities that were being encouraged by the experimenter (mainly ball; biscuits/buttons; body parts cards (other activities were only encouraged when his attention could not be focused on these activities) were more likely to receive Charlie's cooperation and attention if the activities were assisted by a dog rather than comparable control materials. In support of this is the finding that the amount of time Charlie was focused on the current activity was significantly greater ($p<0.01$) during the dog sessions i.e. he was less likely to be distracted or 'switch off' during these sessions. The time that he spent focused on other things was significantly greater during control sessions ($p<0.05$). During control sessions Charlie chose more 'other' activities that were probably less interactive than the scheduled activities that the experimenter was encouraging, and these results indicate that the dog-assisted activities focused his attention and thereby increased his interaction and cooperation with the adult.

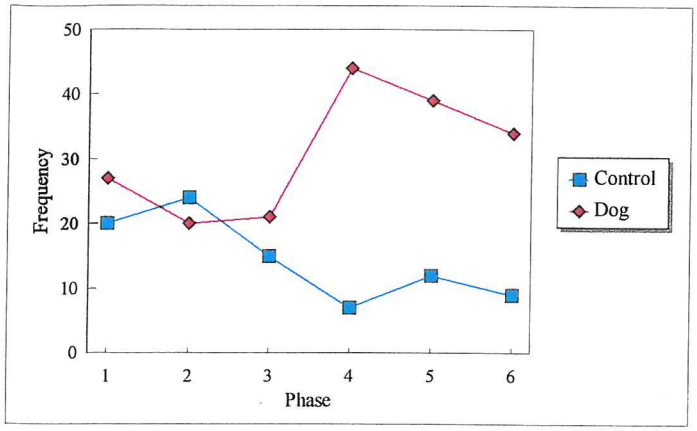
The dog appeared to encourage Charlie to remain with the adult present ($p<0.05$) and make fewer attempts to leave the room ($p<0.01$). The dog also significantly reduced the number of times that Charlie screamed during the sessions ($p<0.01$), which during control sessions was probably another

indication of his desire to leave the room where sessions were conducted. All of this demonstrates his greater willingness to be involved and to cooperate in the activities where the dog was present or involved.

One variable that is difficult to explain in light of the other findings already presented is that the number of physical contacts that Charlie made towards the adult is greater during the control sessions ($p<0.01$). It seems likely that this finding was the result of Charlie's attempts to ask the adult if he could leave the room (he would take the adult's hand and walk towards the door). This explanation does fit with the interpretation made by the adult during the sessions, but should be treated with caution.

The only variable that was autocorrelated was time spent in close proximity to the adult, and Figure 6.64 shows that the dog sessions were never lower than their corresponding control sessions, again suggesting that this finding was not the result of a Type I error.

Figure 6.52 Charlie: Video-recorded behaviour - appropriate communicative responses about the activity.



Medians

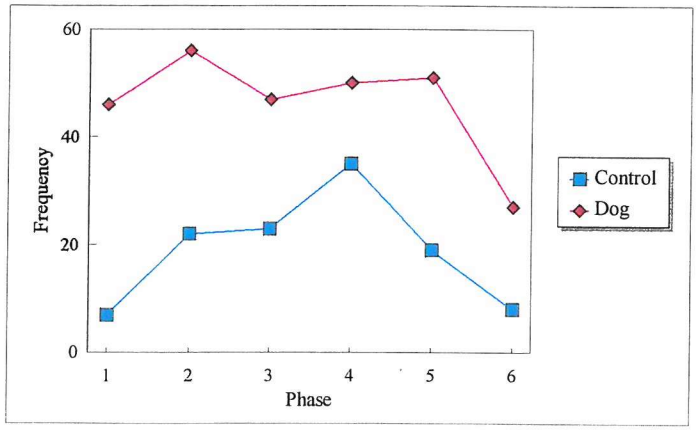
Control = 13.5

Dog = 30.5

RT ANOVA scores

$F(1,10) = 12.830$
$p<0.01$

Figure 6.53 Charlie: Video-recorded behaviour - appropriate physical responses about the activity.



Medians

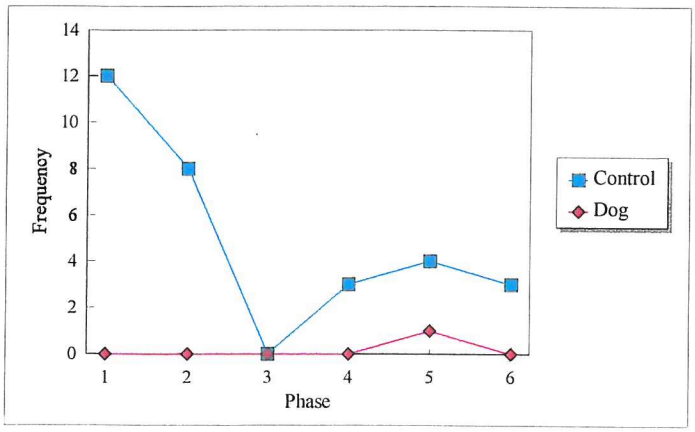
Control = 20.5

Dog = 48.5

RT ANOVA scores

$F(1,10) = 20.643$
$p<0.01$

Figure 6.54 Charlie: Video-recorded behaviour - inappropriate physical responses about the activity.



Medians

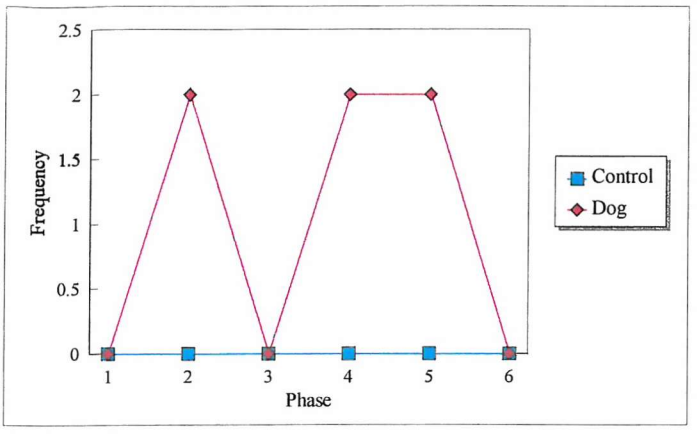
Control = 3.5

Dog = 0.0

RT ANOVA scores

$F(1,10) = 12.762$
$p<0.01$

Figure 6.55 Charlie: Video-recorded behaviour - appropriate physical initiations towards the dog.



Medians

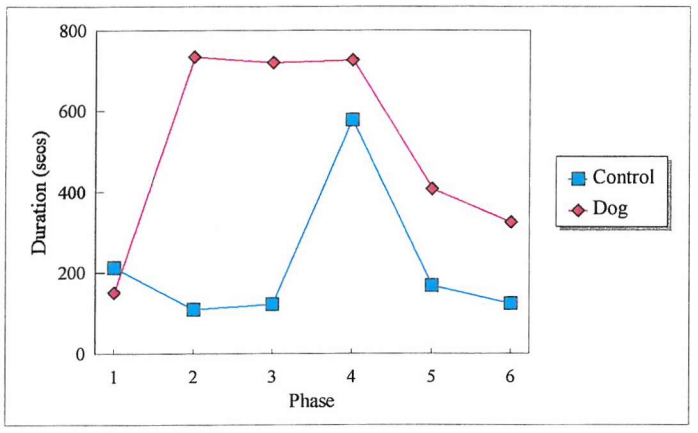
Control = 0

Dog = 1

RT ANOVA scores

$F(1,10) = 5.000$
$p<0.05$

Figure 6.56 Charlie: Video-recorded behaviour - duration of the ball activity.



Medians

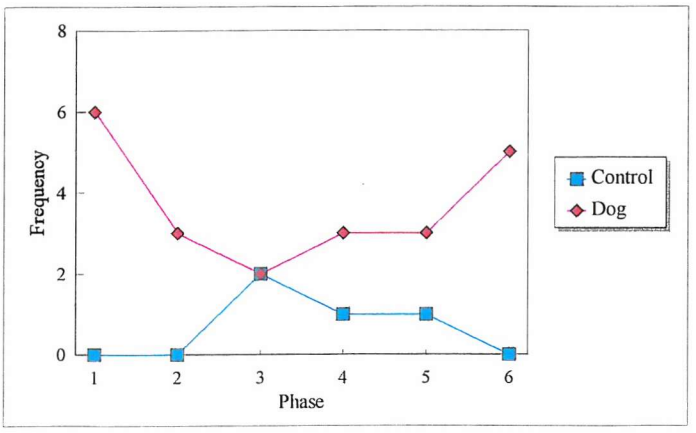
Control = 146.2

Dog = 564.0

RT ANOVA scores

$F(1,10) = 6.500$
$p<0.05$

Figure 5.57 Charlie: Video-recorded behaviour - frequency of starting the biscuits/buttons activity.



Medians

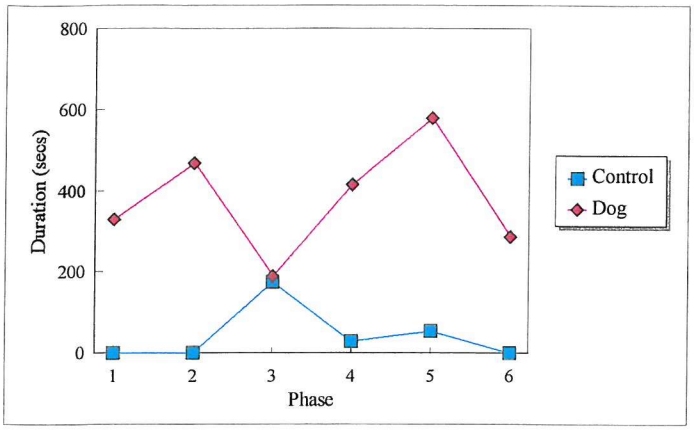
Control = .5

Dog = 3.0

RT ANOVA scores

$F(1,10) = 28.422$
$p<0.01$

Figure 6.58 Charlie: Video-recorded behaviour - duration of the biscuits/buttons activity.



Medians

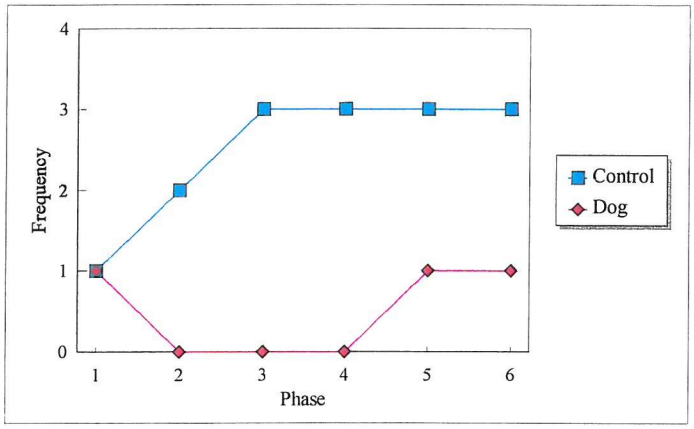
Control = 13.9

Dog = 371.9

RT ANOVA scores

$F(1,10) = 32.727$
$p<0.01$

Figure 6.59 Charlie: Video-recorded behaviour - frequency of starting the jigsaw activity.



Medians

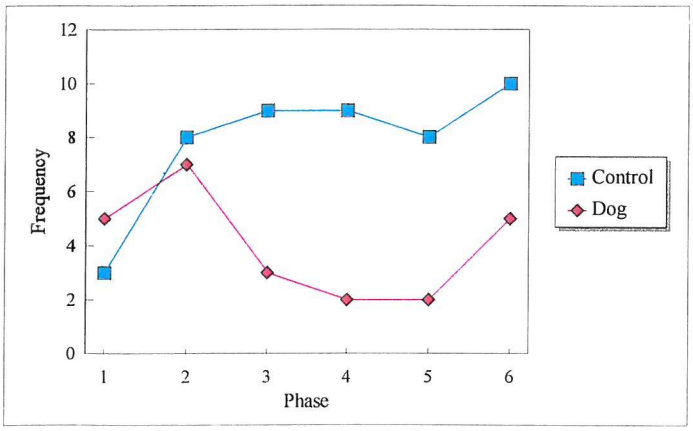
Control = 3.0

Dog = 0.5

RT ANOVA scores

$F(1,10) = 22.547$
$p<0.01$

Figure 6.60 Charlie: Video-recorded behaviour - frequency of starting other activities.



Medians

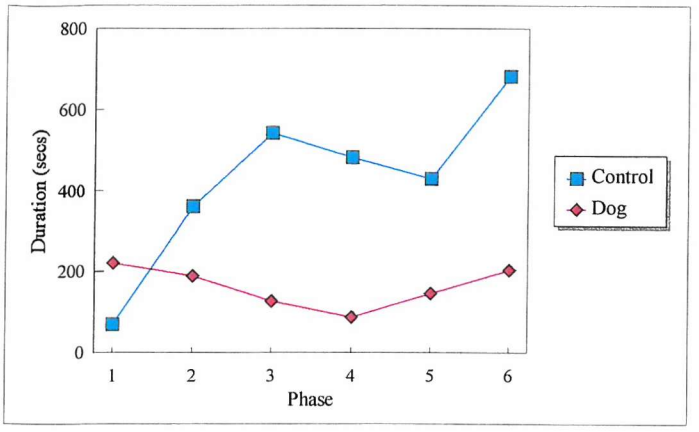
Control = 8.5

Dog = 4.0

RT ANOVA scores

$F(1,10) = 9.953$
$p<0.05$

Figure 6.61 Charlie: Video-recorded behaviour - duration of other activities.



Medians

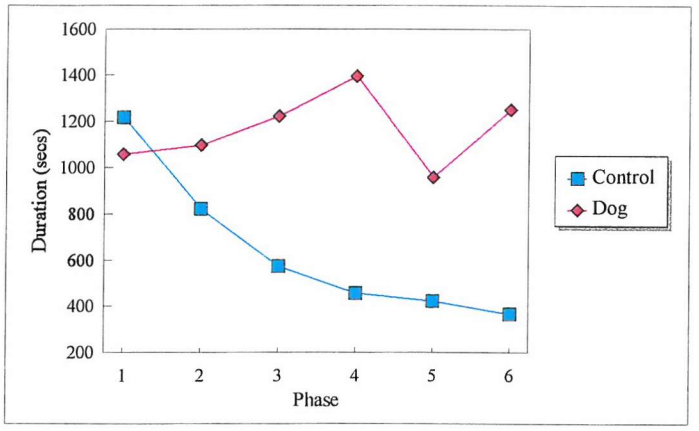
Control = 455.9

Dog = 168.3

RT ANOVA scores

$F(1,10) = 5.053$
$p<0.05$

Figure 6.62 Charlie: Video-recorded behaviour - time spent focused on the current activity.



Medians

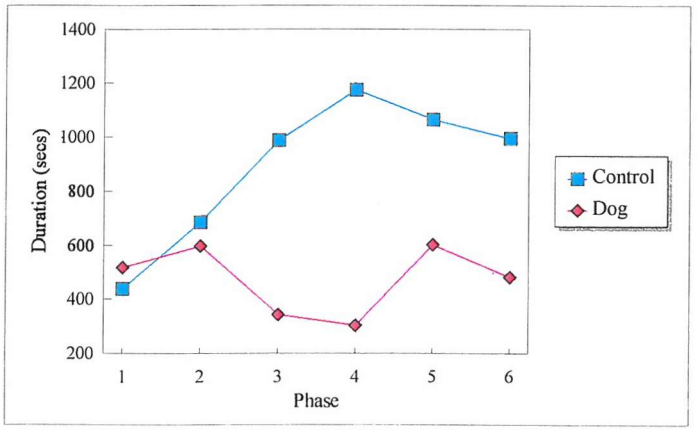
Control = 514.0

Dog = 1160.9

RT ANOVA scores

$F(1,10) = 11.029$
$p<0.01$

Figure 6.63 Charlie: Video-recorded behaviour - time spent focused on things other than the activity.



Medians

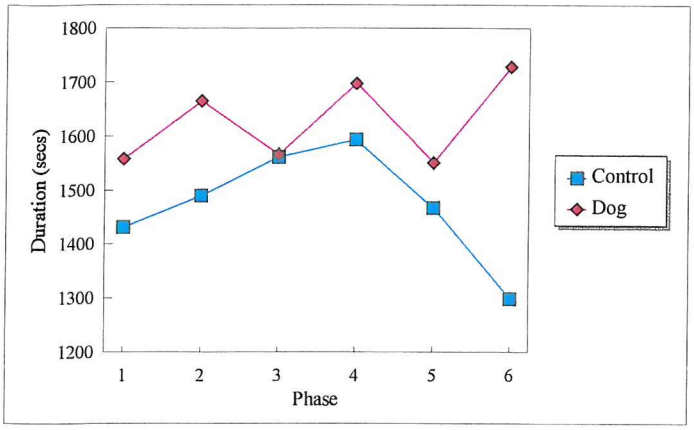
Control = 992.0

Dog = 498.8

RT ANOVA scores

$F(1,10) = 8.412$
$p<0.05$

Figure 6.64 Charlie: Video-recorded behaviour - time spent in close proximity to the adult.



Medians

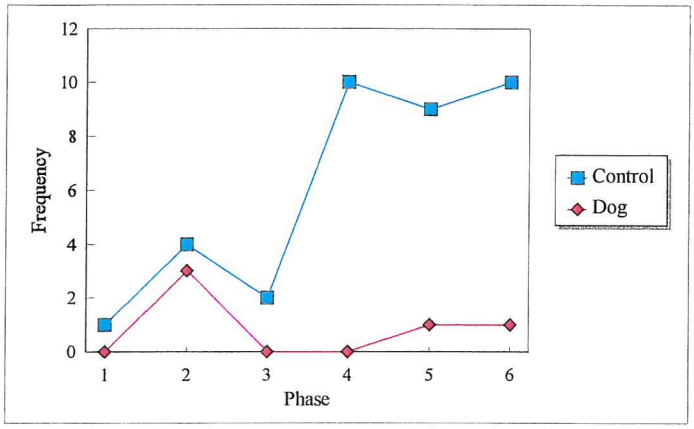
Control = 1478.6

Dog = 1616.1

RT ANOVA scores

$F(1,10) = 6.500$
$p<0.05$
* autocorrelated within dog sessions

Figure 6.65 Charlie: Video-recorded behaviour - attempts to leave the room.



Medians

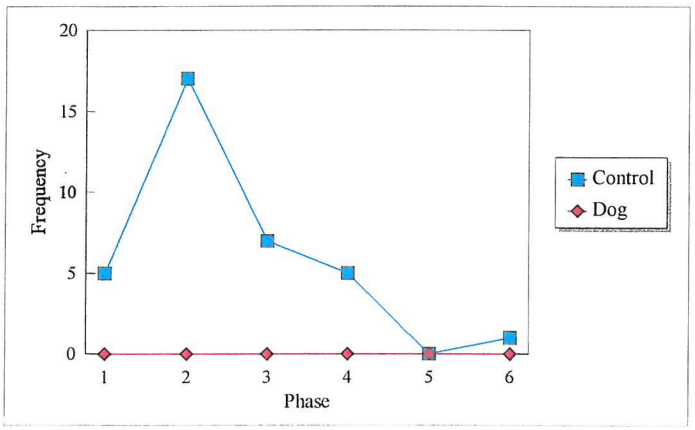
Control = 6.5

Dog = 0.5

RT ANOVA scores

$F(1,10) = 11.811$
$p<0.01$

Figure 6.66 Charlie: Video-recorded behaviour - screams.



Medians

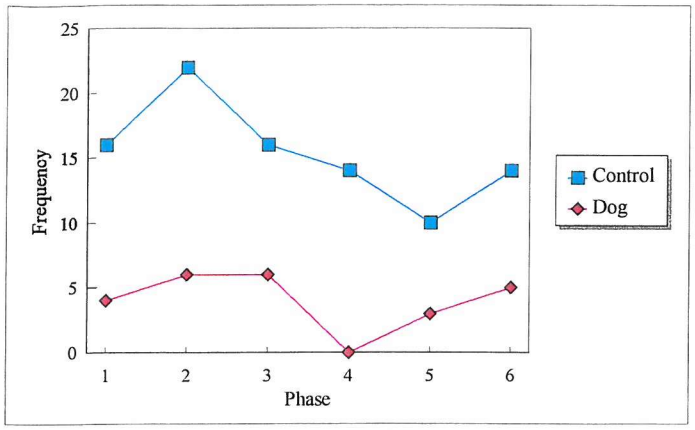
Control = 5

Dog = 0

RT ANOVA scores

$F(1,10) = 18.987$
$p<0.01$

Figure 6.67 Charlie: Video-recorded behaviour - physical contacts made towards the adult.



Medians

Control = 15.0

Dog = 4.5

RT ANOVA scores

$F(1,10) = 32.239$
$p<0.01$

CHECKLISTS COMPLETED AFTER SESSIONS AND/OR VIDEO OBSERVATIONS

Checklists (The Real Life Rating Scale, Freeman et al 1986) were completed after each video observation (once after each session observed using the interactive behaviours ethogram and once after each session observed using the autistic behaviours ethogram - every session was therefore observed twice) for both Tyrone and Charlie, and after each session for Charlie only. Therefore intra-rater reliability could be calculated for both children. However it should be noted that as the video observations involved the observer concentrating on different types of behaviours it was predicted that overall scores would be more reliable than the scores of sub-scales and that overall scores would be a more valid indicator of effects between conditions. Two sets of data were available for Tyrone and therefore a Spearman Rank Correlation was carried out. Three sets of data for Charlie meant that a Kendall W test of concordance was used. The results from these tests are presented in Table 6.7.

Table 6.7 Results of Intra-Rater Reliability Testing for The Real Life Rating Scale Developed by Freeman et al (1986)

Real Life Rating Scale Sub-Scales	**Tyrone**	**Charlie**
Affectual responses	$\rho = .410$ ($p = .186$)	$W = .504$ ($p = .002$)
Language	$\rho = .643$ ($p = .024$)	$W = .228$ ($p = .065$)
Sensory motor	$\rho = .140$ ($p = .664$)	$W = .008$ ($p = .905$)
Sensory responses	$\rho = -.037$ ($p = .908$)	$W = .310$ ($p = .024$)
Social relationship to people	$\rho = .094$ ($p = .772$)	$W = .557$ ($p = .001$)
Overall Score	**$\rho = .760$ ($p = .004$)**	**$W = .563$ ($p = .001$)**

It would be expected *a priori* that sub-scores would demonstrate lower levels of reliability than overall scores. This is accentuated in Tyrone's case, most likely because the only data available was recorded after videos had been observed for different behaviours (i.e. interactions or autistic behaviours - both of which are included in the Real Life Rating Scale). It was therefore considered most appropriate to use an average of each child's overall score, rather than any sub-scores, in order to compare ratings from dog sessions and control sessions. In order to do this an ANOVA was carried out on the raw data (Rank Transformation was not necessary as the results from this scale are scored on a rating scale). The results for this comparison are shown in Table 6.8.

Table 6.8 Results of ANOVA on Average Overall Scores for Dog Sessions Compared with Control Sessions

	Tyrone	**Charlie**
Average Overall Score	$F_{(1,10)} = 10.643$; $p<0.01$	$F_{(1,10)} = 27.176$; $p<0.001$
Mean score for control sessions	0.107	0.187
Mean score for dog sessions	0.018	0.053

The results from this ANOVA on average overall scores indicates that both children showed fewer autistic behaviours and/or greater numbers of appropriate interaction skills during the dog sessions. This is supported by the behavioural measures already described which indicate that both children were more responsive and cooperative during dog-assisted activities. However, no significant effect was seen on their autistic behaviours and the results from this Real Life Rating Scale might be considered to be largely influenced by the increased interaction elicited by the dog.

Intra-Observer Reliability of Durations Data

Two ethograms were used to collect the behavioural measures data for Tyrone and Charlie, in order to obtain the required information it was necessary to record the durations of the scheduled activities in both cases. It was therefore possible to carry out an intra-observer reliability analysis by using a Spearman Rank Correlation (see Table 6.9). Observations of the same sessions were always separated by a period of at least two weeks.

Table 6.9 Intra-observer reliability of activity durations

Durations	**Tyrone**	**Charlie**
Ball activity	$\rho = .993$ ($p<.001$)	$\rho = .951$ ($p<.001$)
Biscuits/Button Activity	$\rho = .986$ ($p<.001$)	$\rho = .986$ ($p<.001$)
Body Parts Cards	$\rho = .958$ ($p<.001$)	$\rho = .832$ ($p<.005$)
Other	$\rho = .853$ ($p<.005$)	$\rho = .958$ ($p<.001$)
Books	(activity not done)	$\rho = .927$ ($p<.001$)
Symbol Cards	(activity not done)	$\rho = .914$ ($p<.001$)
Jigsaws	(activity not done)	$\rho = .986$ ($p<.001$)

The correlations for the durations data measured twice for both Tyrone and Charlie indicates a good level of intra-rater reliability with all variables showing a good correlation with rho values greater than 0.8.

PARENTAL OBSERVATIONS

A short interview with the parents was carried out at the end of each study. Tyrone's mother was involved in all sessions and felt that the dog had encouraged greater participation in the activities and had provided a good focus for attention. Outside the sessions, Tyrone's reaction to dogs had always been one of interest but during and after the study was reported as more enthusiastic to the point where he would stop "mid-tantrum" when he saw a dog walking past. Tyrone's mother felt that there had been no problems/disadvantages in carrying out the project.

Charlie was known to have some interest in dogs and other animals, although he would avoid dogs when out walking. This interest had been seen to decrease in the months before this study began. In the time period during and shortly after the study, Charlie's parents reported that this interest both in dogs and other animals increased again and that he would use sign language to communicate about a dog or animal that he saw and would then carefully approach it. This is a useful indication of not only Charlie's interest but also that he had learned not to approach animals by rushing at them.

Parental reports suggest that structured activity sessions involving a dog can have a good impact on reactions to dogs and other animals outside the sessions, perhaps introducing another interest for family interactions.

DISCUSSION

The results indicate a general positive effect of the dog-assisted activities for both individuals studied, while also showing idiosyncratic reactions (where a variable is significantly affected for only one of the two subjects).

For Tyrone, all activities encouraged greater cooperation, with higher levels of responsive behaviour and lower levels of not responding during dog sessions. This finding supports that of the greater

amount of time spent focused on the scheduled activity. Together these results suggest that the dog-assisted activities provided a sustainable focus of interest that encouraged interaction with the adults. Additionally, there is some evidence that Tyrone was physically closer to the adults and would sit with them for longer. This is particularly important for Tyrone, where the activities were concentrated on teaching specific skills (communication, requesting, sorting and matching). There is also some indication that the different activities might have had slightly different effects, with the biscuits activity with the dog capturing Tyrone's attention for significantly longer than the similar control activity. This finding could be important for extended programmes that implement dog-assisted activities, where some activities, if they are of particular interest to an individual, could be developed, for example, to incorporate new or difficult skills. However, it should be remembered that the sessions in this study always involved other activities and such variety may have been necessary to stimulate greater interest in a subsequent activity or session.

The dog-assisted activities were seen to have a positive effect on Tyrone's interactive behaviour. There was a specific aim to increase his use of symbols and sign language but this variable was not seen to significantly differ between conditions, but it was found that the number of communicative responses (i.e. appropriate use of symbols or signs) rose sharply in the last two dog sessions. Unfortunately the restricted number of weeks available for this project prevented further investigation, but it does suggest that after four weeks some communicative skills had been learnt and were more apparent during the dog-assisted activities.

Charlie also showed significant differences in behaviour between control and dog sessions, the interactive behaviours showing a similar pattern to Tyrone. Charlie was more responsive (both communicatively and physically) during dog sessions, he also attended to the scheduled activity for longer if it involved the dog. In addition Charlie's challenging behaviour was significantly reduced during dog sessions, he was less likely to respond inappropriately to requests about the activity, made fewer attempts to leave the room, screamed less often and spent more time close to the adult guiding activities. Two (ball and biscuits/buttons) of the main activities (ball, biscuits/buttons and body parts cards) being encouraged by the adult were also attended to for significantly longer when they were focused on the dog, with less distraction to other things. Charlie also independently chose the jigsaw - an activity that required minimal interaction - more often during control sessions. All these behavioural differences support the interpretation that the dog-assisted activities increased interactive behaviour and cooperation while simultaneously reducing difficult behaviours.

The findings from the Real Life Rating Scale (Freeman et al 1986) suggest that it could provide a very general idea of whether an individual is responding well to dog-assisted activities. For Tyrone and Charlie it supported the behavioural measures in that it indicated a lower score on autistic behaviour for dog sessions, however this is probably misleading as it is most likely reflecting (particularly for Tyrone) an increase in appropriate behaviours rather than a decrease in inappropriate behaviours.

The overall impressions of the effects of the dog-assisted activities on interaction are similar for the two autistic children, even though only four behaviours (time spent focusing on the activity, duration of biscuits/buttons activity, appropriate physical response about the activity and time spent in close proximity to the adult) show significance for both children. Again this highlights the value of the single-case approach to identify single behaviours that may be significantly affected by dog-assisted activities, while also showing a general impact of dog-assisted activities when individuals' findings are compared.

The fact that an increase in positive reactions to animals outside sessions is reported by parents is perhaps not surprising for these two children who already had some interest in animals. If these findings could be extended to children who are either not interested (and thereby introducing an additional area of interest for activities and interaction) or those who are scared of dogs (creating problems for families when they are out), additional value from these dog-assisted activities could be obtained. Obviously, if this was attempted a slightly different introduction to the dog (perhaps even to the extent of systematic desensitisation over a period of time) and structure of sessions would be necessary to avoid any negative reactions or distress.

STUDIES 4a & 4b

THE CHARACTER CHECKLIST: INFORMATION FROM SINGLE-CASE STUDIES FOR YOUNG ADULTS WITH SEVERE LEARNING DISABILITIES AND YOUNG CHILDREN WITH AUTISM

A short checklist containing thirteen items about personality characteristics was designed (see Appendix 19) in order to investigate whether it might be possible to predict how an individual will respond to dog-assisted activities. Staff working with the children/young adults and/or parents and the Clinical Psychologist completed a checklist for each individual.

Statistical analysis was not carried out due to the small number of subjects and respondents completing checklists. Additionally the reliability and validity of the checklist could not be assessed in these circumstances. However the checklists were designed as a preliminary investigation into the types of items that might in future research be helpful in selecting appropriate candidates for dog-assisted activities.

Figure 6.68 shows the average scores (where more than one checklist has been completed) for each item. This graph illustrates the range of responses for each character description. Only four questions are grouped at one end of the scale:

i) all individuals were described as being at least slightly interested in things around them,

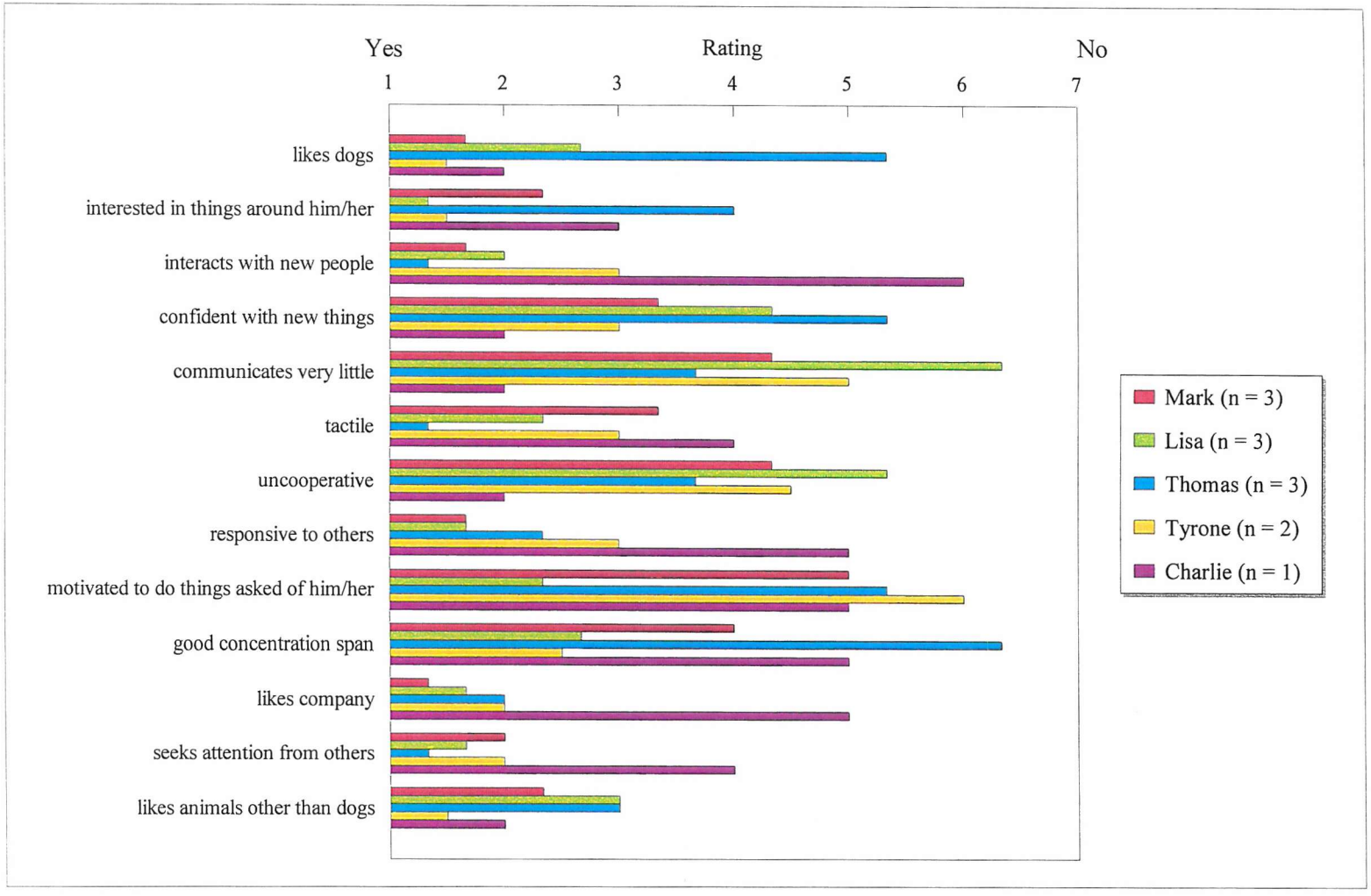
ii) they were also described as being tactile individuals

iii) they were all thought to seek attention from others, and

iv) all five individuals were seen to like animals other than dogs.

In addition there is a tendency towards all participants liking dogs, with the exception of Thomas who was known to avoid dogs when out walking but was not thought to be fearful of them. With the exception of Charlie all were considered as interactive with new people, responsive to others and liking company.

Figure 6.68 Average scores from staff and parental checklists concerning individuals' personal characteristics.



Both autistic children (Tyrone and Charlie) were predicted to definitely benefit from the dog-assisted activities as they were known to be interested in dogs and other animals, although Charlie was seen to avoid dogs when out walking. There was greater indecision as far as the young adults were concerned: two out of three staff members thought that both Lisa and Mark would definitely benefit from the dog-assisted activities and one thought they probably would. Predictions for Thomas were less positive, where one out of three thought that Thomas would definitely benefit, one thought it was probable and the other did not know. In the event, the outcomes for Thomas were very positive and were perhaps less so for Lisa.

Overall the character checklists (and informal discussions) that were completed before the study suggested that the three young adults and the two autistic boys involved in these projects would differ significantly in the degree to which they benefitted from the dog-assisted activities. However, all five individuals described in this chapter appeared to gain some benefits from the dog-assisted activity sessions, compared to control activities. Lisa probably showed the fewest gains that could be solely attributed to the dog sessions. It is noticeable that Lisa's characteristics as described through the checklists are similar to the majority of the other children/young adults, while Charlie and Thomas show greater divergence from the average. This finding suggests that this short character checklist would not be very useful in predicting the outcome of dog-assisted activities. It should be noted that the four common characteristics described above may be the most influential in affecting responses to dog activities and should be monitored in future studies. At this stage it would seem most appropriate to carry out a closely observed and controlled introduction to the dog in order to assess the suitability of individuals for dog-assisted activity sessions. The slightly negative predictions before sessions from staff and the positive feedback during and after sessions concerning Thomas's reactions to the dog reflects staff willingness to objectively observe such sessions.

DISCUSSION

No single behavioural measure was affected by the dog-assisted activities for all individuals. However in all cases appropriate communicative and/or physical responses were significantly more frequent during dog sessions, with three out of the five individuals also showing significantly lower rates of not responding to the adults. In addition specific behaviours that were targeted were seen to be significantly affected by the dog: Mark was more willing to join in an interactive activity; for Lisa the dog may have encouraged her to start using her partially paralysed right arm; Thomas and Charlie both showed less difficult behaviour; Tyrone developed and used some communicative skills.

Overall greater cooperation and interaction for all individuals was elicited through the dog-assisted activities, supporting the findings of previous studies by this author. There is also strong suggestive evidence from this research that specific problems could also be assisted by these activities. It should also be noted that none of the individuals described showed any significant differences between dog and control sessions for the frequency of communicative initiations. As mentioned in earlier chapters, other authors (e.g. Corson *et al.*, 1977) have described social facilitation effects of AAA. It might therefore be expected that social initiations would be encouraged through AAA, but this has not been demonstrated in these single-case research studies.

One of the problems associated with the methods used in this research is the time-consuming nature of taking video recordings and then watching these recordings (possibly several times). Therefore, in addition to the video observations, these studies employed short checklists that were completed by either the experimenter or the staff involved. The results from both the checklists and the behavioural measures could then be compared to give an indication of the validity and reliability of such checklists. If checklists could be developed that were valid, reliable and easy to use it would allow for systematic and widespread evaluation of dog-assisted activities. This study found that staff were likely to give objective measures of effects and with some 'fine-tuning' and development of questions this could be a suitable way of assessing dog-assisted activities. In addition a valid and reliable scale for measuring autistic behaviour (Freeman *et al.*, 1986) was found to give a good

overall impression of behaviour, but sub-scales were not found to be reliable when the coder had been concentrating on specific behaviours while observing the videotapes.

The issue of intra- and inter- observer reliability is often raised when observational methods are used. Unfortunately due to the nature of the method it is extremely difficult to find and train other observers who are familiar with children from a special needs population. However, intra-observer reliability on durations from Tyrone and Charlie's sessions suggest that after a two week period a second observation by the same person results in a highly reliable measure.

A preliminary 'character checklist' was designed to briefly examine the possibility that certain personality characteristics might influence reaction to dog-assisted activities. There was no evidence that this was the case in these single-case studies, although there were some characteristics common to all five individuals.

After a number of studies that followed traditional experimental methods (see earlier chapters) established a picture of the common behavioural effects that might occur when providing dog-assisted activities, it was considered appropriate to investigate the application of these findings in a 'real world setting'. Therefore a single-case experimental approach was taken to investigate the impact of dog-assisted activities on a number of individuals. This approach involved following standard clinical procedures, targeting specific behaviours and adapting studies to suit the needs and circumstances of the individuals involved. These single-case studies provided detailed information about individuals' reactions to dog-assisted activities and allowed for comparison between individuals, illustrating common effects and idiosyncratic responses. This provides detailed information for those working with these individuals and provides other researchers with a greater range of reactions that might be expected when implementing dog-assisted activities.

As a direct result of this work a PAT dog volunteer group has been established with the assistance of professionals within the local community health team. The group will continue providing dog-assisted activities using the information from this research.

In conclusion, these single-case studies confirm the findings of previous studies, with dog-assisted activities encouraging interest and interaction with adults guiding activities. They also suggest that the activities can be modified and adapted to target specific skills or behaviours. The process of evaluating dog-assisted activities is seen to be a complex area that requires further research, but it is

hopeful that easier methods could be usefully developed. The single-case experimental approach was considered to be a valuable method for developing dog-assisted activity programmes in a clinical setting.

CHAPTER 7

DISCUSSION

DISCUSSION

SUMMARY OF FINDINGS

The first two studies described in this thesis aimed to provide a general picture of the effects that animal-assisted activities might have on the behaviour of children with special needs. In order to achieve this, data from several individuals was pooled before statistical analysis; firstly, from children that were worked with individually and secondly, from children that were worked with together in groups.

The first study (Study 1; Chapter 3) suggested that an imitation dog does not elicit the same behaviour as a real dog and could not therefore be used as a substitute when considering AAA. It also provided information about the behaviours that might be encouraged through AAA; the children were more likely to be responsive to an adult's interaction about the activities and were less likely to ignore her. The real dog focused attention on itself, and encouraged initiations from the children towards and about itself, rather than increasing the number of initiations *per se*. It was clear that the real dog provided something more than just a tactile stimulus. The replication of this study (Study 1a; Chapter 3) in the Czech Republic lent further support to all these conclusions.

The second study (Chapter 4) compared different types of AAA with comparable control activities, working with groups of children. The findings from this study were restricted by a number of methodological problems and consequently information concerning behavioural effects on the children was limited. It was found that high ability children (within the SLD category) working on educational tasks (number and writing skills) were more likely to be cooperative if the activity included the dog. As with the previous study a total increase in social initiations was not found. The main finding from this study was that the degree of dog involvement in the activity may be an important factor in influencing appropriate or desirable behaviour during AAA, and that educational tasks that are possibly unappealing to children may be more easily enhanced through animal involvement. It also appeared that the degree of dog involvement in each activity was related to the size of the behavioural effect.

The intention for the third study (Chapter 5) was to group the data from several children seen individually to examine whether a dog could help motivate or reward children that had physical

rather than learning disabilities. However it soon became clear that the differences between these children with Cerebral Palsy, in terms of abilities and impairments would have obscured a great deal of information. Therefore statistical analysis was carried out separately for the results of each individual. This highlighted the value of a single-case experimental approach as the findings from each child were quite distinct and different behaviours were affected for the different children. The overall conclusion was that in order to provide a motivating or rewarding stimulus the dog had to be highly involved in the activities. This supported the findings of the second study and the suggestion that the degree of dog involvement is a major factor in the outcome of AAA for children with special needs.

The final study (Chapter 6) was comprised of a series of single-case experimental designs and aimed to investigate in detail whether individuals with SLD (children and young adults - subsequently referred to as 'children'), would show idiosyncratic reactions within and in addition to the general pattern that was emerging from preceding studies. Considering the findings from these single-case experiments as a whole the general impression was one of the AAA eliciting a significant increase in appropriate interaction and cooperation (although different variables, at the most detailed level, were affected) and providing a more sustainable focus of interest than control activities. Again increases in social initiations were not found for any of the individuals studied. Examining the behavioural data and achievement of target goals for each individual illustrated the different needs and individualised responses of these children and young adults with special needs.

In combination, all the studies suggest that some benefit can be obtained from AAA for several different kinds of children with special needs. They also indicate that there are large individual differences and that these should be carefully monitored when designing, implementing and evaluating AAA. Studies 1a and 2 indicate that cognitive and adaptive abilities might impact on the behavioural effects that AAA can have on an individual. It appears that children of lower abilities might derive less benefit from animal involvement in activities than those with higher abilities. However, Thomas (Study 4a; Chapter 6) was a young adult with extremely poor functioning, and the specifically designed AAA programme was seen to have a significant and positive impact on his behaviour. It may have been that the benefits were a result of tasks being suitably adapted, or it is possible that as an older individual a comparison with the young children involved in the earlier studies is not appropriate. Obviously, further research is required to elaborate on this finding.

As mentioned in the first chapter there is little research literature that is directly comparable with this work. However, there were a number of similarities to and differences from research and information from other authors that have described human-animal interactions. Similarities with and differences from previous literature will be presented and the advantages and disadvantages of the different methods used will then be addressed, followed by a discussion of the limitations and practical problems encountered during the studies described in this thesis. Recommendations for the development of this work will be suggested. Finally, conclusions will be made on the behaviour of children with special needs and the effects of AAA.

FINDINGS IN RELATION TO THE HUMAN-ANIMAL INTERACTIONS LITERATURE

As stated before, people that live at home and own pets are a very different group to those that have special needs and live in specialised units. The studies described in this thesis have very little in common with those described in the pet ownership literature. Attachment to pets is mentioned regularly when studying pet owners and the present studies did not and could not investigate this aspect of AAA, since none of the participants 'owned' the dogs used. However, this research did investigate the impact of AAA on social behaviour and to some extent supports the work of Mugford and M'Comisky (1975) who found that caged birds served as 'social lubricants' by acting as a focal point for communication. The studies presented here with children and young adults suggest that the dog served as a good focus for activities and interaction, although this was initiated and maintained by the adult(s) guiding the sessions rather than by the children themselves (effects of the animal on communicative initiations was rarely seen). Kidd and Kidd (1987) report that recognition of animals as a distinct entity occurs very early in life (approximately 12-30 months) and despite the poor adaptive and social skills of the children involved in my studies, it was clear that they behaved differently when the dog was present and therefore probably recognised the dog as an animate creature.

SOCIAL INTERACTIONS

Throughout the human-animal interactions literature there is regular reference to the impact of animals on people's social interactions and this is particularly true of papers relating to people with special needs. Often these are described quite generally, including social facilitation (Corson *et al.*, 1977), social lubricant (Odendaal, 1990) and social catalyst (Levinson, 1972). Although the original

authors often make it clear how this label has been reached, such terms appear in the remainder of the literature with little description or definition as to the behaviours such terms might encompass. Fick (1992) found that elderly nursing home residents made more verbal interactions during dog-assisted therapy, but found no corresponding change in attentive behaviour. This study by Fick suggests that some caution should be taken as to the expected breadth of interactions that might be affected by AAA. My studies also suggest that it is not all aspects of social interactions that are affected by AAA. It was clear that in the majority of cases cooperative or responsive behaviour was enhanced and that this was often accompanied by a reduction in the child's ignoring of the adults present. However, the overall frequency of communicative or social initiations made by the children was largely unaffected, and this was not due to such initiations being absent from sessions (they occurred in both dog and control sessions, but their rate was usually not significantly different between the two conditions). These findings do not contradict those of other researchers who have described increases in social interaction for the elderly (e.g. Haughie *et al.*, 1992), adults (e.g. Francis *et al.*, 1985) and children (e.g. Redefer and Goodman, 1989) , but indicate that such measures are made up of a number of complex components (such as types of responding, initiating, looking/attending etc.) that might be affected differently. Many of the studies described in the literature did not focus on any specific activity, other than interaction with and about the dog, providing a relaxed atmosphere where people interact on an equal level without anyone specifically directing the activities. In such situations it can be difficult to determine who is making social initiations and who is responding, and as a result research has often focused on a general picture of social interactions. The studies presented in this thesis, however, were directed by a specified adult who guided all sessions, and it was therefore possible to monitor closely individuals' rates of initiating and responding, as well as direction of attention and involvement in the activities. Although this was of advantage, it also affects the dynamics of the interactions and future research with some populations could incorporate, for example, 'free time', when initiations could be more easily made by the participants.

Children with autism, by definition, lack fundamental social abilities and tend to keep their own company whenever possible. Redefer and Goodman (1989) found that a group of children with autism showed increases in social interactions and corresponding decreases in isolation during AAA. Tyrone and Charlie (Chapter 6) were both diagnosed as autistic and responded in a similar manner to those children described by Redefer and Goodman. This suggests that many children with autism may benefit from periods of AAA to help develop social and communication skills. Redefer and Goodman also reported that after the AAA sessions had been stopped, the children's behaviour

gradually returned to baseline, and unfortunately it was not possible to investigate long-term effects in the present studies. However, the effects are apparent at initial stages and further research would be extremely helpful in developing suitable AAA programmes and evaluating both long-term effects on behaviour and generalisation to other situations. From the single-case experiments with young adults (Chapter 6) there was some indication that removal of the dog sessions resulted in an increase in inappropriate behaviours and its is possible that once AAAs have started they need to be continued for a certain period of time to maintain beneficial effects on behaviour. This is obviously an area that needs more detailed study.

PROBLEM BEHAVIOURS

Another aspect of social interaction is 'challenging' or problem behaviour that can disrupt or prevent appropriate social behaviours. Beck et al (1986) found that adults attending psychotherapy sessions showed less hostility when caged birds were present. In this thesis Thomas and Charlie (Chapter 6) were both known to exhibit a number of problem behaviours and these were seen to be reduced during the AAA sessions, compared to control sessions. Although, this is a very limited number of cases to demonstrate this, it does suggest that there is some potential for AAA to be utilised in situations where problem behaviours are shown. It should be noted that with these two cases, great care was taken to demonstrate suitable behaviour towards the dog, and the dog was physically protected by the adult if there was any indication of potential aggression towards the dog. Although no such problem behaviours occurred (physical aggression was not the main problem behaviour in either case) the behaviour and guidance of the adult may have been influential.

LONG-TERM EFFECTS

The current state of the literature indicates that the majority of the research that has so far been published has been relatively short-term and has only succeeded in indicating the possible effects of AAA. As a result there is little evidence to support or contradict the findings of Winkler *et al.* (1989) who found that the effects on nursing home residents who initially showed an increase in social interactions when a visiting dog was introduced were not maintained for the 22 weeks of the study. Most of the studies in this thesis were also reasonably short-term, although the three single-case experiments with young adults, which involved frequent visits over a sixteen-week period showed that behavioural changes were maintained. This may be related to the very focused and individually directed nature of the activities that made up the sessions.

Focus of Interactions

Information from Savishinsky (1985) and studies relating to 'pet-facilitated psychotherapy' (e.g. Beck *et al.*, 1986; Thompson *et al.*, 1983) suggest that the activities incorporated in AAA do not necessarily need to be entirely animal-focused. The studies described in this thesis lend some support to this idea and support Nathanson's (1989) study with children that have special needs. Nathanson's work was one of few studies in the area that focused on specific tasks that were not in themselves animal-related but were educational activities relevant to a school curriculum. He found that children were more likely to respond to questions asked during dolphin-assisted sessions, where the dolphin served as a reward for correct responses and was also highly involved in the activity (fetching word boards). The second study (Chapter 4) and the final study (Chapter 6) also showed an increased rate of responding during educational tasks that involved a dog, and the third study (Chapter 5) provided some evidence for the animal to provide motivation if highly involved in the activity and acting as a 'reward' after a task is completed. However, Nathanson's study does not demonstrate whether interaction with a dolphin is sufficient reward in itself, as the study in Chapter 5 suggested that a dog is not.

Imitation Animals

Two studies were found in the literature that examined whether soft, toy imitation animals might elicit the same type of behaviour as real animals. Firstly, Hendy's study (described in McCulloch, 1983) showed that elderly people with special needs behaved differently with real animals (smiling more and being more alert) than with toy/imitation animals. Secondly, Nielsen and Delude (1989) describe real animals as eliciting more attention and higher levels of social initiations from young nursery school children, than imitation animals. The first study described in this thesis (Chapter 3) supports these findings and suggest that an imitation animal cannot substitute a real one in terms of effects on behaviour. There is something intrinsic to a real animal that is likely to be one of the major factors influencing behavioural changes through AAA. All of these studies together suggest that Levinson's (1984) proposal that animals provide 'touch stimulation' is unlikely to be a causal factor in affecting people's behaviour when animals are present. The imitation animals were soft and 'nice to touch' but did not produce the same patterns of behaviour as real animals.

THE ROLE OF THE THERAPIST

A number of other issues that have been mentioned in the literature became relevant during the course of the studies carried out for this thesis. A number of authors stressed the importance of the therapist's guidance of sessions (e.g. Redefer and Goodman, 1989; Draper *et al.*, 1990). The study involving children with CP (Chapter 5) and their therapists suggested that different therapists working with the same dog and the same child could elicit different behavioural patterns from the child. This provides some support for the suggestion of therapist selection. However, further research that is designed to test this hypothesis would be very valuable for highlighting the different effects therapists might have and how they can best utilise a visiting animal. For all the other studies described in this thesis the same therapist/adult(s) guided both control and experimental conditions within each study, following the same approaches and behaving as similarly as possible in both conditions. Therefore 'therapist' effects within these other studies are unlikely to have distorted the results, although 'therapist' effects might be of relevance when comparing studies. Unfortunately due to the small number of studies completed and therefore the limited number of adults involved it is not possible to effectively examine this possibility.

PERSONALITY TRAITS

Another issue that was raised by the literature was that of personality traits influencing who would acquire a pet. It was also apparent from the pets and people with special needs literature that some individuals would not benefit from interactions with visiting pets (e.g. Kongable *et al.*,1989; Thompson *et al.*, 1983). A brief examination of 'personal characteristics' was carried out for the series of single-case experiments described in Chapter 6. Unfortunately these provided little information about the possible characteristics that might predict the outcome of AAA for different individuals since outcomes for all five participants were broadly positive. The four common characteristics (interest in things around them; being tactile; attention seeking; liking animals other than dogs) might be the most telling. Although most of the children involved in the studies described in this thesis responded positively, and no negative outcomes were found, all these children were volunteers either through the consent of their parents or full-time carers (who are unlikely to give permission for children to attend sessions that they feel might cause distress). It was noted that some children were described as being inexperienced or somewhat fearful of dogs when met in public places, but their reactions in the controlled sessions did not reflect this. The one exception to this was a girl in the first study who asked to stand a certain distance away from the dog

during sessions, but when given the opportunity to withdraw from sessions did not want to and attended all sessions. This might indicate a rather biased sample, but refusal of permission by parents and carers, and not responding to requests for participation was very rare. All these studies were carried out in a familiar environment, the dog was clearly controlled by the adults, and activities were tightly structured. These practical issues may also have contributed to the positive reactions of children involved and suggests that structured introduction to animals should be encouraged, and that all such activities should be carefully monitored for negative reactions from both children and animals.

THEORETICAL FRAMEWORKS

As stated in Chapter 1, the research studies in this thesis were designed to establish the effects that AAA might have on the behaviour of children with special needs; they were not designed to test any theoretical frameworks. However, as mentioned earlier Levinson's (1984) suggestion of tactile stimulation and reassurance does not fit well with the comparisons between behaviour with real and imitation animals. It could be argued that the main difference between these two conditions was the real dog's animacy, but the components of this feature are hard to disentangle as animacy involves a variety of behaviours directly from the dog. Brickel's (1982) theoretical suggestion regarding the intrinsic attractiveness of animals is also complicated to test directly and although the dog was found to attract attention to itself a causal relationship between an innate attraction towards an animal and subsequent behavioural effects would be very difficult to establish. His further suggestion (1985), from a learning perspective, that people are taught to love animals would require detailed examination of each individual's experiences with animals.

The studies in this thesis took a behavioural perspective, which is the most common approach with language impaired populations (see Chapter 2). A behavioural approach, by definition, will not provide information concerning psychotherapeutic hypotheses because internal states and motivations do not enter into behavioural analysis. Once rigorous methodological foundations have been established and replications have produced further evidence that AAA is a viable intervention, the field might allow for more productive theorising. For example, a perspective based on systems theory (e.g. von Bertalanffy, 1950) might prove valuable in piecing together the complex triadic inter-relations between therapist, child and dog.

RECOMMENDATIONS AND CAUTIONS - HUMAN HEALTH AND ANIMAL WELFARE

For all the studies described in this thesis practical precautions pertaining to human health and animal welfare described in Chapter 1 were taken. All dogs were given a clean bill of health by their veterinarian prior to each study. Doctors and carers were required to provide information about allergies, phobias and immunosuppression. Animal handlers were carefully selected and well-informed and all dogs had completed a temperament test. Children were required to wash their hands after sessions and were given close guidance and supervision when interacting with the dogs. Opportunities were always taken to teach the children how to behave appropriately when approaching or interacting with a dog. For the benefit of the dog, all sessions were of short duration (session time within any one day did not exceed one hour) with regular breaks and access to water.

COMMENTS ON METHODOLOGY

EXPERIMENTAL PROCEDURES

The purpose of the studies described in this thesis was to examine the potential benefits of AAA sessions compared to control sessions. Children with special needs are a small but heterogeneous group which presents different symptoms and aetiologies. It is therefore difficult to assign children to matched groups that receive different treatments, as the individual differences shown can be quite extreme. It was therefore appropriate in most cases to utilise repeated measures designs where the children served as their own controls and were observed during AAA and other activity sessions. This proved to be a very useful way of determining differences in behaviour between types of sessions. Unfortunately this method has its limitations, and skill acquisition and the generalisation of effects to situations outside the sessions cannot be satisfactorily determined. Two studies attempted to overcome these limitations. In the first study (Chapter 3) two groups of children underwent a programme of repeated measures sessions with one group having two control sessions (not described in detail in this thesis). In the second study (Chapter 4) matched experimental and control groups were used. Neither the first study (Chamradova, 1995) nor the second provided any indication of skill acquisition or generalisation. This may have been a result of the different methods used to measure gross skill acquisition and generalisation and this will be discussed later, when data collection techniques are addressed.

Grouping the data for several children was a valuable way of obtaining a general pattern of behaviour that is likely to be seen when working with children with special needs. The behavioural differences identified in the first study were seen repeatedly in other studies. This leads to the suggestion that a general overall effect on interactive behaviour is likely. However, the progression towards single-case experimental designs demonstrated that there are additional effects of AAA for individuals. Although such findings can only be attributed to the individual studied it does provide information as to the possible areas of behaviour that can be enhanced through such programmes. The differences that were seen between individuals who could be considered to be similar (being at the same school/residence; having the same diagnosis; following the same type of treatment or educational programme) illustrate Malone and Langone's (1994) support for single-case research which does not mask individual treatment effects. As a general behavioural pattern had already been established through traditional experimental methods, it was possible to examine the findings from single-case research studies and compare them to this general pattern. It was clear that the findings supported one another, but that the data from the single-case studies elaborated on specific issues such as individual communication programmes, or problem behaviours, which can be substantially different for each individual studied and would probably have been masked in a group study.

An issue that became apparent through the single-case experimental ABAB design (Study 4a; Chapter 6) was that the findings for Lisa and Thomas both indicated that withdrawal of the dog phase might lead to increases in inappropriate behaviour in the following control phase. This has implications for the repeated measures design where there is frequent withdrawal of the dog, and this might accentuate any differences between the two conditions. In itself this provides information about the effects of the dog-assisted sessions, demonstrating positive reactions to the dog, but it also suggests that there might be some negative impact when carrying out similar activities that do not involve the dog. With a repeated measures design it would be very difficult to assess this possibility and additional measures, possibly before and after both dog and control sessions, would be necessary. However, it is also possible that with a repeated measures method, the established pattern of activities that rapidly alternate actually prevents any dependency on the AAA sessions and therefore the problem of withdrawal is not encountered. Ultimately, this is an important consideration for future research where children act as their own controls and attend both experimental and control sessions, and it would be of value to investigate this further.

DATA COLLECTION TECHNIQUES

As discussed in Chapter 2, observational methods were employed in all the studies described in this thesis. This proved to be a useful method for examining such behaviours in children with special needs, who had limited communication skills. The first study, however, involved children who were quite communicative and this provided an indication of the breadth of such behaviours that might occur. Subsequent studies demonstrated how changes in behaviour might be more restricted with children that had more limited interaction skills. Thomas (Chapter 6), for example, showed a difference in the frequency of physical responses that he made during AAA compared to control activities as he was unable to use verbal means or sign-language.

In order to achieve a full description of behaviours shown during AAA, repeated observation focusing on different aspects of behaviour were required. Video-taped recordings of all sessions were essential in order to do this and are recommended for all studies using direct observation.

It can be argued that direct observations introduce a subjective element to the data collection process. Although this is a risk, using ethological techniques to code all behaviours, with clearly defined and strict assignment of behaviours within these definitions it is possible to remain objective. In these studies it was found to be important to use some 'qualitative' definitions of appropriate and inappropriate behaviour which are obviously dependent on what the therapist is encouraging the child in question to do. Encouraging certain types of behaviour, is often done in order to ultimately integrate the child into the surrounding social environment (e.g. Malone and Langone, 1994), and is the purpose of such interventions. Such a purpose can only be assessed through the opinion of others. The aims of such an intervention can be thought to follow a 'common standard'; it is appropriate to reply to a question directed towards you and it is inappropriate to hit someone if they say 'hello' to you. All the behaviours recorded through the studies in this thesis are carefully defined and examples given, and in this way it was hoped that objectivity was maintained and that replication of the findings in future would be possible. It would have been particularly valuable to carry out measures of inter-rater reliability, but in order to do this observers who are experienced with children with special needs (and preferably with the children involved in the studies) would need to have been trained to use these data collection techniques and then complete lengthy observations of sessions. Unfortunately, practical constraints precluded this, although it would be recommended for future research when possible.

Additional data collection techniques were also employed, including interviews, surveys and standardised tests. The measures used to investigate generalisation of effects outside AAA sessions (British Ability Scales and Portage checklists) proved to be unreliable (Study 2 demonstrated a drop in BAS scores after a six-month period for a group of children who did not suffer from degenerative disorders) and did not show any differences between control and experimental groups. It is possible that AAA effects are not generalised until after a long period of time, or require greater emphasis on phasing the dog out of sessions. These studies did not investigate such issues, but it would be advisable to use similar observation techniques to those used in these studies in order to assess behaviour in other situations. It is only in this way that it would be possible to determine whether the same behaviours are being affected outside AAA sessions.

Subsequently, other methods were introduced in order to provide additional information. Study 3 (Chapter 5) involved staff completing checklists about children's performance on physical tasks, but a limited 1-5 scale was found to be too gross to measure the very specific behaviours that were observed to have been affected. This study demonstrated the limitations of just using direct observation. Although behaviours were seen to be significantly different between conditions, interpretation of these differences was complicated by the fact that the therapists involved contributed greatly to the behaviour and physical movements of the children. Further information and detail about the therapists' involvement during the physical tasks would have greatly enhanced the findings of this study. This could not have been done purely by observation as, for example, it is very difficult to determine how much weight the child is placing on the therapists or how much control over a physical movement the therapists are having to exert. Additional methods to direct observation would be necessary.

In Study 4a (Chapter 6) it was found that staff checklists that focused on more specific behaviours did follow a similar pattern of differences between conditions as the observed behaviour measures (although detail was necessarily more limited) and it was thought that such instruments could be developed successfully to monitor AAA with these adults with SLD. Obviously, direct observation techniques are quite time-consuming and development of additional methods that could easily be used by busy staff would be of value for evaluating AAA programmes. It became apparent that Blurton-Jones' (1972) criticism for rating scales that have not been empirically derived was to some extent applicable in Study 4b. A checklist designed by Freeman *et al.* (1986) did not reflect the observed data from the two children with autism that were studied. Although an overall measure from Freeman *et al.*'s measure did correspond to some extent with the observational data, it did not

shed any light on the type of behaviours that were affected. Semi-structured staff or parent interviews were completed after studies where possible and these did lend some support to the behavioural data collected. In the case of the study involving children with CP (Chapter 5) staff interviews provided some useful additional information that was important for the interpretation of the behavioural data that was collected. These interviews, however, provided general rather than specific information and sought mainly to obtain information about staff and parent attitudes towards AAA. Unfortunately, the limited amount of information obtained precluded any formal analysis. Future projects could be enhanced by attempting to extract more information from interviews with staff, possibly by interviewing during the study period as well as after. Generally, the additional data collection methods that were employed supported the direct observations but would not have been satisfactory on their own.

Altogether these research studies suggest that direct observation is an extremely valuable data collection method that provides a great deal of information about the behavioural effects of AAA. In addition, development of other, less time-consuming, techniques would be best developed in parallel with these observational techniques in order to reduce the loss of information.

PRACTICAL ISSUES

One of the major problems with this research is the small sample sizes, not only for the number of children, but also only one or two therapists/adults and one dog participated in each study. The restricted number of children was due not only to the small number of children with SLD or CP in the general population but the time allocated for sessions was restricted by other school commitments and the time-consuming nature of the data collection techniques. The use of a single therapist and dog was necessary in order to examine behavioural differences without additional confounding variables within any one study. Obviously, it is possible that either the dog, or therapist, was one that was particularly germane to the behavioural changes described. However, the aims of these studies was to establish possible effects on the behaviour of children with special needs during AAA and with this information it may then be easier to design research projects that can manipulate the presentation of different dogs and therapists to further examine these issues.

It is difficult to establish whether differences in children's behaviour were due directly to the dog or indirectly due to subtle but important changes in the therapist's behaviour. There is always the possibility that the expectations of the adults involved in a project of this nature could influence the

findings. In the studies described in this thesis every attempt was made to avoid this possibility. Prior to each study discussions between the each dog handler, the experimenter and any staff involved focused on the importance of providing similarly optimal interactions in both control and experimental conditions. Standard guidelines and behaviours were used to maintain as much similarity as possible between conditions. Analysis of interactions in Study 1a suggested that , at least quantitatively, the handler's interactive behaviour was similar in both conditions. In addition, the finding that staff involved in Study 4a predicted no effects or negative outcomes for AAA, but subsequently provided positive feedback, suggests that their expectancy effects were of minimal influence. However, AAA involves triadic interactions (therapist-child-dog), where all three individuals impact on one another and therefore is a very complicated situation to disentangle, and expectancy effects may still have exerted undetected influences, despite all the precautions taken.

Many problems are encountered when setting-up and carrying out projects such as those in this thesis. Ethical issues are of the utmost importance, and staff and parents must willingly consent to the children's participation and their own (when necessary) with detailed information and opportunities for discussion provided. Schools and residential centres must have suitable facilities and provide permission for animals to visit. Dogs must be temperament-tested, physically examined by a veterinarian and registered with an appropriate association which provides third party insurance (in this case the PAT dogs charity). Information about immune deficiency, allergies and phobias that children or staff might have needs to be collated and considered, with appropriate action taken where necessary. Sessions must be carried out at times that are least disruptive to the children's, staff's and therapists'/dog-handlers' current timetables. All such factors must be dealt with and take precedence over any pre-determined experimental design. In addition video-recording equipment failure and absenteeism can all contribute to problems with interpreting findings. However, such issues are a fact of everyday life when working with individuals that have special needs and are unlikely to be wholly avoided. It is therefore unrealistic to expect an ideal situation in which to carry out an experimental study with these children and such factors must be recorded and incorporated into the design, analysis and interpretation of any findings.

The need to tailor AAA programmes to suit the abilities and needs of each individual involved is apparent. From the studies described in this thesis there is some indication that there is a threshold of cognitive ability in the children below which the benefits of AAA are reduced or are undetectable. Studies 1a and 2 suggested that the lower ability children might be less likely to benefit in terms of behavioural effects through AAA of this type. However, it should be investigated whether it is the

presentation of AAA and the tasks involved that are responsible. As shown by the single-case studies it is valuable to design programmes for individuals, and this should be possible for children who show more severe symptoms and limited skills as well as for the more able children.

In addition it seems that the dog must be closely involved in the AAA tasks and not act as just an occasional focus or reward. This does not mean that the activities are limited to brushing, stroking and walking, but can involve skills such as counting, matching and sorting coloured and shaped biscuits for the dog or having a race with the dog on a physical task. At this point the researcher or therapist is limited only by their imagination and creativity.

FUTURE RESEARCH

The studies described in this thesis provide preliminary information about the potential behavioural impact of AAA on children with special needs, particularly those with SLD. Typically, this leaves many questions unanswered and generates even more. Developing future research could greatly be enhanced by establishing additional data collection methods that can then be implemented quickly and efficiently by staff and carers working with special needs children. Issues concerning the effects of different therapists, dogs and activities would be of value to both researchers and clinicians, as well as the children themselves. In addition the individual differences highlighted in this thesis could be further investigated, allowing for the development of approaches to suit, for example, individuals of different cognitive abilities and with different specific needs. Generalisation of behavioural effects outside sessions and after sessions have been discontinued are also important issues that have only been hinted at here, and require further research in order to be fully understood. As stated earlier the field of AAA research is still in its infancy and rigorous methods and evaluation of findings is necessary in order to design appropriate programmes and to determine more firmly the possible benefits and drawbacks of AAA. The methods described here go someway to providing a foundation for investigating all the above questions.

CONCLUSIONS

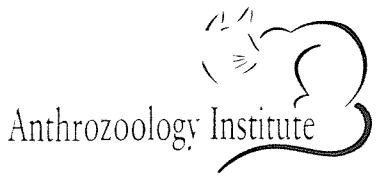
The use of video-recording of AAA and comparable activity sessions allowed for detailed investigation and comparison of the behaviour of children with special needs. Traditional experimental methods provided a general picture of the effects of AAA on the SLD population as a whole, while single-case research designs illustrated the individual nature of responses to AAA. The sequence of studies described in this thesis suggest that children with special needs are likely to benefit from AAA in terms of increasing appropriate interactions, increasing cooperative behaviour and reducing problem behaviours, such as ignoring the adult. This requires that an adult directs the activities in a structured manner. Individual differences, types of activities and level of dog-involvement were all seen to be factors in determining the extent to which AAA affects the behaviour of children with special needs, and are therefore also likely to lead to differences between individuals in the benefit obtained from AAA. All these factors need to be investigated in greater detail in order to establish their respective importance and influence.

This research has produced evidence of clinically significant effects of AAA which could usefully inform clinicians that are working with special needs children. There are also important implications for human-animal interactions research. The results indicate that continued investigation of AAA for children with special needs could contribute to our understanding of factors underlying the long-standing relationship between humans and animals.

Overall, the studies indicate that when a dog is highly involved in an activity that is controlled and guided by a therapist or adult , it can provide a positive, sustainable focus of interaction, encouraging appropriate social behaviours and reducing inappropriate ones.

APPENDICES

PARENTAL CONSENT FORM AND INFORMATION CONCERNING ANIMALS AT HOME - STUDY 1 (CHAPTER 3)



School of
Biological Sciences

University of Southampton
Biomedical Sciences Building
Bassett Crescent East
Southampton
SO16 7PX
United Kingdom

Telephone +44 (0)1703 594254
Fax +44 (0)1703 594269

April 1993

Dear Parent

We are conducting a study to investigate the positive role of interactions between children and animals. We are hoping to do some filming with your child for approximately 20 minutes per week for 8 weeks. This will take place at ******* school, recording sessions with some children in the summer term, and probably with others in the autmn.

The dog involved is a registered PAT (Pets as Therapy) dog that is well socialized with children. The dog's owner, who is an experienced dog handler, and a member of school staff will also be present.

We would be most grateful if you would give permission for your child to be involved in this study.

Yours faithfully

Jenny Limond
Doctoral Student

Dr John Bradshaw
Waltham Director
Anthrozoology Institute

Name of child .....

I do / do not give permission for my son / daughter to be involved in this study.

Signature ..... Date .....

If you do give permission please could you answer the following questions:

1) Do you have any pets at home? Yes / No

If yes, please give brief details:

2) Does your child have regular contact with animals outside the home e.g. pets of family or friends, or local farms etc.? Yes / No

If yes, please give brief details:

University of Southampton

GUIDELINES FOR EXPERIMENTAL SESSIONS - STUDIES 1 & 1a (CHAPTER 3)

The aim of these guidelines was to provide a series of sequential steps to be followed across the sessions. It should be made clear that it is the progressive order which is important and not whether the child succeeds at each stage, since naturally there will be differences. For the purposes of the experimental design, there is an imposed limit on the variety of activities per sessions. This is given in these guidelines. For instance, a child in session two should not be encouraged to brush or feed the dog, activities which first appear in session three.

Sessions	Activities
1 and 2	Stroking the dog Naming colours and body parts Playing 'throw the dog's toy'
3 and 4	Stroking the dog Naming colours and body parts Playing 'throw the dog's toy' Brushing the dog Feeding the dog Counting out treats to feed the dog
5 and 6	Initially, walking the dog on the lead round the room. Then, accessories for all of the activities presented in the first four weeks are readily available to the child and the child is asked "what would you like to do?". If the child does not respond, or is unsure of what she/he wishes to do, the dog handler suggests all of the above activities and then the alternative toys. During these last two weeks, each child should lead the pace of the session. Only if there is a long pause, or the child shows distress or asks the handler for help, is the dog handler to suggest activities.

DEFINITIONS OF BEHAVIOURS OBSERVED USING ETHOGRAMS - STUDY 1 (CHAPTER 3)

Looking towards *(durations)*:	Gaze and/or face orientated towards:
Test dog	the dog that is in the test area for that part of the sessions (i.e. real or imitation dog)
Handler	interactive adult, guiding the sessions and controlling the dog's behaviour
Toys	alternative toys accessible to the children, a toy truck with moving parts and a pop-up animals toy
Experimenter	non-interactive adult present during sessions
Other	any object/person that is not defined above. Includes 'nothing', e.g. just looking into space.
Responding *(frequencies)*:	Behaviour immediately following questions or requests made by the handler:
Communicative responses	using speech or signs to reply to the handler's questions and requests
Physical responses	actively doing something in response to the handler's questions and requests
No response	ignoring a specifically directed question or request
Initiating *(frequencies)*:	Behaviour produced in the absence of questions or requests from the handler:
Communicative initiations	using speech or signs to draw attention to something or inform (e.g. requesting, naming)
Physical initiations	actively doing something towards a person or object (e.g. manipulating)

Direction of Initiations:	
Directly towards	a communicative or physical initiation made directly towards the activity or an object (e.g. saying "hello doggie" or picking up an object)
To the handler about	a communicative initiation towards the handler about the activity or something else. A physical initiation that involves manipulating an object in order to convey a message to an adult present
Responses/Initiations Concerning:	
Test dog	the dog that is in the test area i.e. the real dog during the real dog condition, the imitation dog during the imitation dog condition
Absent dog	the dog that is not in the test area i.e. the real dog during the imitation dog condition, the imitation dog during the real dog condition
Other	anything other than the test dog or the absent dog
Type of Response/Initiation:	
Appropriate	desirable behaviour, correct responses to questions and requests and/or expressing interest and enthusiasm. These are behaviours that are applicable to the activities and can be initiated by the child or in response to the handler's questions and requests.
Inappropriate	undesirable behaviour, incorrect responses to questions and requests and/or expressing disinterest and lack of enthusiasm. These are behaviours that are contrary to the expressed wishes of the handler, or are socially unacceptable behaviours initiated by the child (e.g. kicking the pop-up toy)
Indistinguishable	all responses and initiations were coded before the appropriate/inappropriate category was used. Behaviours that could not be interpreted were omitted from these categories and were left as a discrepancy between total number of responses/initiations and those that were defined as either appropriate or inappropriate

SUB-SECTIONS OF BRITISH ABILITY SCALES USED AND THE QUESTIONNAIRE GIVEN TO TEACHERS - STUDY 1 (CHAPTER 3)

BRITISH ABILITY SCALES (BAS):

Tests taken from the section entitled "Retrieval and Application of Knowledge"

1. BASIC NUMBER SKILLS

2. NAMING VOCABULARY

3. VERBAL COMPREHENSION

TEACHER'S QUESTIONNAIRE:

General Questions	
i	Have the children talked about the sessions at all? (Good and bad)
ii	Do the children behave differently after sessions?
iii	Any comments about this project and what we have been doing?
Ranking of characteristics - ideally no ties	
1	Speech ability (quality not quantity)
2	Sign language ability (quality not quantity)
3	General communication ability
4	Does as told
5	Responds to questions
6	Coordination ability
7	Use of eye contact
8	Well behaved
9	Attentive
10	Temper tantrums
11	Mood changes
12	Aggressive behaviour
13	Talkativeness (vocal or sign language)
14	Sociable
15	Active
16	Friendly
17	Cooperative
18	Demanding of attention
19	Stubborn
Any other comments	

DOG HANDLER INTERVIEW - STUDY 1 (CHAPTER 3)

Chip, the real dog, had 7 minutes on and then 10-15 minutes off a maximum of 4 times in one afternoon.

AGE:	7 years
TEMPERAMENT:	very 'laid back', not easily startled, nothing really bothers him (e.g. loud noises, sudden movement) he may bark but nothing more.
HEALTH:	A veterinary examination carried out before the study reported no clinical health problems. However, general problems include loss of sight: can see light and dark, but has a very broken picture. Now also thought to be going deaf. Often suffers from upset stomach. Had Parvo Virus as a puppy.

When he arrived at the school he was quite alert and trotted in quite happily - the owner does not think that he recognised the school as such, but approached it as just an outing. Chip certainly did not develop an aversion to the school. His eagerness did not change throughout the study - never once lethargic on the way in to the school. Sometimes became lethargic in the experimental room, but this was thought to be a result of the heat and 'stuffiness' in the room.

The owner did not see any changes in Chip's health or temperament, either during or after the study EXCEPT that he became extremely "greedy", after food had been introduced into the study. This was thought to be a result of a change in feeding regime - Chip is not normally fed in the afternoon. He started stealing from the rubbish bin etc. whereas before he would not have done that, and he also started begging and stealing food. This was definitely a problem for the dog owner, however it was soon resolved by her after the study.

The dog owner reported that Chip was very tired after sessions, probably similar to after a long walk. His normal regime is to sleep in the afternoon - so this was a change. He would sleep it off and be back to normal activity and alertness the next day. The dog owner felt that Chip would have been affected if the sessions had been any longer or had there been more than 4 children seen in one day.

No other problems were seen. The dog owner thought that this study had not affected Chip's welfare in either direction, bad or good.

Owner's Comments:

Although Chip recovered from his tiredness very rapidly after a good night's sleep, she felt that it would have been easier on Chip if sessions had been at a different time of day, to fit in with his routine.

After the study had finished, Chip saw the owner's nieces (approximately the same age as the children

involved in the study) for the first time in several months (i.e. before the study had begun). Normally he will wait for them to approach him, but on this occasion he got up and went to them wagging his tail. The dog owner reported this to be an extremely unusual occurrence and thought that regular contact with children of this age may have affected this behaviour.

Comments about the study:

The dog owner would not make Chip do anything he did not want to, such as fetching his toys. So, when Chip was bored and quiet, the children became bored and quiet (except maybe at the beginning of the study).

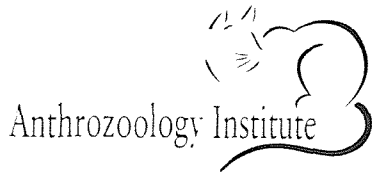
When Chip was taken to the classroom after the study had finished, the children in the class that were involved in the study seemed to be showing off to the other children, and definitely took the most interest in Chip.

DEFINITIONS OF BEHAVIOURS OBSERVED USING ETHOGRAMS - STUDY 1a (CHAPTER 3)

Attention directed towards *(durations)*:	Gaze and/or face orientated towards, listening to, taking notice of something
Responding *(frequencies)*:	Behaviour immediately following questions or requests made by the handler:
Responses	using speech or signs to reply to the handler's questions and requests or actively doing something in response to the handler's questions and requests
No response	ignoring a specifically directed question or request
Initiating *(frequencies)*:	Behaviour produced in the absence of questions or requests from the handler
Initiations	using speech or signs to draw attention to something or inform (e.g. requesting, naming) or actively doing something towards a person or object (e.g. manipulating)
Direction of Initiations:	
Directly towards	a communicative or physical initiation directly to the activity or an object (e.g. "hello doggie" or picking up an object)
To the handler about	a communicative initiation towards the handler about the activity or something else. A physical initiation that involves manipulating an object in order to convey a message to an adult present
Attention Directed to / Responses / Initiations Concerning:	
Dog	the dog that is in the test area for that part of the sessions (i.e. real or imitation dog)
Handler	interactive adult, guiding the sessions and controlling the dog's behaviour
Toys	alternative toys accessible to the children, a toy truck with moving parts and a pop-up animals toy
Other	any object/person that is not defined above. Includes 'nothing', e.g. just looking into space.

Type of Response/Initiation:	
Appropriate	favourable behaviour, correct responses to questions and requests and/or expressing interest and enthusiasm
Inappropriate	unfavourable behaviour, incorrect responses to questions and requests and/or expressing disinterest and lack of enthusiasm
Indistinguishable / Neutral	behaviours that could not be interpreted or described as either appropriate or inappropriate

PARENTAL CONSENT FORM AND INFORMATION CONCERNING ANIMALS AT HOME - STUDY 2 (CHAPTER 4)



School of
Biological Sciences

University of Southampton
Biomedical Sciences Building
Bassett Crescent East
Southampton
SO16 7PX
United Kingdom

Telephone +44 (0)1703 594254
Fax +44 (0)1703 594269

December 1993

Dear Parent

We are conducting a study to investigate the positive role of interactions between children and animals. In order to do this we will be filming two groups of children in their school environment at ******: for one group there will be a registered PAT (Pets as Therapy) dog present and for the other group there will be no animals present. These filming sessions will follow a similar pattern to the children's usual class work, with the addition of the PAT dog as a focal object in one group.

As an appendix to the data obtained from this main study, *(the head teacher)* has given us permission to test the children in classes *,* and *, before and after completion of the study, with tests that are used in common practice. All this information will be kept confidential. Parents will receive a synopsis of the work carried out.

The PAT dog involved is well socialized with children, and the two adults who will be present throughout this study are experienced with dogs.

We hope that you will contribute to this study which has already been piloted in a special school similar to ******. Even if your child is fearful of dogs we hope that you will agree to them being involved as we have found that controlled interactions with dogs can be very beneficial.

(The head teacher) has agreed that this study will take place in school time during Friday afternoon assembly between 2 and 3 o'clock. After this study we hope that the dog will be a regular visitor to the school.

We would be most grateful if you would give permission for your child to be involved in this study. We are hoping to start the study on Friday 14th January and it would therefore help us a great deal if you could return this form by Wednesday 12th January.

Yours faithfully

Jenny Limond
Postgraduate Student

Dr J W S Bradshaw
Waltham Director

University of Southampton

PARENTAL PERMISSION FORM FOR A STUDY INVESTIGATING THE ROLE OF INTERACTIONS BETWEEN CHILDREN AND ANIMALS

Name of child: .....

I do/do not give permission for my son/daughter to participate in this study.

Please circle as appropriate:

I give permission for my son/daughter to be in either group.

I give permission for my son/daughter to be in the PAT dog group only.

I give permission for my son/daughter to be in the group only where no dog is present.

We would be extremely grateful if you could please answer the following questions:

1) Do you have any pets at home? Yes/No

If yes, please give brief details:

2) Does your child have regular contact with animals outside the home e.g. pets of family or friends, or local farms etc.? Yes/No

If yes, please give brief details:

APPENDIX 8

SUB-SECTIONS OF THE BRITISH ABILITY SCALES USED - STUDY 2 (CHAPTER 4)

1. RECALL OF DIGITS

2. VISUAL RECOGNITION

3. BASIC NUMBER SKILLS

4. VERBAL COMPREHENSION

5. NAMING VOCABULARY

CHECKLIST COMPLETED BY TEACHERS - STUDY 2 (CHAPTER 4)

Name .....

	Behaviour		Comments		Comments
1	Watches person moving directly in line of vision				
2	Smiles in response to attention by adult				
3	Vocalizes in response to attention				
4	Looks at own hands, often smiles or vocalizes				
5	Responds to being in family (group) circle by smiling, vocalizing or ceasing to cry				
6	Smiles in response to facial expression of others				
7	Smiles and vocalizes to mirror image				
8	Pats and pulls at adult facial features (hair, nose, glasses, etc.)				
9	Reaches for offered object				
10	Reaches for familiar persons				
11	Reaches for, and pats at mirror image or another child				
12	Holds and examines offered object for at least a minute				
13	Shakes or squeezes object place in hand, making sounds unintentionally				
14	Plays unattended for 10 minutes				
15	Seeks eye contact often when attended for 2-3 minutes				
16	Plays alone contentedly near adult activity 15-20 minutes				
17	Vocalizes to gain attention				

18	Imitates peek-a-boo				
19	Claps hands, (pat-a-cake) in imitation of adult				
20	Waves bye-bye in imitation of adult				
21	Raises arms - "so big" in imitation of adult				
22	Offers toy, object, bit of food to adult, but does not always release it				
23	Hugs, pats, kisses familiar persons				
24	Shows response to own name by looking or reaching to be picked up				
25	Squeezes or shakes toy to produce sound in imitation				
26	Manipulates toy or object				
27	Extends toy or object to adult and releases				
28	Imitates movements of another child at play				
29	Imitates adult in simple task (shakes clothes, holds items)				
30	Plays with one other child, each doing separate activity				
31	Takes part in game, pushing car or rolling ball with another child 2-5 minutes				
32	Accepts adults' absence by continuing activities, may momentarily fuss				
33	Actively explores his environment				
34	Takes part in manipulative game (pulls string, turns handle) with another person				
35	Hugs and carries doll or soft toy				
36	Repeats actions that produce laughter and attention				

37	Hands book to adult to read or share with him/her				
38	Pulls at another person to show them some action or object				
39	Withdraws hand, says "no-no" when near forbidden object with reminders				
40	Waits for needs to be met when place in high chair or on changing table				
41	Plays with 2 or 3 peers				
42	Shares object or food when requested with one other child				
43	Greets peers and familiar adults when reminded				
44	Cooperates with adult request 50% of the time				
45	Can bring or take object or get person from another room on direction				
46	Attends to music or stories 5-10 minutes				
47	Says "please" and "thank you" when reminded				
48	Attempts to help adult with tasks by doing a part of the chore (holding dust pan)				
49	Plays "dress-up" in adult clothes				
50	Makes a choice when asked				
51	Shows understanding of feelings by verbalizing love, mad, sad, laugh, etc.				
52	Sings and dances to music				
53	Follows rules by imitating actions of other children				
54	Greets familiar adults without reminder				
55	Follows rules in group games led by adult				

56	Asks permission to use toy that peer is playing with				
57	Says "please" and "thank you" without reminder 50% of the time				
58	Will take turns				
59	Follows rules in group games led by an older child				
60	Cooperates with adult requests 75% of the time				
61	Plays near and talks with other children when working on own project (30 minutes)				
62	Ask for assistance when having difficulty (with bathroom or getting a drink)				
63	Contributes to adult conversation				
64	Repeats rhymes, song or dances for others				
65	Works alone at chore for 20-30 minutes				
66	Apologizes without reminder 75% of the time				
67	Will take turns with 8-9 other children				
68	Plays with 2-3 children for 20 minutes in co-operative activity (project or game)				
69	Engages in socially acceptable behaviour in public				
70	Asks permission to use objects belonging to others 75% of the time				
71	States feelings about self: mad, happy, love				
72	Plays with 4-5 children on co-operative activity without constant supervision				
73	Explains rules of game or activity to others				
74	Imitates adult roles				

75	Joins in conversation at mealtime				
76	Follows rules of verbal reasoning game				
77	Comforts playmates in distress				
78	Chooses own friends				
79	Plans and builds using simple tools (inclined planes, fulcrum, lever, pulley)				
80	States goals for himself and carries out activity				
81	Acts out parts of story, playing part or using puppets				

DEFINITIONS OF BEHAVIOURS OBSERVED USING ETHOGRAMS - STUDY 2 (CHAPTER 4)

Responding *(frequencies)*:	Behaviour immediately following questions or requests made by an adult:
Communicative responses	using speech or signs to reply to an adult's questions and requests
Physical responses	actively doing something in response to an adult's questions and requests
No response	ignoring a specifically directed question or request
Initiating *(frequencies)*:	Behaviour produced in the absence of questions or requests from an adult:
Communicative initiations	using speech or signs to draw attention to something or inform (e.g. requesting, naming)
Physical initiations	actively doing something towards a person or object (e.g. manipulating)
Responding to / Initiations directed towards:	
Adult	either of the two adults present in the session
Peers	any of the other children in the group
Focal object/Activity	any of the objects being used in the activity during that session (including the dog in experimental groups)
Responses/Initiations Concerning:	
Focal object/Activity	anything relating to the activity being carried out during that session (including the dog in experimental groups)
Other	anything that did not relate to the activity being carried out during that session

Type of Response/Initiation:	
Appropriate	desirable behaviour, correct responses to questions and requests and/or expressing interest and enthusiasm. These behaviours can be initiated by the child or in response to the handler's questions and requests.
Inappropriate	undesirable behaviour, incorrect responses to questions and requests and/or expressing disinterest and lack of enthusiasm. These are behaviours that are contrary to the expressed wishes of the handler, or are socially unacceptable behaviours initiated by the child (e.g. throwing pencils)
Indistinguishable	behaviours that could not be interpreted by the adults present or observers and therefore could not be categorised as either appropriate or inappropriate
Involvement in the Activity and in the Group: *(Number Skills and Writing Skills Activities only)*	
Doing the activity	performing the tasks and activity specified for that session (e.g. colouring in, or counting and matching)
Not doing the activity	not performing the tasks and activity specified for that session
In the group	sitting/standing close to peers and adults that are carrying out the activity specified for that session
Not in the group	sitting/standing at a distance for peers and adults that are carrying out the activity specified for that session

GROUPING OF FREQUENCY VARIABLES - STUDY 2 (CHAPTER 4)

		High Ability Groups				Low Ability Groups			
		Writing Skills	Number Skills	Social Activity	First weeks	Writing Skills	Number Skills	Social Activity	First weeks
Single variables	approp comm response to adult about focal	✓	✓	✓	✓	✓	✓	✓	✓
	approp phys response to adult about focal	✓	✓	✓	✓	✓	✓	✓	✓
	no response to adult about focal	✗	✓	✓	✗	✓	✓	✓	✓
	approp comm initiation to adult about focal	✓	✓	✓	✓	✓	✗	✗	✓
	approp phys initiation to focal about focal	✓	✓	✓	✓	✓	✓	✓	✓
	approp phys initiation to adult about focal	✗	✓	✗	✗	✗	✗	✗	✗
	approp phys response to peer about focal	✗	✓	✓	✓	✗	✗	✗	✗
Grouped variables	no response about focal	✗	✓	✗	✓	✗	✗	✗	✗
	responses about focal	✓	✓	✓	✓	✓	✓	✓	✓
	responses about other	✓	✓	✓	✓	✗*	✓	✓	✗*
	inititiatons about focal	✓	✓	✓	✓	✓	✓	✓	✓
	initiations about other	✓	✓	✓	✓	✓	✓	✓	✓

(approp = appropriate; comm = communicative; phys = physical)

✗* - did not occur
grouped variables = excluding the single variables analysed separately in that column

INFORMATION ABOUT EACH CHILD AND CONCERNING ANIMALS AT HOME - STUDY 3 (CHAPTER 5)

Child	Age	Sex	Nature of Cerebral Palsy
Andrew	2years 3months	male	spastic diplegia (lower limbs) with upper limbs slightly affected
Ryan	2years 6months	male	spastic diplegia (lower limbs) with upper limbs slightly affected
David	3years 10months	male	athetoid quadriplegia
Imogen	4years 6months	female	spastic hemiplegia (right side affected)
Nathan	4years 10months	male	no clear diagnosis; microcephal, with learning disabilities, shows signs of ataxia

CONTACT WITH DOGS:

Andrew- no dog at home, but visits his grandmother who has a dog.

Ryan - six dogs at home, plus other pets.

David - no dog at home (has a pet rabbit), but is very enthusiastic about dogs and visits his grandmother who has a dog.

Imogen - one dog at home.

Nathan - did have a dog at home that recently died, but is rather unsure about dogs.

DEFINITIONS OF BEHAVIOURS OBSERVED USING ETHOGRAMS - STUDY 3 (CHAPTER 5)

Total time taken to complete the task	timed from the start of the child's first step (or pull - on the bench) until the last step/pull was completed
DIRECTION OF LOOKING:	
Towards the task or the reward	child's gaze directed towards the current task, or the reward that was available for that session (e.g. dog, toy, biscuits)
Towards other	child's gaze directed towards anything other than the task or reward
COMMUNICATION BY THE CHILD:	
Concerning the task	verbal or non-verbal communication about the current task (e.g. "step over")
Concerning the reward	verbal or non-verbal communication about the reward available that session (e.g. "can I have a biscuit later?")
Concerning other	verbal or non-verbal communication about anything other than the task or reward (e.g. "my mummy is coming to collect me today"). Including, references to rewards from other sessions, for example, the dog when it was not there
COMMUNICATION BY THE THERAPIST:	
Response	therapist responds/replies to something that the child has said/"communicated"
Instruction	verbal direction to the child concerning any aspect of the task (e.g. "hold your head up", " Step, Step"
Negative comment	concerning any aspect of the task, correcting the child's performance or behaviour, referring to something that the child has done wrong while on the task (e.g. "Don't do that", "Not like that", "Stop")
Praise	telling the child that they are doing well
General encouragement	telling the child that they can do it , coaxing them along
Encouragement with the reward as an incentive	referring to the reward available that session, telling the child that they can play with the reward when they finish or if they do well

NUMBER OF STEPS/ PULLS WITH HELP/DIRECTIONS GIVEN BY THERAPIST:	
Instructed verbally	verbal direction specifically referring to the child's stepping action - movement of the legs only (pulling - movement of the arms, on the bench) (e.g. "turn your feet out", "step over", "pull", "stretch your arms")
Corrected verbally	referring specifically to something that the child has done wrong with the stepping/pulling movement (e.g. "no, not like that, put your foot flat")
Started physically	therapist physically starts the step/pull by manipulating the child's feet/ hands
Corrected physically	therapist physically alters the child's step/pull part-way through a movement that the child has started
Fully manipulated	therapist physically directs the whole step/pull
Total number of steps/pulls taken	irrespective of therapist involvement , the total number of steps/pulls made on that task

NOTE: one sentence can be recorded as two behaviours, with sentences being split into 'units of information' e.g. "No, put your foot there" is recorded as a negative comment and an instruction. Also for each step, it can be physically manipulated by the therapist as well as the child being given an instruction at the same time.

THERAPISTS' ASSESSMENTS OF PERFORMANCE ON TASKS - STUDY 3 (CHAPTER 5)

NAME OF CHILD: .....

	LOW				HIGH
STEPS UP	1	2	3	4	5
STEPS DOWN	1	2	3	4	5
BENCH	1	2	3	4	5
FLOOR LADDER	1	2	3	4	5

STAFF INTERVIEW - STUDY 3 (CHAPTER 5)

Staff Interview After the Study had been Completed

(E= Experimenter; S = Staff (the three therapists involved in the study);
Merry = the visiting PAT dog)

E: What were the advantages/gains you thought there might have been ?

E: Do you think there were any good things about it for the children ?
S: What, Merry coming in?
E: Yes.
S: It gave them something to look forward to
S: I told you before we started, that I was sure that it would be good - because of my dog at home. They all have dogs at home, I'm pretty sure that it was good and I think that it worked

E: Do you think it made the tasks a bit more interesting?
S: Yes definitely and she (Merry) made Andrew speak and that was another word he learned: to say "Merry" and "pulling"
S: In a group they were calling her as well which was good

E: So on the days that Merry was coming in you think they were a bit more enthusiastic about it?
S: Yes, because sometimes they were "oh, Merry's not coming in. Andrew kept calling her and I had to say 'No'. They were sad when Merry didn't come, weren't they?
S: Yes, when they go to do the obstacle course when Merry isn't there it's sort of "oh right just going to the table for a drink"

E: So is that pretty much what you expected to get out of it?
S: Yes.
S: Yes I think we got what we wanted

E: What problems and down sides for the children?

E: Was Merry a distraction or anything like that?
S: No the only thing was that it had to be done one by one so the other kids felt bored,
S: certainly at the beginning,
S: then it was getting better and better. If we'd had another room and we could have moved the children to the other room..... for example, David (and others when on obstacle course) wanted to know what the others were doing in the room.

E: Actually having Merry there do you think there were any problem for them with that?
S: No.
S: No.

E: Advantages for you (the staff), was it easier to get them going or was it much as usual?
S: well, we didn't have to find motivation (in the kids).

E: So do you think you had to put in less effort when Merry was there?
S: Yes.
S: Yes.

S: Also made us get on and be ready for 2pm, also the kids I think the kids got used to this routine, they knew it and think it was pretty good. It took us a while to get used to all this, a few weeks.

E: Were there any real problems with having the dog come in? for example you had to clean stuff
S: Not really.
S: No.

E: Was it a bit frantic having her come in?
S: No more frantic than if she wasn't here.

E: Do you think dog-assisted activities (not research studies) are good for children in this sort of centre?
S: What all the time?
E: No, just once a month or something like that.
S: Yes, definitely. They will miss her and will be so happy to see her again.

E: Any suggestions for things suitable for the children and the staff, e.g. more playing, fewer specific things like the obstacles?
S: Here? yes. I think the obstacle course was alright. Playing is OK - but it won't last for more than 10 - 15 minutes 'cos they get bored.
S: All things are good because they all involve motor skills.

E: Any other comments?
S: We enjoyed it. It was good for the kids.

DOG HANDLER INTERVIEW - STUDY 3 (CHAPTER 5)

Dog Owner Questionnaire Given After the Study had been Completed

Dog's Name: Merry

Dog's Age: 4 years

Dog's Breed: Border Collie

How would you describe your dog's temperament?:

> Strong, keen worker, loves to play with children. (My vet and his nurse called her well-balanced). She is not afraid of thunder.

Does your dog have any ongoing health problems?

> No, she's always been fit and active.

Do you think your dog's health was affected in any way through her involvement in this study?

> No

How did your dog behave when you arrived at the Centre, before a session (e.g. excited/subdued, eager, reticent)?

> Interested - keen when she saw all the toys, but a little reserved about being stroked by adults she doesn't know.

Did you notice any differences in your dog's behaviour during or after visits to the Centre?

> During she was excited and at times vocal (she shows this same keen attitude to competition work). After she relaxed, but would have leapt into action if required!

Did your dog seem tired after sessions at the centre?

> She would quite happily have worked longer.

Did your dog show any signs of stress or 'irritation' at any time (including during sessions) that could be related to her involvement in this study?

No, only enjoyment and enthusiasm.

Do you think your dog's involvement in the study was good for her in any way, (e.g. enjoys working)?

Yes she loves to be occupied and I am sure she would love to do more.

Any other comments about your dog's behaviour:

The children's vulnerability brought out her soft side.

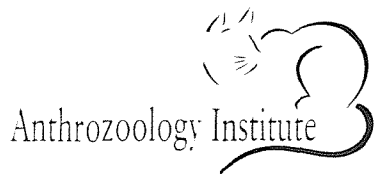
Any comments about the study: (including any problems and difficulties for you and if possible any ideas about how these may be overcome)

No problems. I was very impressed by the progress made over the months we attended. The methods used brought good results and I feel Merry's presence helped.

What effects did you feel that your dog had on the children's behaviour? (e.g. do you think that she affected their motivation to carry out particular tasks? any social effects? did the children approach you more during sessions when your dog was with you?)

I felt they enjoyed her visits and were a little disappointed when I came without her. Some loved to race her on the bench exercise, they showed great determination.
The three therapists work hard showing endless patience. At times the work is very stressful, Merry made them laugh. They and the children were helped by stroking her. She provided a combination of positive help and light relief.

PARENTAL CONSENT FORM - STUDIES 4a & 4b (CHAPTER 6)



School of
Biological Sciences

University of Southampton
Biomedical Sciences Building
Bassett Crescent East
Southampton
SO16 7PX
United Kingdom

Telephone +44 (0)1703 594254
Fax +44 (0)1703 594269

May 1996

Dear *(Parent/Guardian)*

Information Concerning a Clinical Research Study Assessing Dog-Assisted Activities

I am a PhD student at Southampton University, working with Dr Brown at Westwood. We are carrying out a study looking at the use of pets in treatment programmes. I am writing to inform you about this work and ask for your permission to include *(the participant)* in this study. We aim to see whether a registered therapy dog can help improve social behaviours and encourage learning of new skills, as other research has suggested. This will involve individual activity sessions with an adult, both with and without the dog. These will need to be recorded on video. This work is mainly for clinical purposes for the benefit of the individuals involved, but the videotapes may be used for teaching purposes. All sessions will take place at ****** and will be supervised.

The dog handler is very experienced with dogs and has previously worked with this dog in similar environments with children that have special needs. The dog is well-trained, temperament tested and is highly socialized with people.

If *(the participant)* shows any discomfort or anxiety in connection with this treatment, proceedings will be stopped. Permission for involvement in this project can be withdrawn at any time. Withdrawal from the project would not require any justification and would not in any way affect *(the participant's)* future care or treatment.

Outcomes from this research will be published but anonymity will be ensured.

We would be very pleased if you would give permission for *(the participant)* to be included in this study. If you are willing to give permission please sign the accompanying form. If you have any queries or would like to discuss this project further, please contact Jenny Limond at the Anthrozoology Institute or Dr Brown at ******.

Yours faithfully

Jennifer Limond
PhD Student

Dr A Brown
Clinical Psychologist

University
of Southampton

RESEARCH CONSENT FORM: An Assessment of Dog-Assisted Activities

Participant's full name: .....

Parent's / Guardian's full name: .....

Have you read the information letter given to you?	Yes / No
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 this study?	Yes / No

Who have you spoken to in connection with this study? .....

Do you understand that you are free to withdraw *(the participant)* from the study:

- At any time
- Without having to give a reason for withdrawing
- And without affecting *(the participant's)* future care — Yes / No

Do you agree that *(the participant)* may take part in this study? — Yes / No

I, ..., HEREBY CONSENT, for my son/daughter, as named above, to take part in a clinical research investigation, about which I have received written information. I understand that video recordings will be made and that in addition to clinical and research purposes, the recordings may be used for the education of and research by staff professionally involved in the treatment of my son/daughter and others with special needs. I give permission for Southampton Community Health Service Trust or the University of Southampton to keep a copy of the recordings that are made during this study.

Parent's/Guardian's signature: ..... Date: .....

DEFINITIONS OF BEHAVIOURS OBSERVED USING ETHOGRAMS - STUDY 4a (CHAPTER 6)

Length of sessions *(duration)*	a maximum time period for sessions was set, the young adults were encouraged to stay for this time but were not forced to and could therefore choose to leave the session before the maximum time period
Frequency of responses *(frequencies)*:	
Communicative responses	using speech or signs to reply to a question, request or action
Physical responses	actively doing something in response to a question, request or action
No response	ignoring a specifically directed question or request
Frequency of Initiations *(frequencies)*:	
Communicative initiations	using speech or signs to draw attention to something or inform (e.g. requesting, naming)
Physical initiations	actively doing something towards a person or object (e.g. manipulating)
Direction of Initiations:	
Towards	a communicative or physical initiation directly to the activity or an object (e.g. "hello doggie" or picking up an object)
About	a communicative initiation towards an adult about the activity or something else. A physical initiation that involves manipulating an object in order to convey a message to an adult present
Responses / initiations concerning:	
Activity	the activity being guided by the adult/therapist
Other	anything other than the activity being guided by the adult/therapist

Type of response / initiation:	
Appropriate	favourable behaviour, correct responses to questions and requests and/or expressing interest and enthusiasm.
Inappropriate	unfavourable behaviour, incorrect responses to questions and requests and/or expressing disinterest and lack of enthusiasm.
Indistinguishable	uninterpretable communication that could not be categorised as appropriate or inappropriate (only applies to communicative behaviours)
Affect *(frequencies)*:	
Laugh/smile	includes whooping
Angry action	throwing objects, hitting
Upset	crying or showing behaviour that indicates discomfort
Specific Idiosyncratic Behaviours (*durations and/or frequencies)*:	
Uses right hand *(frequency)*	
Rocks *(frequency and duration)*	one foot in front of the other and shifting weight rhythmically
Licks hands / flicks fingers *(frequency)*	
Genital manipulation *(frequency)*	touches or rubs genital area using hands
Hugs / touches adults present *(frequency)*	
Groans *(frequency and duration)*	includes both a deep growl and a higher pitched 'moaning'
Claps *(frequency)*	includes both a very hard, loud clap where arms start very wide apart; and rapid clapping where hands remain close together

CHARACTER CHECKLIST AND GENERAL INFORMATION- STUDY 4a (CHAPTER 6)

Form filled in by: .....

The following characteristics are possible factors that may influence an individual's suitability for dog-assisted activities/therapy.

If you think that a statement applies very strongly to *(the participant)* please put a tick in the box closest to that statement, if a statement only applies to a small degree then put a tick in a box one or two along from that statement. If you think that neither statement applies, or you do not know whether either statement applies, then please put a tick in the middle box.

likes dogs	☐☐☐☐☐☐☐	dislikes dogs
interested in things around him/her	☐☐☐☐☐☐☐	not interested in things around him/her
interacts with new people	☐☐☐☐☐☐☐	ignores new people
confident with new things	☐☐☐☐☐☐☐	timid with new things
communicates very little	☐☐☐☐☐☐☐	communicates a lot
tactile	☐☐☐☐☐☐☐	not tactile
uncooperative	☐☐☐☐☐☐☐	cooperative
responsive to others	☐☐☐☐☐☐☐	unresponsive to others
motivated to do things asked of him/her	☐☐☐☐☐☐☐	not motivated to do things asked of him/her
good concentration span	☐☐☐☐☐☐☐	poor concentration span
likes company	☐☐☐☐☐☐☐	prefers to be left alone
seeks attention from others	☐☐☐☐☐☐☐	does not seek attention from others
likes animals other than dogs	☐☐☐☐☐☐☐	dislikes animals other than dogs

Are there any other characteristics about *(the participant)* that you think may influence whether the dog visits will be:

i) beneficial for him/her?

ii) not beneficial for him/her?

Overall, do you think that the dog visits will be beneficial for *(the participant)*?

Yes, definitely / Probably / Don't Know / Probably Not / No, definitely not

Please describe any contact that you know of that *(the participant)* has with

i) dogs (e.g. family visits with a dog, out on walks)

ii) animals other than dogs (e.g. horse riding, farm visits)

GENERAL INFORMATION ABOUT (THE PARTICIPANT)

Form filled in by: .....

Does he/she respond to people's questions and requests?

Not at all	Some of the time	Half the time	Most of the time	All the time
1	2	3	4	5

Does he/she initiate communication with people?

Not at all	Some of the time	Half the time	Most of the time	All the time
1	2	3	4	5

Is he/she difficult/disruptive during the day?

Not at all	Some of the time	Half the time	Most of the time	All the time
1	2	3	4	5

Is he/she interested in things going on around him/her?

Not at all	Some of the time	Half the time	Most of the time	All the time
1	2	3	4	5

Is he/she uncooperative when asked to do things?

Not at all	Some of the time	Half the time	Most of the time	All the time
1	2	3	4	5

Does he/she interact with people about things other than e.g. food, drink, toilet?

Not at all	Some of the time	Half the time	Most of the time	All the time
1	2	3	4	5

STAFF CHECKLISTS COMPLETED AFTER EACH SESSION - STUDY 4a (CHAPTER 6)

Name of staff member: .....

Date: .....

Participant: Mark

How much of the time (minutes) was he attending to the activities?

□ None □1-5 □ 6-10 □ 11-15

How often did he respond to the adults present?

□ None □ 1-5 times □ 6-10 times □ 11-15 times □ 16+ times

How often did he initiate communication about the activities?

□ None □ 1-5 times □ 6-10 times □ 11-15 times □ 16+ times

Comments:

Name of staff member: .....

Date: .....

Participant: Lisa

How many times did you need to ask her to take her hand from her face and look up?

□ None □ 1-3 times □ 4-6 times □ 7-9 times □ 10+ times

Is this better/worse than usual? _____

Much worse Much better

How many times did she use her right hand for doing things?

□ None □ 1-3 times □ 4-6 times □ 7-9 times □ 10+ times

Is this better/worse than usual? _____

Much worse Much better

How much of the time (minutes) was she attending to the activities?

□ None □1-5 □ 6-10 □ 11-15

How often did she respond to the adults present?

□ None □ 1-5 times □ 6-10 times □ 11-15 times □ 16+ times

How often did she initiate communication about the activities?

□ None □ 1-5 times □ 6-10 times □ 11-15 times □ 16+ times

Comments:

APPENDIX 20

Name of staff member: .....

Date: .....

Participant: Thomas

For how many minutes was he rocking?

□ None □1-5 □ 6-10 □ 11-15

Is this better/worse than usual? _____

Much worse Much better

How many times did he rub his genitals through his pad?

□ None □ 1-3 times □ 4-6 times □ 7-9 times □ 10+ times

Is this better/worse than usual? _____

Much worse Much better

How many times did he lick his hand (including just before finger flicking)?

□ None □ 1-3 times □ 4-6 times □ 7-9 times □ 10+ times

Is this better/worse than usual? _____

Much worse Much better

How much of the time (minutes) was he attending to the activities?

□ None □1-5 □ 6-10 □ 11-15

How often did he respond to the adults present?

□ None □ 1-5 times □ 6-10 times □ 11-15 times □ 16+ times

How often did he initiate communication about the activities?

□ None □ 1-5 times □ 6-10 times □ 11-15 times □ 16+ times

Comments:

All participants - information about behaviour during sessions

Did he/she respond to questions and requests?

Not at all	Some of the time	Half the time	Most of the time	All the time
1	2	3	4	5

Did he/she initiate communication about the activities?

Not at all	Some of the time	Half the time	Most of the time	All the time
1	2	3	4	5

Was he/she difficult/disruptive during the session?

Not at all	Some of the time	Half the time	Most of the time	All the time
1	2	3	4	5

Was he/she interested in/attending to the activities?

Not at all	Some of the time	Half the time	Most of the time	All the time
1	2	3	4	5

Was he/she uncooperative during the session?

Not at all	Some of the time	Half the time	Most of the time	All the time
1	2	3	4	5

Was he/she interacting with you about the activities during the session?

Not at all	Some of the time	Half the time	Most of the time	All the time
1	2	3	4	5

Do you think that he/she enjoyed the session?

Not at all	Some of the time	Half the time	Most of the time	All the time
1	2	3	4	5

Did you enjoy the session?

Not at all	Some of the time	Half the time	Most of the time	All the time
1	2	3	4	5

Did you feel that anything was achieved during today's session? If yes, please comment:

DEFINITIONS OF BEHAVIOURS OBSERVED USING ETHOGRAMS - STUDY 4b (CHAPTER 6)

(RESPONSE AND INITIATION BEHAVIOURS, AFFECT AND AVOIDANCE)

Scheduled Activity (Ball, Biscuits/Buttons, Bodyparts Cards, Book, Jigsaw, Symbol Cards or Other)	The activity that was indicated on the schedule board, or one that had been chosen by the child and acknowledged as suitable by the adult
Frequency of responses *(frequencies)*:	
Communicative responses	using speech or signs to reply to a question, request or action
Physical responses	actively doing something in response to a question, request or action
No response	ignoring a specifically directed question or request
Frequency of Initiations *(frequencies)*:	
Communicative initiations	using speech or signs to draw attention to something or inform (e.g. requesting, naming)
Physical initiations	actively doing something towards a person or object (e.g. manipulating)
Direction of Initiations:	
Towards	a communicative or physical initiation directly to the activity or an object (e.g. "hello doggie" or picking up an object without being asked to)
About	a communicative initiation towards an adult about the activity or something else. A physical initiation that involves manipulating an object in order to convey a message to an adult present
Responses / initiations concerning:	
Activity	the scheduled activity being guided by the adult/therapist
Adults presents	
Dog	
Other	anything other than the scheduled activity, adults present or the dog

Type of response / initiation:	
Appropriate	favourable behaviour, correct responses to questions and requests and/or expressing interest and enthusiasm.
Inappropriate	unfavourable behaviour, incorrect responses to questions and requests and/or expressing disinterest and lack of enthusiasm.
Indistinguishable	uninterpretable communication that could not be categorised as appropriate or inappropriate (only applies to communicative behaviours)
Affect *(frequencies)*:	
Scream	
Cry	
Temper tantrum	a brief or prolonged outburst
Grimace	
Smile	
Other Behaviours *(frequencies)*:	
Escape attempts	trying to leave the room, against the adults' wishes
Word	attempts to pronounce a word (this is recorded in addition to a communicative response/initiation as described above)
Non-communicative vocalisation	sounds that do not bear any resemblance to a recognisable word, often repetitive sounds

DEFINITIONS OF BEHAVIOURS OBSERVED USING ETHOGRAMS - STUDY 4b (CHAPTER 6)

(FOCUS, PROXIMITY, MOVEMENT AND AUTISTIC BEHAVIOURS)

Scheduled Activity *(durations)* (Ball, Biscuits/Buttons, Body parts Cards, Book, Jigsaw, Symbol Cards or Other)	the activity that was indicated on the schedule board, or one that had been chosen by the child and acknowledged as suitable and subsequently encouraged by the adult
Object of Focus/Attention *(durations)*:	
Activity	the scheduled activity being guided by the adult/therapist
Adults present	
Dog	
Other	anything other than the scheduled activity, the adults present or the dog
Proximity *(durations)*:	
With	Close to the adults present, within approximately 1.5 feet
Distant	Further than 1.5 feet, generally avoiding the adult
Movement *(durations)*:	
Sit	
Stand	
Moving around the room	
Autistic behaviours *(frequencies)*:	
Spontaneous bodily contact	the child touches the adult (with any part of the body) (not requested by the adult) (Althaus *et al.*, 1994)
Give affection	initiating a physical or verbal expressions of affection (Hauck *et al.*, 1995)
Whirl *(S-M)*	sits or stands in one place and spins himself around (Freeman *et al.*, 1986)

Flaps arms, hands, fingers *(S-M)*	moves arms, hands and/or fingers in an up-down, side-to-side or circular motion at least two times. He may utilize one or both arms and hands, one or all fingers during this activity. Fingers may be wiggled individually or in unison. May flap his arms, hands and/or fingers in front of, to the side or behind body. Frequently the child will engage in this behaviour in front of eyes, in which case "Watches motion of own hands or objects" is noted in addition. (Freeman *et al.*, 1986)
Pacing *(S-M)*	walks, skips or runs in a repetitive course (Freeman *et al.*, 1986)
Bang head / hit self *(S-M)*	hits head or any part of his body with own hand or object; strikes head against another object or person such as wall, table, floor; hits any part of his body (Freeman *et al.*, 1986)
Rocks head or body *(S-M)*	sits or stands in one place and moves his body and/or head in a back-and-forth side-to-side, or circular motion at least two times (Freeman *et al.*, 1986)
Toe walks *(S-M)*	child stands or walks on balls of feet or toes (Freeman *et al.*, 1986)
Genital manipulation	touches or rubs genital area using hands, fingers or another object, such as a toy or eating utensil. The child may also rub against other people or objects (Freeman *et al.*, 1986)
Whirls/spins object *(S-R)*	(Freeman *et al.*, 1986)
Rubs surfaces *(S-R)*	uses his hand, fingers or any part of his body to rub against another person or object. May be a repetitive act (Freeman *et al.*, 1986)
Watches motion of own hands or objects *(S-R)*	includes finger wiggling
Repetitive behaviour *(S-R)*	repeats some behaviour at least two times e.g. waving objects, tapping objects Freeman *et al.*, 1986)
Sniff self / objects *(S-R)*	smells any part of his body, other people or objects
Lines up objects *(S-R)*	lines up, orders or arranges two or more objects (Freeman *et al.*, 1986)

Visual detail scrutiny *(S-R)*	scrutinizes small details i.e. looks at object in front of eyes (Freeman *et al.*, 1986)
Stares *(S-R)*	stares into space for at least 5 seconds (Freeman *et al.*, 1986)
Covers eyes / ears *(S-R)*	covers eyes/ears with his hand or an object (Freeman *et al.*, 1986)
Flicks objects *(S-R)*	uses fingers to flick repetitively (Freeman *et al.*, 1986)
Bite self *(S-R)*	
Bite object *(S-R)*	

(S-M) indicates a variable included in the sensory-motor behaviours category.

(S-R) indicates a variable included in the sensory-response category.

FREEMAN *ET AL.* (1986) A SCALE FOR RATING SYMPTOMS OF PATIENTS WITH THE SYNDROME OF AUTISM IN REAL LIFE SETTINGS - STUDY 4b (CHAPTER 6)

SENSORY-MOTOR SCALE	
Whirls	sits or stands in one place and spins himself around
Flaps arms, hands, fingers	moves arms, hands and/or fingers in an up-down, side-to-side or circular motion at least two times. He/she may utilize one or both arms and hands, one or all fingers during this activity. Fingers may be wiggled individually or in unison. May flap his arms, hands and/or fingers in front of, to the side or behind body. Frequently the child will engage in this behaviours in front of eyes, in which case "Watches motion of own hands or objects" is noted in addition
Pacing	walks, skips or runs in a repetitive course
Bang head, hits self	three types of behaviour are included here: 1) hits head or any part of his/her body with own hand or object 2) strikes head against another object or person such as wall, table, floor 3) hits any part of his body
Rocks head or body	sits or stands in one place and moves his body and/or head in a back-and-forth side-to side, or circular motion at least two times
Toe walks	child stands or walks on balls of feet or toes
Other idiosyncratic motor behaviour	specify the behaviour
SOCIAL-RELATIONSHIP TO PEOPLE SCALE	
Appropriate response to interaction attempt	refers to gestures, facial reactions, and posture
Appropriate response to activities and events in the environment	this encompasses a broad number of responses. Some examples are: shows interest in conversation around him, responds appropriately to noises (such as siren, shout, object being dropped).
Initiates appropriate physical interaction with others	an appropriate affectionate or play interactions.
Ignores or withdraws from interaction attempt	ignores or withdraws from approach or attempt to initiate interaction. This may be seen as the following: appears to be oblivious to the interaction attempt, showing no facial, physical or verbal reactions

Physically provokes or disturbs others	hits, pokes, kicks, bites, pushes, pinches other children or adults. Include also attempts of aggression (e.g. child swings fist to hit another person, but misses) and token aggression.
Changes activities	interrupts obvious normal sequences for no apparent reason (e.g. suddenly runs to door, darts to a wall)
Genital manipulation	touches or rubs genital area or breasts using hands, fingers or another object, such as a toy or eating utensil. Child may also rub against other people or objects (e.g. rug, wall, chair)
Isolates self from the group	sits, stands, wanders, or runs away from the group. Or may remain with the group, but not actively participate or who interest in the group's activities or conversation. Does not seek out others for conversation or gestural interaction. Also usually seen at these times may be behaviours from the solitary motor, affectual reactions, sensory responses categories. These should be noted in the appropriate categories.
Responds to hugs/being held by rigidity	body becomes rigid and stiff and responses to a hug or being held. Does not extend arms to the person initiating the holding-hugging behaviour
AFFECTUAL RESPONSE SCALE	
Abrupt affectual changes	suddenly begins to cry, laugh, giggle, or smile without any apparent reasons or stimulus from the immediate environment
Grimaces	funny or strange facial expressions or movements. This may be seen while staring into a mirror.
Temper outbursts, explosive and unpredictable behaviour	anger directed or expressed by body movement.
Cries	
Other idiosyncratic affectual behaviours	specify behaviour
SENSORY RESPONSE SCALE	
Uses objects and toys appropriately	uses objects in the manner in which they were intended. This includes eating utensils.
Agitated by loud/sudden noises	

Whirls or spins objects	
Rubs surfaces	uses his hand, fingers or any part of his/her body to rub against another person or object. May be a repetitive act.
Agitated by new activities or environment	cries, becomes agitated or upset when given a new activity or as a result of a change in the environment, or change to a new environment.
Watches motion of own hands or objects	includes finger wiggling
Repetitive behaviour (stereotypic actions)	repeats some behaviour at least two times. Examples are: waving objects, tapping objects, repeatedly putting food in mouth then spitting it out, picking up napkin and dropping it again.
Sniff self or objects	smells any part of his/her body, other people or objects
Lines up objects	lines up, orders or arranges two or more objects, such as toys, food or furniture/
Visual detail scrutiny	scrutinizes small details i.e. looks at objects in front of eyes.
Destructive to objects	throws, hits, bangs, kicks and bites objects or toys.
Repetitive vocalisations	makes same sound at least two times - clicking of teeth.
Stares	stares into space for at least 5 seconds.
Covers eyes, ears	covers eye(s)/ear(s) with his/her hand or object
Flicks objects	uses fingers to flick repetitively.
Other idiosyncratic sensory response	specify behaviour
LANGUAGE SCALE	
Communicative use of language	with speech **not** directed to other people. Included here is labelling of objects.
Initiates or responds to communication with gestures	

Initiates appropriate verbal communication	two behaviours constitute this category: 1) starts up an appropriate verbal exchange 2) verbally lets needs or desires be known. e.g. "I have to go to the bathroom".
Noncommunicative use of delayed echolalia	says words, phrases, and sentences heard in the past, with little or no relationship to current situation.
Immediate echolalia	repeats words or phrases after hearing them. May repeat a question in part or whole instead of answering.
Delusions	verbalized non-rational (psychotic) ideation.
Auditory hallucinations	appears to be hearing things that are not there.
Visual hallucinations	appears to be seeing things that are not there.
Noncommunicative vocalisations	makes single vowel (aaaa) or consonant (mmmmm) sounds or combine vowel and consonant in a non-repetitive pattern (ba na da go). Non-directed screaming and screeching is included here.
No or brief response to communication attempts	answers briefly or not at all when others attempt conversation.

BIBLIOGRAPHY

BIBLIOGRAPHY

Achenbach, T.M. and Edelbrock, C. (1983) *Manual for the Child Behaviour Checklist and Revised Child Behaviour Profile*. Cincinatti: Queen City Printers.

Albert, A. and Bulcroft, K. (1988) Pets, families and the life course. *Journal of Marriage and the Family*, **50**, 543-552

Allen, K. (1997) Pets as moderators of blood pressure and heart rate: the buffering hypothesis and the main effect model of social support. Abstract, *International Society for Anthrozoology Conference 1997*, Boston (pages not numbered)

Allen, K.M., Blascovich, J., Tomaka, J. and Kelsey, R.M. (1991) Presence of human friends and pet dogs as moderators of autonomic responses to stress in women. *Journal of Personality and Social Psychology*, **61**(4), 582-589

Allen, N.B. (1996) Cognitive Psychotherapy. In: S. Bloch (Ed.) *An Introduction to the Psychotherapies* (Third edition). Oxford Medical Publications

Allyon, J. and Azrin, N. (1968) *The Token Economy*. New York: Appleton-Century-Crofts

Althaus, M., Minderaa, R.B. and Dienske, H. (1994) The assessment of individual differences between young children with a pervasive developmental disorder by means of behaviour scales which are derived from direct observation. *Journal of Child Psychology and Psychiatry*, **35**(2), 333-350

Alvin, J. (1981) Regressional techniques in music therapy. *Music Therapy*, **1**(1), 3-8

American Psychiatric Association (1994) *Diagnostic and Statistical Manual of Mental Disorders, 4th edition (DSM-IV)*. Washington DC: American Psychiatric Association

Anderson, J.L., Albin, R.W., Mesaros, R.A., Dunlap, G. and Morelli-Robbins, M. (1993) Issues in providing training to achieve comprehensive behavioral support. In: J. Reichle and D.P. Wacker (Eds.) *Communicative Alternatives to Challenging Behavior: Integrating Functional Assessment and Intervention Strategies*. Baltimore: Paul H. Brookes Publishing Co.

Anderson, W.P., Reid, C.M. and Jennings, G.L. (1992) Pet ownership and risk factors for cardiovascular disease. *The Medical Journal of Australia*, **157**, 298-301

Anon (1995) International Pet Food Market. *Anthrozoös*, **8**(1), 55-56

Anon (1998) Walking the dog not as good as walking alone. *Anthrozoös*, **11**(2), 109

Archer, J. (1992) *Ethology and Human Development*. London: Harvester Wheatsheaf

Archer, J. (1997) Why do people love their pets? *Evolution and Human Behavior*, **18**, 237-259.

Armour, R.A. (1986) *Gods and Myths of Ancient Egypt*. Cairo: The American University in Cairo Press

Banks, S., Davis, P., Howard, V.F. and McLaughlin, T.F. (1993) The effects of directed art activities on the behaviour of young children with disabilities: a multi-element baseline analysis. *Art Therapy*, **10**(4), 235-240

Barba, B.E. (1995) A critical review of research on the human/companion animal relationship: 1988 to 1993. *Anthrozoös*, **8**(1), 9-19

Barnett, J.C. and Quigley, J. (1984) Animals in long-term care facilities: a framework for program planning. *Journal of Long-Term Care Administration*, **12**, 1-8

Baron-Cohen, S., Cox, A., Baird, G., Swettenham, J., Nightingale, N., Morgan, K., Drew, A. and Charman, T. (1996) Psychological markers in the detection of autism in infancy in a large population. *British Journal of Psychiatry*, **168**, 158-163

Baum, N. T. (1994) The phenomena of playing within the process of sandplay therapy. In: N. Bouras (Ed.) *Mental Health in Mental Retardation - recent advances and practices*. Cambridge University Press

Baun, M.M., Bergstrom, N., Langston, N.F. and Thomas, L. (1984) Physiological effects of human/companion animal bonding. *Nursing Research*, **33**, 126-129

Baun, M.M., Oetting, K. and Bergstrom, N. (1991) Health benefits of companion animals in relation to the physiologic indices of relaxation. *Holistic Nursing Practice*, **5**(2), 16-23

Beail, N. and Warden, S. (1996) Evaluation of a psychodynamic service for adults with intellectual disabilities: rationale, design and preliminary outcome data. *Journal of Applied Research in Intellectual Disabilities*, **9**(3), 223-228

Beale, I.L. (1995) Learning disabilities: current status and future prospects. *Journal of Child and Family Studies*, **4**(3), 267-277

Beck, A.M. and Katcher, A.H. (1984) A new look at pet-facilitated therapy. *Journal of the American Veterinary Medical Association*, **184**(4), 414-421

Beck, A.M., Seraydarian, L. and Hunter, G.F. (1986) Use of animals in the rehabilitation of psychiatric inpatients. *Psychological Reports*, **58**, 63-66

Beck, A.T., Rush, A.J., Shaw, B.F. and Emery, G. (1979) *Cognitive Therapy of Depression*. New York: The Guilford Press

Benson, B.A. (1994) Anger management training: a self-control programme for persons with mild mental retardation. In: N. Bouras (Ed.) *Mental Health in Mental Retardation - recent advances and practices*. Cambridge University Press

Benson, B.A., Rice, C.J. and Miranti, S.V. (1986) Effects of anger management training with mentally retarded adults in group treatment. *Journal of Consulting and Clinical Psychology*, **54**(5), 728-729

Berlin, I.N. (1986) The use of competitive games in play therapy. In: C.E. Schaefer and S.E. Reid (Eds.) *Game Play: Therapeutic Use of Childhood Games*. New York: John Wiley & Sons

Bernsen, A.H. (1981) Severe Mental Retardation among children in a Danish urban area. In: P. Mittler (Ed.) *Frontiers of Knowledge in Mental Retardation: Volume 1 - Social, Educational and Behavioral Aspects*. Fifth Congress of the International Association for the Scientific Study of Mental Deficiency. Baltimore: University Park Press

Beyersdorfer, P.S. and Birkenhauer, D.M. (1990) The therapeutic use of pets on an Alzheimer's unit. *American Journal of Alzheimer's Care and Related Disorders and Research*, **5**(1), 13-17

Blackshaw, J.K. and Crowley, P. (1991) A survey to determine the presence and claimed therapeutic use of pets in selected institutions. *Australian Veterinary Practitioner*, **21**(1), 11-13

Blair, C., Ramey, C.T. and Hardin, J.M. (1995) Early intervention for low birthweight, premature infants: participation and intellectual development. *American Journal on Mental Retardation*, 99(5), 542-554

Blurton Jones, N. (1972) Characteristics of ethological studies of human behaviour. In: N. Blurton Jones (Ed.) *Ethological Studies of Child Behaviour*. Cambridge University Press

Bonny, H.L. (1997) The state of the art of music therapy. *The Arts in Psychotherapy*, **24**(1), 65-73

Bossard, J.H.S. (1944) The mental hygiene of owning a dog. *Mental Hygiene*, **28**, 408-413

Boswell, B. (1993) Effects of movement sequences and creative dance on balance of children with mental retardation. *Perceptual and Motor Skills*, 77(3), 1290

Boucher, K.L. and Will, L.A. (1992) An overview of animal facilitated therapy. *Iowa State University Veterinarian*, **53**(1), 10-14.

Bouras, N. (1994; Ed.) *Mental Health in Mental Retardation - recent advances and practices*. Cambridge University Press

Bradlyn, A., Himadi, W., Crimmins, D., Christoff, K., Graves, K. and Kelly, J. (1983) Conversation skills training for retarded adolescents. *Behaviour Therapy*, **14**, 314-324

Brickel, C.M. (1981) A review of the roles of pet animals in psychotherapy and with the elderly. *International Journal of Aging and Human Development*, **12**, 119-128

Brickel, C.M. (1982) Pet-facilitated psychotherapy: a theoretical explanation via attention shifts. *Psychological Reports*, **50**, 71-74

Brickel, C.M. (1984) Depression in the nursing home: a pilot study using pet-facilitated psychotherapy. In: R.K. Anderson, B.L. Hart and L.A. Hart (Eds.) *The Pet Connection*. Minneapolis: Center to Study Human-Animal Relationships and Environments.

Brickel, C.M. (1985) Initiation and maintenance of the human-animal bond: familial roles from a learning perspective. *Marriage and Family Review*, 8(3-4), 31-48

Brickel, C.M. (1986) Pet-facilitated therapies - a review of the literature and clinical implementation considerations. *Clinical Gerentologist*, **5**(3-4), 309-332

Brown, J.F. (1998) Clinical training dissertations: some fundamental design isues that we seldom talk about. *Clinical Psychology Forum*, **116**(June), 30-33

Bryant, B.K. (1985) The neighbourhood walk: sources of support in middle childhood. *Monographs of the Society for Research in Child Development*, **50**, Serial No. 210

Bryant, B.K. (1990) The richness of the child-pet relationship: a consideration of both benefits and costs of pets to children. *Anthrozoös*, **3**(4), 253-261

Bucke, W.F. (1903) Cyno-psychoses: children's thoughts, reactions and feelings toward pet dogs. *Journal of Genetic Psychology*, **10**, 459-513

Bullock, M. (1985) Animism in childhood thinking: a new look at an old question. *Developmental Psychology*, **21**(2), 217-225

Bunt, L. (1994) *Music Therapy: an art beyond words*. London: Routledge

Burch, M.R., Bustad, L.K., Duncan, S.L., Fredrickson, M. and Tebay, J. (1995) The role of pets in therapeutic programmes. In: I.Robinson (Ed.) *The Waltham Book of Human-Animal Interaction: benefits and responsibilities of pet ownership*. Elsevier Science Ltd, Oxford: Pergamon

Busk, P.L. and Marascuilo, L.A. (1992) Statistical analysis in single-case research: issues, procedures, and recommendations, with applications to multiple behaviors. In: T.R. Kratochwill and J.R. Levin (Eds.) *Single-Case Research Design and Analysis: New Directions for Psychology and Education*. London: Lawrence Erlbaum Associates.

Bustad, L.K. and Hines, L. (1984) Historical perspectives on the human-animal bond. In: R.K. Anderson, B.L. Hart and L.A. Hart, (Eds.) *The Pet Connection*. Minneapolis: Center to Study Human-Animal Relationships and Environments.

Cain, A.O. (1983) A study of pets in the family system. In: A.H. Katcher and A.M. Beck (Eds.) *New Perspectives on our Lives with Companion Animals*. Philadelphia: University of Pennsylvania Press

Cain, A.O. (1985) Pets as family members. *Marriage and Family Review*, **8**(3-4), 5-10

Cameron, P. and Mattson, M. (1972) Psychological correlates of pet ownership. *Psychological Reports*, **30**, 286

Carmack, B.J. and Fila, D. (1989) Animal-assisted therapy: a nursing intervention. *Nursing Management*, **May**, 96-101

Carter, J.L. (1979) Art therapy and learning disabled children. *Art Psychotherapy*, **6**(1), 51-56

Case, C. and Dalley, T. (1992) *The Handbook of Art Therapy*. London: Routledge

Cass, J. (1981) Pet facilitated therapy in human health care. In: B. Fogle (Ed.) *Interrelations Between People and Pets*. Illinois: Charles C Thomas

Cattanach, A. (1995) Drama and play therapy with young children. *The Arts in Psychotherapy*, **22**(3), 223-228

Chamradova, A. (1995) Animal-assisted therapy in children with severe mental retardation. *Ceskoslovenska Psychologie*, **39**(6), 559-561

Clegg, J. (1996) Psychotherapy in learning disabilities. *British Journal of Clinical Psychology*, **35**, 321-322

Clements, J.C. (1987) *Severe Learning Disability and Psychological Handicap*. Chichester: John Wiley and Sons.

Cohen, P.M. and Solnit, A.J. (1993) Play and therapeutic action. *Psychoanalytic Study of the Child*, **48**, 49-63

Condoret, A. (1983) Speech and companion animals: experience with normal and disturbed nursery school children. In: A.H. Katcher and A.M. Beck (Eds.) *New Perspectives on our Lives with Companion Animals*. Philadelphia: University of Pennsylvania Press

Conte, R., Andrews, J.J.W., Loomer, M. and Hutton, G. (1995) A classroom-based social skills intervention for children with learning disabilities. *Alberta Journal of Educational Research*, **41**(1), 84-102

Corson, S.A. and Corson, E.O. (1978) Pets as mediators of therapy. *Current Psychiatric Therapies*, **18**, 195-205

Corson, S.A. and Corson, E.O. (1980) Pet animals as nonverbal communication mediators in psychotherapy in institutional settings. In: Corson, S.A., Corson, E.O. and Alexander, J.A. (Eds.) *Ethology and Nonverbal Communication in Mental Health*. Oxford: Pergamon Press

Corson, S.A., Corson, E.O. and Gwynne, P.H. (1975) Pet-facilitated psychotherapy. In: R.S. Anderson (Ed.) *Pet Animals and Society*. London: Bailliere Tindall

Corson, S.A., Corson, E.O., Gwynne, P.H. and Arnold, L.E. (1977) Pet dogs as nonverbal communication links in hospital psychiatry. *Comprehensive Psychiatry*, **18**(1), 61-72

Couper, J.L. (1981) Effects on motor performance of children with learning disabilities. *Physical Therapy*, **61**, 23-26

Covert, A.M., Whiren, A.P., Keith, J. and Nelson, C. (1985) Pets, early adolescents, and families. *Marriage and Family Review*, **8**(3-4), 95-108

Cox, R.P. (1993) The human/animal bond as a correlate of family functioning. *Clinical Nursing Research*, **2**(2), 224-231

Culliton, B.J. (1987) Take two pets and call me in the morning. *Science*, **237**, 1560-1561

Cusack, O. (1988) *Pets in Mental Health*. New York: The Haworth Press

Dagnan, D. and Chadwick, P. (1997) Cognitive-behaviour therapy for people with learning disabilities: assessment and intervention. In: B.S. Kroese, D. Dagnan and K. Loumidis (Eds.) *Cognitive-Behaviour Therapy for People with Learning Disabilities*. London: Routledge

Dampney, J. (1988) *Horses as an aid to the Education of Handicapped Young People*. New Forest: The Fortune Centre

Daniel, S.A., Burke, J. and Burke, J. (1987) Educational programs for pet-assisted therapy in institutional settings: an interdisciplinary approach. *Veterinary Technician*, **8**(4), 394-399

Davis, J.H. (1985) Children and pets: a therapeutic connection. *Pediatric Nursing*, **11**, 377-379

Davis, J.H. (1987) Preadolescent self-concept development and pet ownership. *Anthrozoös*, **1**(2), 90-94

Davis, J.H. and Juhasz, A.M. (1995) The preadolescent/pet friendship bond. *Anthrozoös*, **8**(2), 78-82

Davis, J.M. and Valla, F.R. (1978) Evidence for the domestication of the dog 12,000 years ago in the Natufian of Israel. *Nature*, **276**(5688), 608-610

Delta Society (1992) *Handbook for Animal-Assisted Activities and Animal-Assisted Therapy.* Washington: Delta Society.

de Tilly, J.N. (1991) Animals and therapy. *Veterinary Technician*, **12**(6), 455-459

Dissanayake, C. and Crossley, S.A. (1989) Behaviour in children with early infantile autism: responsiveness to people. In: P. Lovibond and P. Wilson (Eds.) *Clinical and Abnormal Psychology.* North-Holland: Elsevier Science Publishers B.V.

Dockrell, J. and McShane, J. (1992) *Children's Learning Difficulties - a cognitive approach.* Oxford: Blackwell

Dolan, M.C. (1973) Music therapy: an explanation. *Journal of Music Therapy*, **10**(4), 172-176

Downing, J. (1987) Conversational skills training: teaching adolescents with mental retardation to be verbally assertive. *Mental Retardation*, **25**, 147-155

Draper, R.J., Gerber, G.J. and Layng, E.M. (1990) Defining the role of pets animals in psychotherapy. *Psychiatric Journal of the University of Ottawa*, **15**(3), 169-172

Dunlap, G., Foster-Johnson, L., Clarke, S., Kern, L. and Childs, K.E. (1995) Modifying activities to produce functional outcomes: effects on the problem behaviors of students with disabilities. *Journal of the Association for Persons With Severe Handicaps*, **20**(4), 248-258

Edgerton, C.L. (1994) The effect of improvisational music therapy on the communicative behaviors of autistic children. *Journal of Music Therapy*, **31**(1), 31-62

Edgington, E.S. (1992) Nonparametric tests for single-case experiments. In: T.R. Kratochwill and J.R. Levin (Eds.) *Single-Case Research Design and Analysis: New Directions for Psychology and Education.* London: Lawrence Erlbaum Associates

Einfeld, S.L. and Tonge, B.J. (1995) The developmental behavior checklist: the development and validation of an instrument to assess behavioral and emotional disturbance in children and adolescents with mental retardation. *Journal of Autism and Developmental Disorders*, **25**(2), 81-104

Endenburg, N. and Baarda, B. (1995) The role of pets in enhancing human well-being: effects on child development. In: I.Robinson (Ed.) *The Waltham Book of Human-Animal Interaction: benefits and responsibilities of pet ownership.* Elsevier Science Ltd, Oxford: Pergamon

Fick, K.M. (1992) The influence of an animal on social interactions of nursing home residents in a group setting. *The American Journal of Occupational Therapy*, **47**(6), 529-534.

Fitzgerald, F.T. (1986) The therapeutic value of pets. *Western Journal of Medicine*, **144**(1), 103-105

Fonagy, P. and Higgitt, A. (1984) *Personality, Theory and Clinical Practice*. London: Methuen

Forness, S.R. and Kavale, K.A. (1996) Treating social skill deficits in children with learning disabilities: A meta-analysis of the research. *Learning Disability Quarterly*, **19**(1), 2-13

Francis, G., Turner, J.T. and Johnson, S.B. (1985) Domestic animal visitation as therapy with adult home residents. *International Journal of Nursing Studies*, **22**(3), 201-206

Fraser, W.I. and Green, A.M. (1991) Changing perspectives on mental handicap. In: W.I. Fraser, R.C. MacGillivray and A.M. Green (Eds.) *Hallas' Caring for People with Mental Handicaps* (Eighth edition). Oxford: Butterworth-Heinemann.

Frazer, J.G. (1987) *The Golden Bough*. London: Papermac, Macmillan

Freeman, B.J., Ritvo, E.R., Yokota, A. and Ritvo, A. (1986) A scale for rating symptoms of patients with the syndrome of autism in real life settings. *Journal of the American Academy of Child Psychiatry*, **25**(1), 130-136

Friedmann, E. and Katcher, A. (1982) Author's reply [to Wright & Moore 1982]. *Public Health Reports*, **97**, 381

Friedmann, E. and Thomas, S.A. (1985) Health benefits of pets for families. *Marriage and Family Review*, **8**(3-4), 191-203

Friedmann, E. and Thomas, S.A. (1995) Pet ownership, social support, and one-year survival after acute myocardial infarction in the Cardiac Arrhyhmia Suppression Trial (CAST). *American Journal of Cardiology*, **76**, 1213-1217

Friedmann, E., Katcher, A.H., Eaton, M. and Berger, B. (1984) Pet ownership and psychological status. In: R.S. Anderson, B.L. Hart and L. Hart (Eds.) *The Pet Connection: its influence on our health and quality of life*. Minneapolis: Globe Publishing Co.

Friedmann, E., Katcher, A.H., Lynch, J.J. and Thomas, S.A. (1980) Animal companions and one-year survival of patients after discharge from a coronary care unit. *Public Health Reports*, **95**, 307-312

Friedmann, E., Katcher, A.H., Meislich, D. and Goodman, M. (1979) Physiological response of people to petting their pets. *American Zoologist*, **19**, 915

Friedmann, E., Katcher, A.H., Thomas, S.A., Lynch, J.J. and Messent, P.R. (1983) Social interaction and blood pressure influence of animal companions. *The Journal of Nervous and Mental Disease*, **171**(8), 461-465

Frith, U. (1993) Autism. *Scientific American*, **June**, 78-84

Garrity, T.F., Stallones, L., Marx, M.B. and Johnson, T.P. (1989) Pet ownership and attachment as supportive factors in the health of the elderly. *Anthrozoös*, **3**(1), 35-44

Gelman, R., Durgin, F. and Kaufman, L. (1995) Distinguishing between animates and inanimates: not by motion alone. In: D. Sperber, D. Premack and J. Premack (Eds.) *Causal Cognition: A Multidisciplinary Debate*. Oxford: Clarendon Press

Gelman, S.A. and Gottfried, G.M. (1996) Children's causal explanations of animate and inanimate motion. *Child Development*, **67**, 1970-1987

George, M.H. (1988) Child therapy and animals: a new way for an old relationship. In: C.E. Schaefer (Ed.) *Innovative Interventions in Child and Adolescent Therapy*. New York: Wiley

Gilroy, A. and Lee, C. (1995) Juxtapositions in art therapy and music therapy research. In: A. Gilroy and C. Lee (Eds.) *Art and Music: Therapy and Research*. London: Routledge

Gonski, Y.A. (1985) The therapeutic utilization of canines in a welfare setting. *Child and Adolescent Social Work Journal*, **2**, 93-105

Gostason, R. (1985) Psychiatric illness among the mentally retarded - a Swedish population study. *Acta Psychiatrica Scandinavica* (Suppl. 318), **71**, 1-117

Greenspan, S.I. (1992) Reconsidering the diagnosis and treatment of very young children with autistic spectrum or pervasive developmental disorder. *Zero to Three*, **13**, 1-9

Grossberg, J.M., Alf, E.F. & Vormbrock, J.K. (1988) Does pet dog presence reduce human cardiovascular responses to stress? *Anthrozoös*, **2**(1), 38-44

Guttman, G. (1981) The psychological determinants of keeping pets. In: B. Fogle (Ed.) *Interrelations Between People and Pets*. Illinois: Charles C Thomas

Guttman, G., Predovic, M. and Zemanek, M. (1983) The influence of pet ownership on non-verbal communication and social competence in children. From: *The Human Pet Relationship. International Symposium on the occasion of the 80th Birthday of Konrad Lorenz*, October 1983. Vienna: IEMT

Hart, L.A. (1995) The role of pets in enhancing human well-being: effects for older people. In: I.Robinson (Ed.) *The Waltham Book of Human-Animal Interaction: benefits and responsibilities of pet ownership*. Elsevier Science Ltd, Oxford: Pergamon

Hastings, R.P. and Remington, B. (1994) Staff behaviour and its implications for people with learning disabilities and challenging behaviours. *British Journal of Clinical Psychology*, **33**, 423-438

Hauck, M., Fein, D., Waterhouse, L. and Feinstein, C. (1995) Social initiations by autistic children to adults and other children. *Journal of Autism and Developmental Disorders*, **25**(6), 579-595

Haughie, E., Milne, D. and Elliott, V. (1992) An evaluation of companion pets with elderly psychiatric patients. *Behavioural Psychotherapy*, **20**(4), 367-372

Hawton, K., Salkovskis, P.M., Kirk, J. And Clark, D.M. (1989; Eds.) *Cognitive Behaviour Therapy for Psychiatric Problems*. Oxford University Press

Hay, D. (1996) Animal magic. *Sainsbury's The Magazine*, **February**, 54-56

Herbert, M. (1991) *Clinical Child Psychology: social learning, development and behaviour.* Chichester: John Wiley & Sons

Hinshelwood, R. (1991) Psychodynamic Formulation. *British Journal of Psychotherapy*, **8**(2), 166-173

Hollins, S., Sinason, V. and Thompson, S. (1994) Individual, group and family psychotherapy. In: N. Bouras (Ed.) *Mental Health in Mental Retardation - recent advances and practices.* Cambridge University Press

Horner, R.H., O'Neill, R.E., and Flannery, K.B. (1993) Building effective behavior support plans from functional assessment information. In M.E. Snell (Ed.) *Systematic Instruction of Persons with Severe Handicaps* (Fourth edition). Columbus: Charles E Merrill

Howell-Newman, K. and Goldman, R.L. (1993) Marketing animal facilitated therapy. *Health Marketing Quarterly*, **11**(1/2), 77-98

Howlin, P. and Rutter, M. (1987) *Treatment of Autistic Children*. Chichester: John Wiley and Sons

Hughes, C., Killian, D.J. and Fischer, G.M. (1996) Validation and assessment of a conversational interaction intervention. *American Journal on Mental Retardation*, **100**(5), 493-509

Hulme, C. and Mackenzie, S. (1992) *Working Memory and Severe Learning Difficulties.* London: Lawrence Erlbaum Associates

Hunt, S.J., Hart, L.A. and Gomulkiewicz, R. (1992) Role of small animals in social interactions between strangers. *The Journal of Social Psychology*, **132**(2), 245-256

Hyde, K.R., Kurdek, L. and Larson, P. (1983) Relationships between pet ownership and self-esteem, social sensitivity, and interpersonal trust. *Psychological Reports*, **42**, 110

Iannuzzi, D. and Rowan, A.N. (1991) Ethical issues in animal-assisted therapy programs. *Anthrozoös*, **4**(3), 154-163

Jones, K. (1955) *Lunacy, Law and Conscience.* New York: Humanities

Kaufman, M. (1992) Classroom pets: the wrong message. *The Latham Letter*, **13**(2), 20-22

Kavale, K.A. (1990) Variances and verities in learning diability interventions. In: T.E. Scruggs and B.Y.L. Wong (Eds.) *Intervention Research in Learning Disabilities.* London: Springer-Verlag

Kay, B.R. (1990) Bittersweet Farms. *Journal of Autism and Developmental Disorders*, **20**(3), 309-321

Kazdin, A.E. (1982) *Single-case research designs: methods for clinical and applied settings.* Oxford University Press

Kendall, P.C. and Panichelli-Mindel, S.M. (1995) Cognitive-behavioral treatments. *Journal of Abnormal Child Psychology*, **23**(1), 107-124.

Kidd, A.H. and Kidd, R.M. (1987) Reactions of infants and toddlers to live and toy animals. *Psychological Reports*, **61**, 455-464

Kidd, A.H. and Kidd, R.M. (1989) Factors in adults' attitudes toward pets. *Psychological Reports*, **65**, 903-910

Kline, P. (1984) *Psychology and Freudian Theory: An Introduction*. London: Methuen

Kohl, F.L. and Beckman, P.J. (1990) The effects of directed play on the frequency and length of reciprocal interactions with preschoolers having moderate handicaps. *Education and Training in Mental Retardation*, **25**(3), 258-266

Kongable, L.G., Buckwater, K.C. and Stolley, J.M. (1989) Effects of pet therapy on social behaviour of institutionalized Alzheimer's Clients. *Archives of Psychiatric Nursing*, **3**(4), 191-198

Krakow, J.B. and Kopp, C.B. (1983) The effects of developmental delay on sustained attention in young children. *Child Development*, **54**, 1143-1155

Kratochwill, T.R. (1992) Single-case research design and analysis: an overview. In: T.R. Kratochwill and J.R. Levin (Eds.) *Single-Case Research Design and Analysis: New Directions for Psychology and Education*. London: Lawrence Erlbaum Associates

Kratochwill, T.R., Mott, S.E. and Dodson, C.L. (1984) Case study and single-case research in clinical and applied psychology. In: A.S. Bellack and M. Hersen (Eds.) *Research Methods in Clinial Psychology*. Oxford: Pergamon Press

Kroese, B.S., Dagnan, D. and Loumidis, K. (1997; Eds.) *Cognitive-Behaviour Therapy for People with Learning Disabilities*. London: Routledge

Krupski, A. (1980) Attention processes: research, theory and implications for special education. In: B. Keogh (Ed.) *Advances in Special Education (Vol 1)*. Greenwich, Conn: JAI

Lasseter, J., Privette, G., Brown, C.C. and Duer, J. (1989) Dance as a treatment approach with a multidisabled child: implications for school counseling. *School Counselor*, **36**(4), 310-315

LaVigna, G.W. and Donnellan, A.M. (1986) *Alternatives to Punishment: Solving Behavior Problems with Non-aversive Strategies*. New York: Irvington

Lev, E.L. (1983) An activity therapy group with children in an in-patient psychiatric setting. *Psychiatric Quarterly*, **55**(1), 55-64

Levinson, B.M. (1962) The dog as a cotherapist. *Mental Hygiene*, **46**, 59-65

Levinson, B.M. (1964) Pets: a special technique in child therapy. *Mental Hygiene*, **48**, 243-248

Levinson, B.M. (1965) Pet psychotherapy: use of household pets in the treatment of behavior disorders in childhood. *Psychological Reports*, **17**, 695-698

Levinson, B.M. (1967) The pet and the child's bereavement. *Mental Hygiene*, **51**, 197-200

Levinson, B.M. (1968a) Household pets in residential schools. *Mental Hygiene*, **2**, 411-414

Levinson, B.M. (1968b) Interpersonal relationships between pet and human being. In: M.W. Fox (Ed.) *Abnormal Behaviour in Animals*. W.B. Saunders: Philadelphia

Levinson, B.M. (1969) *Pet-orientated child psychotherapy*. Springfield: Charles C Thomas

Levinson, B.M. (1970) Pets, child development and mental illness. *Journal of the American Veterinary Medical Association*, **157**, 1759-1766

Levinson, B.M. (1971) Household pets in training schools serving delinquent children. *Psychological Reports*, **28**, 475

Levinson, B.M. (1972) *Pets and human development*. Springfield: Charles C Thomas

Levinson, B.M. (1978) Pets and personality development. *Psychological Reports*, **42**, 1031-1038

Levinson, B.M. (1980) The child and his pet: a world of nonverbal communication. In: S.A. Corson, E.O. Corson and J.A. Alexander (Eds.) *Ethology and Nonverbal Communication in Mental Health*. Oxford: Pergamon Press

Levinson, B.M. (1982) The future of research into relationships between people and their animal companions. *International Journal for the Study of Animal Problems*, **3**, 283-294

Levinson, B.M. (1984) Human/companion animal therapy. *Journal of Contemporary Psychotherapy*, **14**, 131-144

Lindsay, W.R., Howells, L. and Pitcaithly, D. (1993) Cognitive therapy for depression with individuals with intellectual disabilities. *British Journal of Medical Psychology*, **66**, 135-141

Lindsay, W.R. and Michie, A.M. (1991) Teaching new skills. In: W.I. Fraser, R.C. MacGillivray and A.M. Green (Eds.) *Hallas' Caring for People with Mental Handicaps* (Eighth edition). Oxford: Butterworth-Heinemann

Lindsay, W., Neilson, C. and Lawrenson, H. (1997) Cognitive-behaviour therapy for anxiety in people with learning disabilities. In: B.S. Kroese, D. Dagnan and K. Loumidis (Eds.) *Cognitive-Behaviour Therapy for People with Learning Disabilities*. London: Routledge

Loney, J. (1971) The canine therapist in a residential children's setting: qualifications, recruitment, training and related matters. *Journal of the American Academy of Child Psychiatry*, **10**(3), 518-523

Losardo, A. and Bricker, D. (1994) Activity based intervention and direct instruction: a comparison study. *American Journal on Mental Retardation*, **98**(6), 744-765

Loumidis, K. and Hill, A. (1997) Social problem-solving groups for adults with learning disabilities. In: B.S. Kroese, D. Dagnan and K. Loumidis (Eds.) *Cognitive-Behaviour Therapy for People with Learning Disabilities*. London: Routledge

Loyer-Carlson, V. (1992) Pets and perceived life quality. *Psychological Reports*, **70**(3), 947-952

MacDuff, G.S., Krantz, P.J. and McClannahan, L.E. (1993) Teaching children with autism to use photographic activity schedules: maintenance and generalization of complex response chains. *Journal of Applied Behavior Analysis*, **26**, 89-97

Mader, B., Hart, L.A. and Bergin, B. (1989) Social acknowledgement for children with disabilities: effects of service dogs. *Child Development*, **60**(6), 1529-1534

Malan, D. (1979) *Individual Psychotherapy and the Science of Psychoanalysis*. London: Butterworth Heinemann

Mallon, G.P. (1992) Utilization of animals as therapeutic adjuncts with children and youth: a review of the literature. *Child and Youth Care Forum*, **21**(1), 53-67

Mallon, G.P. (1994a) Some of our best therapists are dogs. *Child and Youth Care Forum*, **23**(2), 89-101

Mallon, G.P. (1994b) Cow as co-therapist: utilization of farm animals as therapeutic aides with children in residential treatment. *Child and Adolescent Social Work Journal*, **11**(6), 455-474

Malone, D.M. and Langone, J. (1994) Object-related play skills of youths with mental retardation: a review of single-subject design research. *Remedial and Special Education*, **15**(3), 177-188

Malone, D.M. and Stoneman, Z. (1995) Methodological issues in studying the toy play of young children with mental retardation. *Topics in Early Childhood Special Education*, **15**(4), 459-487

Martin, P. and Bateson, P. (1993) *Measuring Behaviour: an introductory guide*. Cambridge University Press

Massey, C.M. and Gelman, R. (1988) Preschooler's ability to decide whether a photographed unfamiliar object can move itself. *Developmental Psychology*, **24**(3), 307-317

Matson, J.L., Benavidez, D.A., Compton, L.S., Paclawskyj, T. and Baglio, C. (1996) Behavioral treatment of autistic persons: a review of research from 1980 to the present. *Research in Developmental Disabilities*, **17**(6), 433-465

McBride, E.A., Rosenvinge, H.P., Stevenage, S.V. and Roberts, C. (1995) Naturally-occurring pet ownership and health in British community dwelling elderly. Presented at *The 7th International Conference on Human-Animal Interactions*. September 6-9, Geneva.

McCulloch, M.J. (1981) The pet as prosthesis - defining criteria for the adjunctive use of companion animals in the treatment of medically ill depressed outpatients. In: B. Fogle (Ed.) *Interrelations Between People and Pets*. Illinois: Charles C Thomas

McCulloch, M.J. (1983) Animal-facilitated therapy: overview and future direction. In: A.H. Katcher and A.M. Beck (Eds.) *New Perspectives on our Lives with Companion Animals*. Philadelphia: University of Pennsylvania Press

Messent, P.R. (1983) Social facilitation of contact with other people by pet dogs. In: A.H. Katcher and A.M. Beck (Eds.) *New Perspectives on our Lives with Companion Animals*. Philadelphia: University of Pennsylvania Press

Messent, P.R. and Horsfield, S. (1985) Pet population and pet owner bond. *Proceedings of the International Symposium on the Human-Pet Relationship*. Vienna: IEMT

Michie, A.M., Lindsay, W.R. and Smith, A.H.W. (1998) Changes following community living skills training: A controlled study. *British Journal of Clinical Psychology*, **37**, 109-111

Miller, M.G. (1986) Art - a creative teaching tool. *Academic Therapy*, **22**(1), 53-56

Miller, M. and Lago, D. (1990) The well-being of older women: the importance of pet and human relations. *Anthrozoös*, **3**(4), 245-252

Montague, J. (1991) Music therapy. In: W.I. Fraser, R.C. MacGillivray and A.M. Green (Eds.) *Hallas' Caring for People with Mental Handicaps* (Eighth edition). Oxford: Butterworth-Heinemann.

Mosey, A.C. (1973) *Activities Therapy.* New York: Raven Press

Mugford, R.A. and M'Comisky, J.G. (1975) Some recent work on the psychotherapeutic value of cage birds with old people. In: R.S. Anderson (Ed.) *Pet Animals and Society.* Cassell: London

Nadeau, R. (1993) Using the visual arts to expand personal creativity. In: B. Warren (Ed.) *Using the Creative Arts in Therapy: A Practical Introduction.* London: Routledge

Nathanson, D.E. (1989) Using Atlantic Bottlenose dolphins to increase cognition of mentally retarded children. In: P. Lovibond and P. Wilson (Eds.) *Clinical and Abnormal Psychology.* North-Holland: Elsevier Science Publishers B.V.

Netting, F.E., Wilson, C.C. and New, J.C. (1987) The human-animal bond: implications for practice. *Social Work*, **Jan-Feb**, 60-64

Nicholson, A. and Alberman, E. (1992) Prediction of the number of Down's syndrome infants to be born in England and Wales up to the year 2000 and their likely survival rates. *Journal of Intellectual Disability Research*, **32**, 505-517

Nicholson, J. and Goody, S. (1994) Survey of pet ownership amongst older people. *Conference Proceedings: Issues in Research in Companion Animal Studies*, The Society for Companion Animal Studies. 17-18 September: Cambridge

Nielsen, J.A. and Delude, L.A. (1989) Behaviour of young children in the presence of different kinds of animals. *Anthrozoös*, **3**(2), 119-129

Nielsen, J.A. and Delude, L.A. (1994) Pets as adjunct therapists in a residence for former psychiatric patients. *Anthrozoös*, 7(3), 166-171

Odendaal, J.S.J. (1990) Companion animals in therapy. *Journal of Comprehensive Health*, **1**(1), 14-17

Odom, S.L., McConnell, S.R. and Chandler, L.K. (1993) Acceptability and feasibility of classroom-based social interaction interventions for young children with disabilities. *Exceptional Children*, **60** (3), 226-236

Oldfield, A. and Adams, M. (1990) The effects of music therapy on a group of profoundly mentally handicapped adults. *Journal of Mental Deficiency Research*, **34**, 107-125

Ort, M. and Liepmann, M.C. (1981) The IFFV schedule of children's handicaps, behavior, and skills - reliability and discrimination. In: P. Mittler (Ed.) *Frontiers of Knowledge in Mental Retardation: Volume 1 - Social, Educational and Behavioral Aspects.* Fifth Congress of the Interactional Association for the Scientific Study of Mental Deficiency (IASSMD). Baltimore: University Park Press.

Ory, M.G. and Goldberg, E.L. (1983) Pet possession and life satisfaction in elderly women. In: A.H. Katcher and A.M. Beck (Eds.) *New Perspectives on our Lives with Companion Animals.* Philadelphia: University of Pennsylvania Press

Owen, M.S., McDonald, L. and Baine, D. (1994) Direct observation of communicative interaction in a group home setting. *Education and Training in Mental Retardation*, **29**(1), 34-42

Payne, H. (1992) Shut in, shut out: dance movement therapy with children and adolescents. In: H. Payne (Ed.) *Dance Movement Therapy: Theory and Practice*. London: Tavistock/Routledge

Peters, J.S. (1987) *Music Therapy: An Introduction.* Illinois: Charles C Thomas

Pfau, H. (1990) *PAT at Huntington: a volunteer program of pet-assisted therapy.* Training Manual: Huntington Memorial Hospital.

Poresky, R.H. (1996) Companion animals and other factors affecting young children's development. *Anthrozoös*, 9(4), 159-168

Poresky, R.H., Hendrix, C. (1990) Differential effects of pet presence and pet-bonding on young children. *Psychological Reports*, **67**(1), 51-54

Powell, S. and Jordan, R. (1993) Diagnosis, intuition and autism. *British Journal of Special Education*, **20**(1), 26-29

Rachlin, H. (1991) *Introduction to Modern Behaviorism* (Third edition). New York: W.H. Freeman & Co.

Rachman, S. (1997) The evolution of cognitive behaviour therapy. In: D.M. Clark and C.G. Fairburn (Eds.) *Science and Practice of Cognitive Behaviour Therapy.* Oxford University Press

Redefer, L.A. and Goodman, J.A. (1989) Brief Report: pet-facilitated therapy with autistic children. *Journal of Autism and Developmental Disorders*, **19**(3), 461-467

Remington, B. (1991; Ed.) *The Challenge of Severe Mental Handicap: a behaviour analytic approach.* Chichester: John Wiley & Sons

Richards, D.D. and Siegler, R.S. (1986) Children's understanding of the attributes of life. *Journal of Experimental Child Psychology*, **42**, 1-22

Richer, J. (1980) Communication, noncommunication, culture and autism. In: S.A. Corson, E.O. Corson and J.A. Alexander (Eds.) *Ethology and Nonverbal Communication in Mental Health.* Oxford: Pergamon Press

Ritter, M. and Low, K.F. (1996) Effects of dance/movement therapy: a meta-analysis. *The Arts in Psychotherapy*, **23**(3), 249-260

Robin, M. and ten Bensel, R. (1985) Pets and the socialization of children. *Marriage and Family Review*, **8**(3/4), 63-78

Robinson, I. (1995) Associations between man and animals. In: I.Robinson (Ed.) *The Waltham Book of Human-Animal Interaction: benefits and responsibilities of pet ownership.* Elsevier Science Ltd, Oxford: Pergamon

Robson, C. (1993) *Real World Research: a resource for social scientists and practitioner researchers.* Oxford: Blackwell

Rogers, J., Hart, L.A. and Boltz, R.P. (1993) The role of pet dogs in casual conversations of elderly adults. *Journal of Social Psychology*, **133**(3), 265-277

Rosenhan, D.L. and Seligman, M.E.P. (1989) *Abnormal Psychology* (Second Edition). New York: W.W. Norton and Company

Roskam, K. (1979) Music therapy as an aid for increasing auditory awareness and improving reading skill. *Journal of Music Therapy*, **16**(1), 31-42

Ross, S.B., Vigdor, M.G., Kohnstamm, M., DiPaoli, M., Manley, B. and Ross, L. (1983) The effects of farm programming with emotionally handicapped children. In: R.K. Anderson, B. Hart and L. Hart (Eds.) *The Pet Connection: its influence on our health and quality of life*. Minneapolis: Center to Study Human-Animal Relationships and Environments

Rutter, M., Graham, P. and Yule, W. (1970) *A Neuropsychiatric Study in Childhood*. London: Spastics International Medical Publications

Russell, A. and Cotton, E. (1994) *The Peto System and its Evolution in Britain: Philosophy, Principles and Practice*. London: Acorn Foundation Publications.

Ryder, R.D. (1973) Pets in man's search for sanity. *Journal of Small Animal Practice*, **14**, 657-668

Salmon, P.W. and Salmon, I.M. (1983) Who owns who? Psychological research into the human-pet bond in Australia. In: A.H. Katcher and A.M. Beck (Eds.) *New Perspectives on our Lives with Companion Animals*. Philadelphia: University of Pennsylvania Press

Salomon, A. and Comeau, J. (1984) Child's modes of communication with the animal. October 1984, *Child in Social Context Conference*. Winnipeg: Conference Proceedings

Salter, K.C. and Fawcett, R.F. (1993) The ART test of interaction: a robust and powerful rank test of interaction in factorial models. *Communications in Statistics - Simula*, **22**(1), 137-153

SAS Institute Inc. (1985) *SAS User's Guide: Statistics, Version 5*. North Carolina: SAS Institute Inc. pp77-92

Savishinsky, J.S. (1985) Pets and family relationships among nursing home residents. *Marriage and Family Review*, **8**(3/4), 109-134

Seaman, J.W., Walls, S.C., Wise, S.E. and Jaeger, R.G. (1994) Caveat emptor: rank transform methods and intercation. *Trends in Ecology and Evolution*, **9**(7), 261-263

Seed, P. (1995) *Team work, specialisation and the future*. Kidderminster: British Instute of Learning Disabilities

Serpell, J.A. (1991) Beneficial effects of pet ownership on some aspects of human health and behaviour. *Journal of the Royal Society of Medicine*, **84**, 717-721

Serpell, J.A. (1996) *In the Company of Animals*. Canto edition, Cambridge University Press

Serpell, J.A. and Paul, E. (1994) Pets and the development of positive attitudes to animals. In A. Manning and J. Serpell (Eds.) *Animals and Human Society*. London: Routledge

Sheldon, B. (1995) *Cognitive-Behavioural Therapy: Research, Practice and Philosophy.* London: Routledge

Sheppard, J.L. (1989) Social skills training for children/adults who are moderately/severely intellectually disabled. In: P. Lovibond and P. Wilson (Eds.) *Clinical and Abnormal Psychology.* North-Holland: Elsevier Science Publishers B.V.

Siegel, J.M. (1993) Companion animals: in sickness and in health. *Journal of Social Issues*, **49**(1), 157-167

Siegel, S. and Castellan, N.J. (1988) *Nonparametric Statistics for the Behavioral Sciences.* New York: McGraw-Hill Book Company

Silver, R.A. and Lavin, C. (1977) The role of art in developing and evaluating cognitive skills. *Journal of Learning Disabilities*, **10**(7), 416-424

Simon, L.J. (1983) The pet trap: negative effects of pet ownership on families and individuals. In: R.K. Anderson, B. Hart and L. Hart (Eds.) *The Pet Connection: its influence on our health and quality of life.* Minneapolis: Center to Study Human-Animal Relationships and Environments

Sinason, V. (1992) *Mental Handicap and the Human Condition - New approaches from the Tavistock.* London: Free Association Books

Skinner, B.F. (1938) *The Behavior of Organisms.* New York: Appletion-Century-Crofts

Smith, T. (1996) Are other treatments effective? In: C. Maurice, G. Green and S.C. Luce (Eds.) *Behavioural Intervention for Young Children with Autism: A Manual for Parents and Professionals.* Texas: Pro-Ed Inc.

Somerville, J. (1997) The welfare of therapy dogs. *BSc Honours Dissertations.* University of Southampton

Stallones, L., Marx, M.B., Garrity, T.F. and Johnson, T.P. (1990) Pet ownership and attachment in relation to the health of US adults, 21 to 64 years of age. *Anthrozoös*, **4**(2), 100-112

Steel, R.G.D. and Torrie, J.H. (1980) *Principles and Procedures of Statistics.* New York: McGraw-Hill Book Company

Stokes, J. and Sinason, V. (1992) Secondary mental handicap as a defence. In A. Waitman and S. Conboy-Hill (Eds.) *Psychotherapy and Mental Handicap.* London: SAGE Publications

Straatman, I., Hanson, E.K.S., Endenburg, N. & Mol, J.A. (1997) The influence of a dog on male students during a stressor. *Anthrozoös*, **10**(4), 191-197

Summer, L. (1997) Considering the future of music therapy. *The Arts in Psychotherapy*, **24**(1), 75-80

Szymanski, L. (1994) Mental retardation and mental health: concepts, aetiology and incidence. In: N. Bouras (Ed.) *Mental Health in Mental Retardation - recent advances and practices.* Cambridge University Press

Thompson, M., Kennedy, R.W. and Igou, S. (1983) Pets as socializing agents with chronic psychiatric patients: an initial study. In: A.H. Katcher and A.M. Beck (Eds.) *New Perspectives on our Lives with Companion Animals*. Philadelphia: University of Pennsylvania Press

Tinbergen, N. (1963) On aims and methods in ethology. *Zietschrift fur Tierpsychologie*, **20**, 410-433

Toolan, P.G. and Coleman, S.Y. (1994) Music therapy, a description of process: engagement and avoidance in five people with learning disabilities. *Journal of Intellectual Disability Research*, **38**, 433-444

van Leeuwen, J. (1981) A child psychiatrist's perspective on children and their companion animals. In: B. Fogle (Ed.) *Interrelations Between People and Pets*. Illinois: Charles C Thomas

Vilà, C., Savolaienen, P., Maldonado, J.E., Amorim, I.R., Rice, J.E., Honeycutt, R.L., Crandall, K.A., Lundeberg, J. and Wayne, R.K. (1997) Multiple and ancient origins of the domestic dog. *Science*, **276**(13 June), 1687-1689

Vines, G. (1993) Secret power of pets. *New Scientist*, **9 October**, 30-34

Voith, V.L. (1985) Attachment of people to companion animals. *The Veterinary Clinics of North America: Small Animal Practice*, **15**, 289-296

von Bertalanffy, L. (1950) The theory of open systems in physics and biology. *Science*, **3**, 25-29

Waltner-Toews, D. (1993) Zoonotic disease concerns in animal-assisted therapy and animal visitation programs. *Canadian Veterinary Journal*, **34**, 549-551

Warren, B. and Coaten, R. (1993) Dance: developing self-image and self-expression through movement. In: B. Warren (Ed.) *Using the Creative Arts in Therapy*. London: Routledge

Watson, J.B. and Rayner, R. (1920) Conditioned emotional reactions. *Journal of Experimental Psychology*, **3**, 1-14

Weiner, J. and Helbraun, E. (1985) Creative movement with a learning disabled child. *Journal of Reading, Writing, and Learning Disabilities International*, **1**(3), 34-44

Wiener, J. and Harris, P.J. (1997) Evaluation of an individualized, context-based social skills training program for children with learning disabilities. *Learning Disabilities Research and Practice*, **12**(1), 40-53

Wilkes, C.N., Shalko, T.K., Trahan, M. (1989) Pet Rx: implications for good health. *Health Education*, **20**(2), 6-9

Willoughby-Booth, S. (1991) Art therapy. In: W.I. Fraser, R.C. MacGillivray and A.M. Green (Eds.) *Hallas' Caring for People with Mental Handicaps* (Eighth edition). Oxford: Butterworth-Heinemann.

Wilsdon, J. (1992) Cerebral Palsy. In: A. Turner, M. Foster and S.E. Johnson (Eds.) *Occupational Therapy and Physical Dysfunction*. Edinburgh: Churchill Livingstone.

Wing, L. (1975) A study of language impairments in severely retarded children. In N. O'Connor (Ed.) *Language, Cognitive Deficits and Retardation*. London: Butterworth

Wing, L. (1981) Language, social, and cognitive impairments in autism and severe mental retardation. *Journal of Autism and Developmental Disorders*, **11**(1), 31-44

Wing, L. and Gould, J. (1978) Systematic recording of behaviors and skills of retarded and psychotic children. *Journal of Autism and Developmental Disorders*, **8**(1), 79-97

Winkler, A., Fairnie, H., Gericevich, F. and Long, M. (1989) The impact of a residential dog on an institution for the elderly: effects on perceptions and social interactions. *The Gerentologist*, **29**(2), 216-223

Winkley, L. (1995) New directions in play therapy. *British Journal of Psychiatry*, **167**, 132-135

Wolpe, J. (1958) *Psychotherapy by Reciprocal Inhibition*. California: Stanford University Press

World Health Organization (1993) *The ICD-10 Classification of Mental and Behavioural Disorders*. Geneva: World Health Organisation

Wright, J.C. & Moore, D. (1982) Comments on "Animal companions and one-year survival of patients after discharge". *Public Health Reports*, **97**, 380-381