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BEHAVIOR OF CHILDREN WITH LEARNING DISABILITIES INTERACTING WITH A THERAPY DOG

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ABSTRACT

Therapy using animals is now a widespread phenomenon, but some authorities have argued that there is insufficient evidence either to justify or to guide animal-assisted therapy. This reflects a paucity of adequate quantitative methodology for investigations in this area. The little research that has been carried out suggests that animal presence may increase general social behavior. Our study aimed to develop a methodology to investigate the effects of a dog on the behavior of children with severe learning disabilities. A repeated measures design was used to observe eight children with Down's syndrome in controlled sessions, under the direction of an adult. Each session consisted of seven minutes of interaction with a real dog, and seven minutes with an imitation dog. Differences in visual attending, and verbal and non-verbal initiation and response behaviors indicated that the real dog provided a more sustained focus for positive and co-operative interactions with itself and the adult, than did the imitation dog.

Key words: Animal-assisted activities; severe learning disabilities; observational techniques; therapy dogs; Down's syndrome.

INTRODUCTION

The use of domesticated animals in therapeutic situations is widespread, from simple ward visits (Carmack & Fila 1989) to more complex one-to-one therapy sessions (Levinson 1984). Mallon (1992) states that "in recent years there has been an increasing use of pets and farm animals in therapy for the emotionally ill, the mentally retarded, children and others who suffer from loneliness or isolation" (p.53). There are many reports of valuable behavioral changes resulting from animal presence, primarily with the elderly, such as increased and improved social interaction (e.g. Mugford & M'Comisky 1975; Brickel 1986). One might therefore expect to find a correspondingly widespread research base that underpins this use.

Various authors have suggested that animals - in particular, dogs - serve to encourage social interactions (Corson et al. 1977; Redefers & Goodman 1989; Nielsen & Delude 1989). Corson et al. (1977) present single case data

showing that withdrawn psychiatric patients became more communicative through what they termed 'pet facilitated psychotherapy.' Redefers and Goodman (1989) used a single case design in their observation of children with autism in a school environment. Each child's behavior during baseline, therapy and follow-up sessions was coded as being directed either towards themselves ('isolation') or towards the therapist or dog ('social interaction'). During the 'pet facilitated therapy,' social interaction behaviors increased significantly and isolation behaviors decreased significantly from baseline frequencies. The effect was weaker by follow-up, but Redefers and Goodman point out that maintenance of effects is especially difficult in therapies aimed at children with autism. They also argue that the therapist's orchestration of the sessions is crucial, and that simple exposure to an animal is an insufficient method for eliciting these behavior changes. Nielsen and Delude (1989) approached the area using a grouped design and a non-clinical sample. They found that real animals elicited more initiative behaviors in their preschool sample than toy animals, and conclude

that live animals, particularly dogs, act as social catalysts. Their intention was to investigate which species of animal proved the most effective catalyst for communication. The sessions were not led by an adult and the children were exposed to each animal no more than twice. It is interesting to see the rates of each type of initiative behavior measured (look at; approach; touch; talk to; talk about; embrace), and how they differ in the presence of each animal. Whether these initiation rates would generalize to a session where an adult is asking questions and setting tasks is unclear, but this was not their aim.

These studies suggest that dogs may serve to increase general social behaviors. A therapeutic tool which could elicit interactive behaviors from children is potentially very valuable. The research does not provide detailed guidance for the therapist who might want to use a dog to help a client achieve a particular task or goal other than to generally improve communication. Even then it is unclear whether this effect will generalize or persist (Redefer & Goodman 1989). Research should aim beyond general social behaviors and try to show more precisely which specific behaviors increase or decrease in the presence of a dog and a directive adult/ therapist. A knowledge of these particulars would provide a more detailed guide for precise therapeutic efforts.

It is not our intention to criticize the studies mentioned above, but it should be noted here that two literature reviews devoted to the phenomenon of Animal-Assisted Therapy (Beck & Katcher 1984; Mallon 1992) agree that there is insufficient high-quality research underpinning this area. Mallon's (1992) review is extensive, but found "relatively few substantive, quantitative studies" and "an abundance of ... case studies ... with no formal research design and no controls" (p.55). This lack of controlled, hypothesis-testing research is perhaps indicative of a need for more sophisticated research methods (Beck & Katcher 1984). Draper et al. (1990) found that "the lack of good research in the field was immediately apparent, especially in the development of satisfactory measuring instruments" (p.170), and recommended the use of videotape.

Another criticism presented by these reviewers was the lack of therapy construction and the absence of criteria for what constitutes a therapeutic gain. They found no clear distinction between therapy itself and recreation or animal presence. Draper et al. (1990) emphasize that the animal should not be seen as the therapist but as a prosthesis, and Mallon (1992) echoes this point stating that the animal is a therapeutic adjunct and not a therapist.

The study described in this paper

addresses the first criticism - the lack of suitable measuring instruments or methodology. It aimed to a) develop a methodology whereby an animal's effect on an individual's behaviors in a controlled situation could be properly measured, b) investigate whether a behavioral difference really is elicited by contact with a live animal and c) approach some understanding of what this difference is, should it be found.

Learning disabled children were observed in one-to-one sessions with an adult. Children with Down's syndrome were chosen since they form one of the more homogeneous groups within the learning disabilities category. These sessions were not intended to emulate any particular form of therapy except that they were one-to-one and guided by an adult who encouraged certain activities. It is assumed that this methodology will provide a foundation which can be adapted for further study.

A natural science paradigm was applied to control this situation and the children's behavior was observed in the presence of a live animal (here, a dog) and separately in the presence of an inanimate imitation of that animal. Although reports suggest that attention and social interaction may be important areas to observe, the lack of hard evidence meant that no decisions could be made beforehand about which specific behaviors were to be analysed. For this reason it was decided that sessions be videotaped and an ethogram be constructed to objectively describe the entire range of behaviors observed on these tapes. This would allow quantitative measurement and statistical analysis of the children's behavior, without limiting the range of behaviors being measured. A two-tailed hypothesis was formulated, stating that the children would behave differently dependent on whether the real dog or the imitation dog was present, but that the direction of this difference could not be predicted.

METHOD

Participants and Experimenters

Eight children with Down's syndrome, six girls and two boys, took part in the study. They were aged between seven and twelve years, and came from two classes of similar ability at a school for children with severe learning difficulties. They were an opportunity sample, not the ideal but the only practical choice in this situation. The experimenter brought the children to and from classes and operated recording equipment. She remained visible but uninvolved during the sessions. Another adult (a trained therapy-dog handler) guided the sessions.

Design

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 participant spending seven minutes in each condition, one immediately following the other. The independent variable was the test dog, whether real or imitation. Guidelines for each condition were identical and the handler behaved as similarly as she was able across conditions to limit effects as far as possible to the independent variable. A familiarization session was run a week before the six formal sessions began, so that each child could experience the situation without either of the dogs being present before observation proper was started. After this, sessions were held weekly over six weeks and participants who began with the real condition one week began with the imitation dog the next, and vice versa. This counterbalanced design, with repeated measures, controlled the effects of order and of systematic subject and extraneous variables such as habituation to or fear of dogs (only two participants had a dog at home) and background noise (inevitable in a school environment).

Setting and Apparatus

Sessions were run in a classroom with a low (0.8m high) L-shaped screen restricting the area in use (4.5m²). Sessions were recorded by a wide-angled surveillance camera and microphone connected to a video recorder. Two dogs were used, one a seven year old neutered male black Labrador Retriever, registered as a Pets as Therapy (PAT) dog (i.e. temperament tested and insured), and the other an imitation (toy) dog similar in size, colour and texture. The same accessories were available for the two dogs: collar, lead, brush, biscuits and a toy. As alternatives to interacting with the dogs, two toys were also provided for the children - a toy truck with moving parts, and a box of pop-up animals.

Procedure

The Experimenter brought participants one at a time from their class to the test area and presented them with the handler, the test dog (real or imitation) and the two toys. After seven minutes the handler would say that the dog was tired and the other dog wanted to come and say 'hello.' This was an attempt to have a natural changeover between conditions, one that the children could understand and accept. The handler was instructed to encourage the participant to perform certain activities involving the test dog (by saying for example, "Why don't you stroke

the dog?" or "Can you tell me what colour he is?"), but the participant was essentially free to choose who or what to interact with or whether to interact at all. The handler followed guidelines which graded these activities so that participants were introduced gradually to the test dog, in an investigative way. These guidelines also allowed the participants to choose for themselves what activities to perform with the test dog in the final two weeks. In practice, the handler used questions and suggestions to encourage the participant to attend to the test dog, but if the participant's interest in something other than the test dog persisted (using the criterion that three suggestions failed to switch the child's attention back to the test dog) then the handler would herself encourage activity involving the new object of the participant's interest. Once both conditions had been run, participants were returned to their class and the real dog was taken out of the test area for water and exercise.

Behavioral Data

An ethogram categorising and describing the range of behaviors elicited during the sessions was constructed from preliminary observations. Three general categories of behavior were distinguished: looking, responding to the adult and initiating. Responding and initiating could be either verbal (including sign language) or non-verbal.

The duration of looking and the frequencies of responding and initiating were measured in terms of the object at which they were directed. Looking and initiation behaviors were directed either at the test dog, the handler, the toys or 'other' (for example, directed at room fittings such as light switches, or undirected). Responding behaviors were all directed at the handler and were divided according to whether they concerned the test dog, or anything else (that is, the toys, other objects, or other people).

RESULTS

The measurements taken from each child in this manner were pooled and differences in grouped effects between conditions were analysed using repeated-measures analysis of variance.

Looking

The children directed their gaze at the dog (whether real or imitation) for longer than at any other object (Table 1, column 1), as a result of the handler constantly 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. In the imitation condition, the children

TABLE 1.

Gaze directed towards (durations), and initiations towards (frequencies), dog/handler/toys/other, under the two conditions (All expressed as Least Squares Means per session)						
	Looking towards (seconds)		Non-verbal initiations (freq.)		Verbal Initiations (freq.)	
	Real	Imitation	Real	Imitation	Real	Imitation
Test dog	302.5**	211.8	6.6	6.3	11.1**	2.5
Handler	67.8	87.2*	0.9	0.6	14.5	13.8
Toys	3.8	41.8**	0.5	2.3**	0.02	0.04
Other	42.4	69.6*	0.5	1.9**	0.02	1.2**

* $F_{(1,7)} > 5.59$, $n = 8$, $p < 0.05$ ** $F_{(1,7)} > 12.25$, $n = 8$, $p < 0.01$ *** $F_{(1,7)} > 29.245$, $n = 8$, $p < 0.001$
in comparisons between real and imitation conditions (2-tailed, repeated-measures ANOVA)

TABLE 2.

Mean frequencies of responses and initiations directed towards the handler, concerning either the test dog or other (All expressed as Least Squares Means)								
No response to the handler could not be reliably divided according to topic.								
	Non-verbal response to handler		Verbal response to handler		Verbal initiations to handler		No response to handler	
	Real	Imitation	Real	Imitation	Real	Imitation	Real	Imitation
Test dog	14.5***	5.6	32.5	29.7	10.2**	5.6	5.2	10.6*
Other	0.5	0.4	1.1	6.6**	0.7	6.7**		

* $F_{(1,7)} > 5.59$, $n = 8$, $p < 0.05$ ** $F_{(1,7)} > 12.25$, $n = 8$, $p < 0.01$ *** $F_{(1,7)} > 29.245$, $n = 8$, $p < 0.001$
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directed their gaze at the adult, the toys and at other for significantly longer than they did in the real dog condition. The real dog was a significantly more focal object than the imitation dog.

Responses to the Handler

The children ignored the adult significantly more frequently in the imitation than the real condition (Table 2, column 4). Non-verbal responses to suggestions concerning the test dog (for example, stroking, brushing or fetching the lead when asked to) were significantly more frequent in the real condition, while there were similar frequencies between conditions of non-verbal responding concerning other suggestions (Table 2, column 1). The frequency of verbal responses concerning the test dog (to questions such as “how many legs does it have?”) was also similar across conditions, though verbal responses which concerned other items were significantly more frequent in the imitation condition (Table 2, column 2).

The children’s response or lack of one was recorded each time the handler encouraged or made a suggestion, so these data also pro-

vide the mean frequency of all suggestions and encouragement given by the adult in each condition. The mean total in the real condition was 53.8, and in the imitation 52.9. Therefore, the handler had been successful in standardizing at least this aspect of her behavior between the two conditions.

The verbal responses could be further subdivided according to whether their content was positive or negative. A positive verbal response was defined as being appropriate to the situation and/or expressing interest or enthusiasm. Negative verbal responses were defined as being inappropriate (when it was known, from other observations, that the child was capable of responding correctly) and/or expressive of disinterest or a lack of enthusiasm. Verbal initiations were similarly divided, but the incidence of negative verbal initiations (a group mean of less than one per session) was too low to merit this distinction. When the handler’s questions and suggestions concerned the real dog, the children responded positively to her significantly more often (Table 3, column 1).

TABLE 3.

Mean frequencies of verbal responses to handler, subdivided by quality
(All expressed as Least Squares Means)

	Positive		Negative	
	Real	Imitation	Real	Imitation
Test dog	27.2**	20.6	1.4	4.4*
Other	0.8	4.2*	0.2	1.5

Some figures in Table 3 are smaller than the corresponding totals in Table 2, due to indistinguishable verbalizations that could not be coded into these subdivisions.

Negative verbal responses concerning the test dog were significantly more frequent in the imitation condition (Table 3, column 2). It should be noted that positive responses far exceed negative responses in both conditions. Interestingly, those verbal responses which concerned other were significantly more likely to occur in the imitation condition (as the children have directed the session towards other) and these were primarily positive.

In summary, the children were less likely to ignore the adult in the real condition and they responded non-verbally more often when the adult's suggestions concerned the real dog. They responded verbally as often in either condition and these responses were more likely to be co-operative when concerning the real dog.

Initiations

There was no significant difference between conditions in the frequency of non-verbal initiations to the test dog or to the adult, but toys and other elicited significantly more non-verbal initiations in the imitation condition (Table 1, column 2).

There were significantly more verbal initiations to the test dog in the real condition and significantly more to other in the imitation condition. The toys elicited very few verbal initiations, but the handler elicited a large number, similar in both conditions. Where these verbal initiations to the handler were about the test dog, they were significantly more frequent in the real condition. Those that were about other were significantly more frequent in the imitation condition (Table 2, column 4).

In summary, the children directed their initiations away from the imitation dog towards toys or other, but towards the real dog away from toys or other. A quantitative similarity in initiations towards the adult contains a qualitative difference with the real dog being the subject of these initiations significantly more frequently.

DISCUSSION

Many of the children's behaviors differed significantly between the sessions with the real dog and an identical situation where the dog was inanimate, so the null hypothesis can be rejected. The children were both more attentive to the real dog, and more responsive to the adult in the real dog's presence. This increased response was more likely to be co-operative when the real dog was present. The handler received similar frequencies of verbal and non-verbal initiations between conditions, but the real dog encouraged significantly more initiative behavior towards and about itself than the imitation dog. In the presence of the imitation dog, the children directed their initiations away from the task in hand more often, towards other things in the experimental environment. The only difference between the two dogs was their 'animatedness' and these results show that a soft and fluffy toy dog will not elicit the same behaviors as a real dog, which will move, vocalize, approach and respond to the children. The real dog appeared to provide a more positive and sustained focus of interest for interactions over the six weeks.

These results enlarge on earlier findings. Nielsen and Delude (1989) found that children talked to and talked about a real dog more often than a toy dog. Both these findings are supported in the present study, but it is important to note that in total, the number of verbal initiations to the handler was in fact similar between conditions. Although the real dog in our study did not increase the total number of verbal initiations to the adult, it did encourage positive interactions and focused the children's attention on the activity; the children were less often distracted by, for example, other objects or noises outside the room.

Redefer and Goodman (1989) found significantly more social interaction behaviors in their dog sessions as opposed to baseline, but they combined verbal and non-verbal behaviors directed at either the dog or the therapist, which may have been responses or initiations. The findings presented here suggest that while these behaviors may increase when considered all together, the individual behaviors may not all follow the same pattern. For example, although there were more non-verbal responses to the handler about the real dog, the number of verbal responses to the handler about both dogs were similar.

Some authors have offered explanations for these effects. Corson et al. (1977) suggest that the 'increased communication' may be due to withdrawn individuals feeling more secure with a submissive animal than they would when

alone with a clinician. Redefer and Goodman (1989) point to the simple, repetitive and non-verbal nature of a dog's behavior, which is at the same time easy to decode but also demanding. They add that a dog may focus attention on itself by virtue of providing multisensory stimulation, a hypothesis borne out in this study. Here the real dog's animatedness appears to be the active component.

It was mentioned earlier that research in this area has been hampered by the lack of an appropriate investigative method. These results show that using videotape and ethograms to describe and then analyse the behaviors observed in a repeated measures design is a productive way of teasing out the behavioral effects elicited by a real dog. The method used was practical, though time-consuming, and the behaviors were obvious and easily coded and recorded. A similar method could be applied to any one-to-one interaction where the effects of an animal (or any other tool) need to be studied; it is recommended that formal therapeutic sessions be analysed in this way. A single case design may be more suitable, but can be used without altering the efficacy of this form of analysis. For research aimed at measuring effects on certain target behaviors, a less exhaustive and more sensitive ethogram

could be designed. Ethograms covering group behaviors and interactions would aid investigation of educational or classroom uses for animals.

The setting and repeated measures design ensured that this investigation was conducted in as near to laboratory conditions as was possible in a school environment. However, one confounding variable which may have affected the children's behavior, was the behavior of the handler. The instructions and guidelines given to the adult controlled her behavior between conditions, and a comparison of means showed that her behavior 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. Therefore any qualitative difference in her behavior between the two conditions was a direct result of a difference in the children's own behavior and therefore did not constitute a loss in control.

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REFERENCES

- Beck, A.M. and Katcher, A.H. 1984. A new look at pet-facilitated therapy. *Journal of American Veterinary Medical Association* 184(4): 414-421.
- Brickel, C.M. 1986. Pet-facilitated therapies - a review of the literature and clinical implementation considerations. *Clinical Gerontologist* 5(3/4): 309-332.
- Carmack, B.J. and Fila, D. 1989. Animal-assisted therapy: a nursing intervention. *Nursing Management* 20(5): 96-101.
- 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.
- Draper, R.J., Gerber, G.J. and Layng, E.M. 1990. Defining the role of pet animals in psychotherapy. *Psychiatric Journal of the University of Ottawa* 15(3): 169-172.
- Levinson, B.M. 1984. Human/companion animal therapy. *Journal of Contemporary Psychotherapy* 14: 131-144.
- 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.
- Mugford, R.A. and M'Comisky, J.G. 1975. Some recent work on the psychotherapeutic value of cage birds with old people. In *Pet Animals and Society*, 54-65, ed. R.S. Anderson. London: Cassell.
- 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.
- 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.