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The Effects Of The Presence Of A Dog On The Social Interactions Of Children With Developmental Disabilities

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The Effects Of The Presence Of A Dog On The Social Interactions Of Children With

Developmental Disabilities

by

Stephanie Walters

A thesis submitted in partial fulfillment
of the requirements for the degree of
Master of Arts in Applied Behavior Analysis
College of Graduate Studies
University of South Florida

Major Professor: Trevor Stokes, Ph.D.
Jennifer Austin, Ph.D.
Holly Steele, Ph.D.

Date of Approval:
March 4, 2005

Acknowledgements

I wish to thank my committee for their support and encouragement throughout this process. Dr. Austin, thank you for your commitment to the students and to seeing us through to the completion of our studies. Your loyalty is to be commended. Dr. Steele, you have been remarkable in your encouragement and support. Thank you for making me laugh and being a calming presence throughout this process. I am honored to have met you. Dr. Stokes, you have been a teacher, a mentor and a friend throughout my studies and especially in writing this thesis. Your encouragement has seen me through many days when I have wanted to give up. Your calming presence and firm responses kept me motivated and committed. You never let me quit. You are an inspiration. Thank you. I would also like to thank Dawn Gonzalez, Jennifer Lotti, Dawn Calder and Arrow for making this thesis a reality.

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The Effects of the Presence of a Dog on the Social Interactions

of Children with Developmental Disabilities

Stephanie Walters

ABSTRACT

The effects of the presence of a dog on the social interactions between children with developmental disabilities and their teacher were analyzed in this study. We examined whether the presentation of a dog would improve the social interactions of three children with developmental disabilities. A baseline condition consisting of the child and teacher in the presence of three toys, one of which was a toy dog was followed by an intervention in which a real dog was added to the sessions. A multiple baseline design across participants was employed to assess experimental changes in interactions during the intervention condition.

All participants demonstrated an increase in overall positive initiated behaviors (verbal and non-verbal), positive initiated interactions toward the teacher (verbal and non-verbal) and positive initiated interactions toward the dog (verbal and non-verbal). The children also showed an overall decrease in negative initiated behaviors (verbal and non-verbal). Two of the three participants demonstrated a decrease in negative initiated interactions toward their teacher (verbal and non-verbal), while with one participant there was a slight increase in negative non-verbal interactions toward the teacher. All three children showed slight increases in negative initiated non-verbal interactions with the dog while negative initiated verbal interactions toward the dog remained the same.

Chapter One

Introduction

Dogs are versatile creatures. They are workers bred to perform many duties such as hunting, herding, protecting livestock and property, and hauling sleds. Through the years, the work that dogs are bred to do has become more refined. Dogs are now trained to sniff out drugs, bombs and other scents for the K-9 police force, have been used in search and rescue efforts both at sea and on land, and more recently, have been trained as companion animals for people with disabilities. They have been trained as seeing-eye dogs for people with visual impairments (Naderi, Miklosi, Doka & Csanyi, 2001) and signal dogs for people with hearing impairments (Hart, Zasloft & Benfatto, 1996). They have also been trained as seizure-alert dogs and to assist people with physical disabilities with aspects of their daily lives including retrieving items, switching lights on and off, and taking off shoes and socks (Lane, McNicholas & Collis, 1998).

For years dog owners have claimed their pets have healing power. Although this is highly subjective, a trend has been developing toward using dogs as 'therapy' for the elderly and people with disabilities. Having people participate in service dog training programs have become an avenue of providing therapy for emotionally disabled children and prison inmates (Law & Scott, 1995; Walsh & Mertin, 1994).

The effects of the presence of animals as adjuncts to therapy are a growing area of research. Many therapists believe that animal-assisted therapy (AAT) helps build rapport quickly, especially with children with emotional difficulties. The media has published

articles concerning the training of service dogs by delinquent children (e.g., Stacy, 2003) as well as incarcerated adults (Walsh & Mertin, 1994). Populations reported to have experienced the positive effects of animals in therapeutic situations include children (Hansen, Messinger, Baun & Megel, 1999), individuals with physical (Eddy, Hart & Boltz, 1987), emotional (Kaminski, Pellino & Wish, 2002) or psychiatric impairments (Marr, French, Thompson, Drum, Greening, Mormon, Henderson & Hughes, 2000), individuals with developmental disabilities (Limond, Bradshaw & Cormack, 1997) or pervasive developmental disorders (Martin & Farnum, 2002), the elderly (Crowley-Robinson, Fenwick & Blackshaw, 1996), (Fick, 1993), delinquent children(Stacy, 2003) , victims of abuse (Williams, 2003), adults with substance abuse (Marr, et. al., 2000) and prisoners (Walsh & Mertin, 1994).

In most of these cases, positive effects have been reported. However, there are few quantitative studies to support AAT. The published literature includes case studies that are primarily subjective testimonials with few formal research designs or controls in place. The literature at present has focused primarily on the benefits of animals on human health.

Physiological Effects

Several studies have been conducted to demonstrate the physiological effects of animals on people. Eighteen humans and eighteen dogs participated in a study conducted by Odendaal (2000). The purpose of this study was to examine the physiological basis for affiliation behavior (behavior that is mutually beneficial) between humans and dogs. Odendaal measured the mean arterial blood pressure and six neurochemicals related to blood pressure (endorphin, oxytocin, prolactin, phenylethylamine, dopamine and cortisol)

before and after conditions of interactions and quiet book reading. Participants were divided into two groups: pet owners and their dogs in an experimental group and individuals with unfamiliar dogs in a control group. In the interaction-with-dog condition, all of the neurochemicals increased significantly ($p<.05$) except cortisol, with both the humans and the dog participants. These neurochemicals are associated with positive affiliation behavior. Therefore the human and dog participants increase in affiliation behavior was indicated by the neurochemical changes. According to Odendaal's report, both the human and the dog participants showed deceased cortisol. The report does assert a significant decrease for humans, although no significance level was noted, whereas for dogs the decrease was not significant ($p=.30$).

The only significant difference between the experimental and control groups in the baseline and interacting-with-a-dog condition was in the level of oxytocin, which was higher in the experimental group ($p<.01$) in which the participants interacted with their own dogs. Oxytocin has been used as an indicator of bsocial attachment in members of the same species. Thus oxytocin can also be associated with measures of social attachment between species as demonstrated by the experimental group interacting with a familiar dog.

Increases in endorphin ($p<.10$), oxytocin ($p<.01$), and prolactin ($p<.01$) were higher during the dog interaction condition versus the reading quietly conditions with no significant changes in other neurochemical levels. Changes in endorphin, oxytocin and prolactin are correlated with social bonding neurochemical changes. Results also indicated that a significant decrease in blood pressure for humans and dogs was achieved

in 5-24 minutes of positive interactions with dogs as well as changes in neurochemical plasma levels that are associated with attachment.

A repeated measures study was conducted by Wilson (1987), who examined the cardiovascular responses of college students to a dog. Ninety-two undergraduate students ages 18-39 participated in this study. Heart rate, blood pressure (systolic and diastolic), and mean arterial pressures were measured before or during three test conditions: reading alone, reading out loud, and petting an unfamiliar dog. Anxiety as assessed as state anxiety (how the participant feels right now) and trait anxiety (how the participant generally feels) were measured following each session using the Spielberger Self-Evaluation Questionnaires. Each session was 10 minutes long and was preceded by a 10 minute adaptation baseline period in which the participant sat quietly and did not talk, read or interact. Each participant was randomly assigned to one of six orders of the sessions so that treatment order was not the same for all of the participants.

Analysis of variance indicated significant differences in treatment effect (p<.001) in all three conditions. The results of this study indicated that interacting with the dog and reading quietly decreased the physiological and psychological responses of the students from pre-session baseline measures (p<.001). Reading aloud was elevated above baseline for heart rate and blood pressure (systolic and diastolic) (p<.0005). Trait anxiety showed no significant difference between conditions. State anxiety level was significantly different from baseline under all conditions except petting an unfamiliar dog (p=.937).

A possible confounding variable to this study includes the following: in the third condition, petting the dog, some participants did talk to the dog which may account for

some elevation in the blood pressure measures. However, since all of the participants

spoke to the dog in that condition the differences should be constant.

Hansen, et al. (1999) conducted a repeated measures study of 34 two-to-six year

old children obtaining physical examinations in a pediatric outpatient clinic. Children did

not share a common diagnosis. The children were randomly assigned to one of two

groups. The experimental group contained the presence of a dog during the physical

examination and the control group did not have a dog present during the physical

examination. Physiological symptoms were measured during the physical examination.

It was hypothesized that the physical examination would be stressful to the children and

the presence of the dog would moderate that distress by being a distraction to the child

because dogs initiate and facilitate interactions which children may consider to be

'friendly'.

Physiological symptoms measured were blood pressure (systolic and diastolic),

mean arterial pressures, heart rate and finger tip temperature. The participants were also

video taped during the examination and the Observation Scale of Behavioral Distress

(OSBD) was used to determine the presence of behaviors indicating distress. These

behaviors included information-seeking (asking questions), crying, screaming, physical

resistance, verbal resistance, verbal pain (reports of actual or anticipated pain or

discomfort) and flailing (arms, legs or body).

Baseline data were taken prior to the examination and at 2 minute intervals

throughout the examination process. No significant differences were found in either

demographic variables or in the presence of a dog in the home between the experimental

and control groups. There was also no statistically significant difference between groups

in measures of systolic, diastolic or mean arterial blood pressures, heart rate or finger tip temperature at baseline or during the examinations.

Behavioral indicators of distress were measured at baseline and throughout the examination and were apparent in both groups. These behaviors increased in frequency over time in both groups. Participants in the groups in which the dog was present exhibited fewer behaviors indicating distress overall, scoring lower on the OSBD (p=0.034). There was no statistically significant difference between the groups at baseline. Therefore, although the presence of the dog did not significantly impact physiological indicators of distress, behavioral indicators of distress were lower in the presence of the dog. This study indicates that the presence of a dog in medical/clinical settings may alleviate distress in children, allowing more thorough examinations and more accurate diagnoses.

Psychological Effects

How play therapy and pet therapy affect hospitalized children were examined by Kaminski et al. (2002). Seventy children with a mean age of 9.86 and who were diagnosed with chronic medical disorders participated in this study. The children were divided into two groups: play therapy group and a pet therapy group. Play therapy consisted of developmentally appropriate play opportunities in the hospital playroom. The pet therapy consisted of the presence of a visiting dog in the sessions to interact with the child. The dependent variables included ratings on a mood rating scale completed by the patient as well as a separate mood rating scale completed by the parent/caregiver of the child. These mood rating scales included questions about feeling "happy, lonely, sad, worried, bored, (feel) like crying and (feel) like playing with other kids" (Kaminski et al.,

2002, p. 325). The children were also asked to identify what they were feeling using a

"faces" chart of facial expressions. The mood rating scale done by the parent/caregiver

contained the following four items: happy, scared, lonely and relaxed. On all three mood

rating scales, the higher the score, the more positive the mood or condition of the child.

At the beginning of each session, the children were videotaped for approximately

2 minutes and again at 10 minutes and 20 minutes into the session. The videotapes were

reviewed and the children were assessed for positive affect, negative affect, anxious-

fearful affect, neutral affect, touch-physical contact and persistence-on task. All of these

behaviors were operationally defined and a coding system was developed. The

percentage of the videotaped time a child engaged in one of the above behaviors

(indicators of affect were behaviorally defined) was analyzed. Physiological indicators

were also measured. These included salivary cortisol measures (a steroid associated with

increased adrenocorticol responses and stress), heart rate and blood pressure, all of which

showed positive improvements.

According to parent/caregiver ratings, children were reported to be happier after

pet and play therapy. The pet therapy group was reported to be happier than the play

group after therapy ($p<.001$). Children in the pet therapy group also displayed

significantly more positive affect and touching than the play therapy group ($p<.05$).

Heart rate was higher in the pet therapy group after therapy. The salivary cortisol levels

were similar in both groups prior to therapy and decreased in both groups after therapy.

The results are from only a portion of the samples of saliva taken due to the evaporation

of some samples. The results of the salivary cortisol measure were not statistically

significant.

Unfortunately, this study was not tightly controlled in some areas. For example, the children did not always begin their sessions immediately following the initial measurements. Therefore, other factors preceding the sessions could account for the changes observed.

Overall, the play and pet therapy were reported as a positive experience for the child by the parents/caregivers. Introducing play and/or pets into a treatment setting such as a hospital will helped promote "normalcy" for the children as well as provide them with opportunities to participate in activities that were likely to decrease boredom and loneliness associated with long stays in the hospital.

Marr et al. (2000) conducted a study on the effects of animal assisted therapy on the pro-social behaviors of 69 adults diagnosed with a mental illness and at risk for substance abuse in an inpatient psychiatric facility. A repeated measures analysis of variance design was used to evaluate mean weekly scores on the Social Behavior Scale (SBS, Perelle & Granville, 1993). Participants were randomly assigned to two groups. Group therapy consisted of substance abuse education. The content of the training was identical for both groups with the exception of the presence of animals in the room for the AAT group. The Social Behavior Scale was used for baseline and ongoing measurement. Some of the items measured were socialization, helpfulness, cooperativeness, activeness, response to surroundings, sociable with others, likely to interact with other patients, smiling and other indications of pleasure. By the fourth week of group sessions, the AAT group was found to interact more with other patients ($p=0.022$), to be more active ($p=0.04$), responsive to their surroundings ($p=0.03$), more sociable with others ($p=0.05$),

more helpful (p=0.04), likely to interact with other patients (p=0.008) and were more likely to smile or indicate pleasure (p=0.003) than the control group.

Social Effects

The beneficial effects of animals on individuals with developmental disabilities/mental retardation and physical disabilities also have been noted in the literature. Specifically noted were the effects of social interactions between individuals with disabilities and a therapist, as well as the interactions of the public toward individuals with disabilities (Eddy et al., 1987; Hart et al., 1987; Lane et al., 1998; Mader, Hart & Bergin, 1989; Martin & Farnum, 2002).

Eddy et al. (1987) published a study in which the frequency of social acknowledgement including smiles, conversation, and touch toward individuals with physical impairments (participants using wheelchairs) and toward people who were ambulatory was examined. The person in the wheelchair was followed by an observer who then recorded the following behaviors of the passersby: smiles, touch, conversation, gaze aversion, path avoidance, or no response. The passerby's responses to the dog were recorded separately than those directed toward the individual in the wheelchair. The behaviors of the passerby toward the participants with physical impairments were recorded for those participants with a service dog and those without a service dog. The results indicated that smiles and conversations from passersby increased in the presence of the service dog. This study suggests that social recognition and acceptance for individuals with physical impairments can be improved with the presence of service animals in social settings.

Social interactions among strangers have also been examined to determine the effects of animals on increasing social interactions. The role of small animals on increasing social interactions among strangers was examined by Hunt, Hart and Gomulkiewicz (1991). A woman serving as a confederate sat in a park reading and taking notes. There were four conditions to the study: the woman with one of the following for each condition: a rabbit, a turtle, a small portable television set that was playing and a bottle of bubbles. The occurrence of smiles, conversation or touching by individuals approaching within 1.5m was recorded for each condition. The individuals were categorized as either adults or children based on appearance. Observations were recorded for a total of 6 hours in each condition (1 hour sessions).

The results indicated that the adults approached the rabbit significantly more than any other stimulus ($p<.004$) and children were significantly more likely to approach the bubbles ($p=.002$) than any other stimuli. Children were also significantly more likely to touch the stimuli ($p=.016$) than the adults and the adults were more likely to smile ($p<.001$) and converse ($p<.001$) than the children.

A similar study was conducted by McNicholas and Collis (2000) to determine if the presence of a dog increased social interactions between strangers. The study included a baseline condition of interactions without the presence of a dog and two conditions, one in which a neatly dressed male walked a dog in a public area and one in which a scruffily dressed male walked a dog in a public area. The results of the study indicated that there were more interactions between strangers in the presence of a dog than without a dog. The results also indicated that the interactions were higher with the neatly dressed male than with the scruffily dressed male and the interactions in both conditions were

significantly higher than without the presence of a dog. These results suggest that the presence of a dog may increase social interactions in the scruffily and the neatly dressed.

The effect animals have on the social lives of humans is perhaps one of the more widely researched areas of animal assisted therapy. Many pet owners acknowledge changes in their social lives resulting from owning a pet. These changes can include increased social contact with strangers, increased activity resulting from taking their pets out and an extension in their network of support from other pet owners. Pet owners often congregate in dog parks, dog beaches, pet shops and at specialized 'doggie' events.

In a retrospective study of 19 people with service dogs utilizing wheelchairs, Hart et al., (1987) found that the participants reported that when the service dog was present, social greetings from strangers (adult and child) increased. Hart et al. (1987) found that the participants were approached significantly more often when the dog was present than when the dog was not present on a typical trip downtown (p<0.01). The social behavior of the participants also increased with 11 of 19 participants reporting more frequent outings (without an attendant) into the community since obtaining a service dog.

The role of service dogs for people with disabilities often has a combined benefit of assisting in social integration, acknowledgement or acceptance among society. Lane et al., (1998) studied the benefits of service dogs for 57 subjects receiving service dogs from the Dogs for the Disabled organization. Participants answered a questionnaire assessing the perceived changes in their lifestyle and well-being following receiving a service dog. The dog's role as a social facilitator, provider of an affectionate relationship, an emotional and esteem supporter and as an influence on perceived health was assessed through the questionnaire. The results indicated that 92% of the participants reported that

people frequently stopped to talk with them when they were out with their dogs. Seventy-five percent of the participants reported that since obtaining a service dog they had made new friends, and over one third of the participants reported having an overall improvement in their social lives as a result of the service dog.

Children with disabilities are not often the recipients of service dogs and often receive less social acknowledgement than adults (Mader et al., 1989). Mader et al. (1989) conducted a study of five children in the California school system with service dogs. The children's age ranged from 10-15 years old. A control group of 5 children of similar age, race and degree of disability was selected. The frequency of social acknowledgement, defined as friendly glances, smiles and conversations was noted in a school setting and in a shopping mall. The results of this study indicated that children with service dogs received significantly more looks and conversations from passersby and conversations were longer in duration than the children without the service dogs in the school setting and in the public setting. These results support the hypothesis that service dogs facilitate social acknowledgement for children with disabilities (Mader et al., 1989).

Martin and Farnum (2002) used a within participants repeated measures design to measure pro-social interactions (behaviors that indicated interest and engagement with the environment) and nonsocial interactions (behaviors such as hand flapping and ignoring questions) during three conditions: with a ball, with a stuffed dog toy and in the presence of a live dog. Therapy sessions occurred three times a week and lasted 15 minutes each. During the therapy sessions, the child was presented with the toy ball, the stuffed dog or the real dog and the therapist. The therapist followed a predetermined

protocol designed to elicit pro-social behaviors. The protocol was based on questions having to do with the independent variable. Ten children diagnosed with pervasive developmental disorder ranging from the age of 3 to 13 participated in the study.

According to this study, the children who were exposed to a real dog were more focused (duration of looking p<.017) and aware (looking at object, therapist or dog) (p<.001) of their environments and displayed a more playful mood (indicated by laughing p<.025, giving treats p<.001, and hand-flapping p<.005) when in the presence of a therapy dog. Children were also more likely to talk to the dog (p<.001) or about the dog (p<.001) when in the presence of the dog. One area of contradiction to the hypothesis within this study is the evidence that children responded with less detailed explanations (p<.001) and were less likely to initiate conversations about themselves (p<.017) or the therapist (p<.001) in the presence of the dog (Martin and Farnum, 2002). Also, hand-flapping was included in Martin and Farnum's description of a non-social behavior however in their discussion of the results of their study they refer to it as a pro-social behavior.

Most significant to the current study is the research by Limond et al., (1997) in which eight children ranging in age from 7 to 12 and diagnosed with Down syndrome participated in a study to determine the effects of the presence of a dog on the behavior of children with developmental disabilities. Because of the lack of adequate quantitative methodological studies, this study also sought to develop procedures for assessing the effects of an animal's presence on an individual's behavior with controls in place in the environment.

A repeated measures design with two conditions was utilized. The conditions consisted of the handler and an imitation dog similar in size, color and texture to the live dog and two toys in the first condition and the handler and a real dog (a 7 year old male black Labrador Retriever) in the second condition. Each session contained both conditions and was a total of 14 minutes each. The children were initially exposed to one condition for 7 minutes, followed by the second condition for another 7 minutes. In each condition the handler encouraged the child to perform activities involving the test dog (real or imitation) but the child was free to interact in any way with the dog, the toys or the handler. The conditions were alternated weekly to control for effects of order and habituation to or fear of dogs.

The behaviors of interest in this study were the duration of time spent in looking toward the therapist, dog, toys or other objects; the frequency of verbal and non-verbal initiations and the frequency of verbal and non-verbal responses toward the therapist, dog, toys or other objects.

The results of this study indicated that the children directed their gaze at the real dog for a significantly longer duration than they did to the therapist, imitation dog and toys, or other objects in the room. The children did not respond to the therapist as often in the imitation condition as the real dog condition, with a statistical difference of $p < 0.05$. Non-verbal responses to suggestions concerning the dog were more frequent in the real dog condition ($p < 0.05$), however the frequency of nonverbal responses to suggestions about items other than the dog were similar in both conditions. The frequency of verbal responses concerning the dog (real or imitation) was similar across both conditions but

there was a statistically significant increase in the verbal responses to items other than the dog in the imitation dog condition.

Verbal responses were categorized as either positive or negative. Positive verbal responses were defined as those that were appropriate to the situation and/or expressed interest or enthusiasm, whereas negative verbal responses were defined as being inappropriate and/or expressing disinterest or a lack of enthusiasm. The children responded positively with significantly greater frequency to questions concerning the test dog in the real dog condition and negative verbal responses concerning the test dog were significantly more frequent in the imitation condition. These results indicated that the children responded non-verbally more often and more positively in the real dog condition. Initiations were similar in frequency in both conditions but toys and other objects (room fixtures such as light switches, or items found in the room other than those selected for the study) elicited significantly more non verbal initiations than the test dog or therapist in the imitation dog condition. There were significantly more verbal initiations to the test dog in the real dog condition and significantly more verbal initiations to other objects in the imitation condition.

While the Limond et al. study noted the effects of the presence of a dog on the frequency and quality of interactions, the quality of those interactions was considered to be either positive or negative based on the verbal behavior of the child. Non-verbal responses were not subdivided into either positive or negative interactions.

The Present Study

In summary, research regarding the effects of dogs on people shows that social interactions, psychological well being, and physiological reactions are affected by the

presence of dogs and therapeutic interactions with dogs. Most research is characterized as anecdotal and qualitative methodologies devoid of objective data within non-experimentally controlled designs.

The purpose of the present study was to more objectively assess the effects of the presence of a dog on the positive and negative social responsiveness (both verbal and non-verbal) of children with developmental disabilities. In addition, the research was conducted within a systematic single case experimental design with replicated effects across participants.

Chapter Two

Method

Participants

Three children between the ages of 5-9 in an Exceptional Student Education (ESE) kindergarten through second grade classroom of a public elementary school were identified for this study. The children in this group were all diagnosed as having mental retardation. The participants consisted of two males and one female. Two of the three children, Kirsten and Georgie were also diagnosed with Down syndrome. The other boy, Owen was diagnosed as hearing impaired. Each child displayed the ability to communicate using one word verbalizations. Two children displayed the ability to use short 2-3 word sentences. All three children either own a dog or have a relative or friend with a dog that they see regularly. Criteria for inclusion were: a diagnosis of mental retardation, placement in a special education class, between the ages of 5-9 years old, and the ability to communicate using a minimum of one word utterances. Criteria for exclusion in this study included allergies to or fear of animals/dogs. After the participants were nominated by their teacher, written informed consent was obtained from the parents/guardians of the participants prior to conducting this study consistent with approval from the Institutional Review Board and the Pinellas County Schools. Parents also were asked whether their children have a dog at home and the extent to which the children had experience interacting with dogs.

Setting

This study was conducted in a public elementary school. The sessions were located in a room adjoining the participant's ESE classroom. The children were allowed to have access to that room prior to the study beginning to control for possible confounds due to a novel environment. The door was left open for the children to wander through throughout the school day. Children also used the room for one to one academic sessions with the teacher as well as to use the cot when ill. The room was approximately 6 x 2.75 meters with three side by side windows. The room contained a cot, two file cabinets, two storage cabinets, shelves containing books and educational materials on three of the walls, a small refrigerator, a microwave, a counter that contained drawers and had a computer and printer on it, one office chair, one children's chair and various toys located in the far corner of the room. Items were placed out of arms reach of the child when possible and items the children might find interesting or distracting were removed or covered with white paper during the sessions, when possible.

A video camera was set up on one of the book shelves facing the child and teacher. It was turned on before the child entered the room and turned off after the child left the room. The child and teacher sat on the floor, across from each other, and with the child facing the camera. The camera was concealed amongst other items on the shelf and had a cloth draped over it to decrease reactivity to being videotaped.

Dependent Variables and Measurement

The social behaviors of the participants served as the dependent measures in this study. Behaviors were categorized as positive or negative, verbal or non-verbal. Positive verbal statements were defined as those utterances indicating pleasure or interest in the

situation (e.g., "that was fun", "I like it", "more", "can I stay?", "I love the dog". et cetera) or requests for help (e.g., help opening bag containing dog treat). Negative verbal statements were defined as those utterances indicating displeasure or disinterest in the situation (e.g., "This sucks", "I hate this", "Can I leave?", "I hate the dog", "Get me out of here" et cetera). Verbal refusals to participate in the session also were scored as negative verbal statements (e.g., "I don't want to", "No", "no more", et cetera).

Positive nonverbal behaviors were defined as those behaviors indicating pleasure or interest in the situation (e.g., smiling, laughing, touching the dog by petting, hugging or kissing, et cetera.), clapping hands, nodding head, complying with a request non-verbally, blowing kisses and social agreement "uh-huh", sharing or handing things to the teacher, throwing/handing treats to the dog, holding the leash or walking the dog, et cetera. Negative nonverbal behaviors were defined as those behaviors indicating displeasure or disinterest in the situation (e.g., turning body or face away from the teacher, crying, frowning (corners of lips turned down), hiding face, attempts to leave the room, physical aggression, property destruction (throwing things, knocking things off shelves/table, playing with computer if these actions would cause damage if uninterrupted) or no response to dog-related questions or task suggestions).

Interactions were further assessed as either child-initiated responses toward the teacher or the dog (e.g., child responded independently without prompting) or teacher-prompted responses toward the teacher or the dog (e.g., child responded to a request to perform a task with the dog or answered a question when asked).

Data Collection and Interobserver Reliability

Each child participated in 8-minute sessions 5 days per week with the teacher. The sessions were scheduled to occur upon arrival at school following breakfast and the times of the sessions remained constant, about 9 am. During experimental sessions, partial interval recording (ten seconds for observation, five seconds for recording) was used to measure the dependent variables (Appendix E). Each session was video taped. The observer, who was a guidance counselor with a Master's degree, was experienced in the behavior of children with developmental disabilities, and was blind to the experimental predictions, was present at the sessions when possible and sat in the far corner of the room and remained as unobtrusive as possible. The observer was instructed not to speak or make eye contact during the sessions. When it was not possible for the observer to be present, the video tapes were reviewed and subsequently scored by the observer. The primary observer was present for all but three sessions. The reliability observer was present for all but four sessions.

A data sheet was designed for use in measuring the dependent variables during sessions (Appendix E). Observers were cued at the end of each interval using a cassette tape that signaled the elapsed time. Session data were reported as the percentage of intervals in which each targeted behavior occurred (number of intervals in which the behavior was scored divided by the total number of intervals x 100).

Measures of dependent variables also were conducted for half an hour following each intervention session (i.e. when the child is reintegrated into the classroom) (Appendix I). During reintegration sessions, data were collected by the teacher or instructional assistant using a rating scale (Appendix I).

The principle investigator provided a training session for the observers. Training included direct instructions on session procedures, operational definitions of the targeted behaviors and data collection procedures, demonstration of session procedures and data collection procedures, role plays demonstrating two examples of each behavior (positive verbal and nonverbal behaviors, negative verbal and nonverbal behaviors and initiations and responses), guided feedback on session procedures, operational definitions of the targeted behaviors and data collection procedures, and corrected role play on session procedures. Each observer participated in one training session each. The teacher's assistant scored 95% proficiency and the guidance counselor (primary observer) scored 100% proficiency following the training. Proficiency was calculated using the following equation to obtain the percentage of agreement: Proficiency = number of correct ÷ number of correct plus incorrect x 100.

Inter-observer agreement was assessed in 65% of the sessions for Kirsten, in 68% of Georgie's, and 44% of Owen's sessions distributed across all conditions. The sessions or videotapes were viewed simultaneously by two observers who were seated at least 1 meter from each other with the video camcorder set up between them and did not confer regarding what they were viewing to insure independence of observations. Inter-observer agreement was calculated by dividing the number of agreement intervals by the number of agreement intervals plus disagreement intervals and multiplying by 100. The primary observer was the school guidance counselor with a master's degree and the reliability observer was a graduate student in applied behavior analysis.

Social Validity

Social validity was assessed using a questionnaire which was administered to the teacher and instructional assistant following the completion of the study (Appendix J: Social Validity). This was intended to measure the appropriateness of the procedures, the social importance of the goals and the social importance of the effects.

Experimental Procedures

Teacher training. Prior to data collection, training was conducted to ensure the teacher conducted experimental sessions according to prescribed protocols. A certified Exceptional Student Education (ESE) teacher with a Masters degree in Special Education conducted all experimental sessions.

The principle investigator provided a training session with the teacher and a session guideline was given to the teacher to follow each session (Appendix A: Baseline Session Guidelines; Appendix B: Intervention Session Guidelines). A Protocol for Interactions (Appendix H), specifying the content of the interactions with the child was given to the teacher to follow along with the Baseline Session Guidelines and Intervention Session Guidelines (Appendices A and B) each session.

Training included direct instructions on baseline and intervention session procedures and the operational definitions of the targeted behaviors; demonstration of baseline and intervention session procedures; role plays demonstrating two examples of each behavior (positive verbal and nonverbal behaviors, negative verbal and nonverbal behaviors and initiations and responses); guided feedback on baseline and intervention session procedures; and corrected role play on baseline and intervention session procedures. The teacher scored 100% proficiency following the training. Proficiency

was scored using the attached Baseline Session Guideline Checklist (Appendix C) or Intervention Session Guideline Checklist (Appendix D). Proficiency percentage was calculated using the following equation: Proficiency = number of correct ÷ number of correct plus incorrect × 100.

 Baseline. Baseline sessions consisted of the presence of the teacher in the room and a choice of three toys, one of which was a toy dog. Prior to beginning each baseline session, the toy dog and two other toys were brought to the session room. The teacher gathered the following items and placed them on the floor for the session: a toy Koosh ball, a toy car, a stuffed dog, a dog leash, dog biscuits in a bag, a brush, and a dog toy. The teacher then went to the classroom and walked the child back to the session room.

 Once in the room, the teacher asked the child to be seated in the designated area and the child was prompted: "Let's play with the dog today". The teacher waited 10 seconds for the child to initiate interactions with the toys or with the teacher. A predetermined guideline for interactions was used in the sessions (Appendix H: Protocols for Interactions), which included questions relating to the dog such as "What color is the dog?", "Do you remember the dog's name?" and tasks related to the dog such as "Give the dog a treat" and "Brush the dog".

 If no interactions with the toys or with the teacher were initiated within ten seconds, the teacher asked the child a dog related question from the protocol. The teacher waited 10 seconds for a response. If no response was made, the teacher asked the child to do a task from the protocol. If there was still no response, the teacher asked the child the next dog-related question from the protocol. Questions and tasks were alternated throughout the session. Once a question or task from the protocol was asked or

offered, the question or task was checked off to ensure the teacher did not ask the same question or task suggestion more than once per session.

Criteria to discontinue sessions were changed during the 10th session for Georgie and during the 4th session of baseline for Kirsten and Owen. The criteria to terminate a session due to a no response to three consecutive dog related questions or task suggestions were dropped. All further sessions were discontinued only if the child engaged in an attempt to leave the room, physical aggression toward the teacher or dog such as grabbing, hitting or kicking, or property destruction. At the end of each session (regardless of the reason for termination), the teacher led the child back to the classroom.

Intervention. Following the stabilization of baseline data, the second condition was introduced. The procedures for these sessions were identical to the procedures for the baseline condition, with the exception of the presence of a real dog. The dog chosen for this study was a one and a half year old male German Shepherd/Labrador Retriever mix named Arrow. Arrow was obedience trained and currently enrolled in therapy dog training. He had experience interacting with children in a special education classroom for over a year.

Prior to beginning each session, the dog was brought to the session room while the children were out of the classroom to avoid disruptions. Intervention sessions ended (regardless of the reason for termination) with the teacher saying "The dog is tired, it's time to say goodbye". The teacher then led the child back to the classroom and returned for the dog. The camera was turned off after the child left the room.

When sessions occurred consecutively the dog was given a 10 minute break every 30 minutes to go outside for a drink of water and a short walk. Arrow was not hurt in the conduct of this study.

Experimental Design

A multiple baseline design across participants was utilized to demonstrate the effects of the presence of a dog on the social interactions of the participants as measured by the dependent variables. Baseline data were taken on all three participants. Intervention with participant one began with the stabilization of baseline data. Upon the stabilization of intervention for participant one and baseline for participants two and three, intervention was then applied to participant two. Again following the stabilization of all data, intervention was applied to participant three (Kazdin, 1982, Parsonson, 2003).

Chapter Three

Results

Overall Positive Initiated Interactions

Figure 1 presents a multiple baseline design across participants of overall child initiated positive interactions during baseline and intervention. Positive initiated verbal interactions were low but stable in all three participants during the baseline condition. . Positive initiated verbal interactions had a mean of 1% and a range of 0%-6% for Kirsten, a mean and range of 0% for Georgie and a mean of 4% and a range of 0%-13% for Owen.

With Kirsten, positive initiated verbal interactions (mean 4%) did not show an initial increase when the dog was introduced however, as the intervention progressed an increase was noted with little variability for Kirsten (range 0%-16%). Georgie demonstrated an immediate increase in positive initiated verbal interactions (mean 24%) also with moderate variability (range 3%-50%). Owen's positive initiated verbal interactions (mean 14%) showed an increase when the dog was introduced as well with some variability (range 3%-28%).

Positive initiated non-verbal interactions (mean 11%) were low with some initial variability (range 0%-57%) for Kirsten the baseline condition. Positive initiated non-verbal interactions (mean 33%) were initially at a moderate level of occurrence but displaying a downward trend in the baseline condition for Georgie (range 0%-65%) and
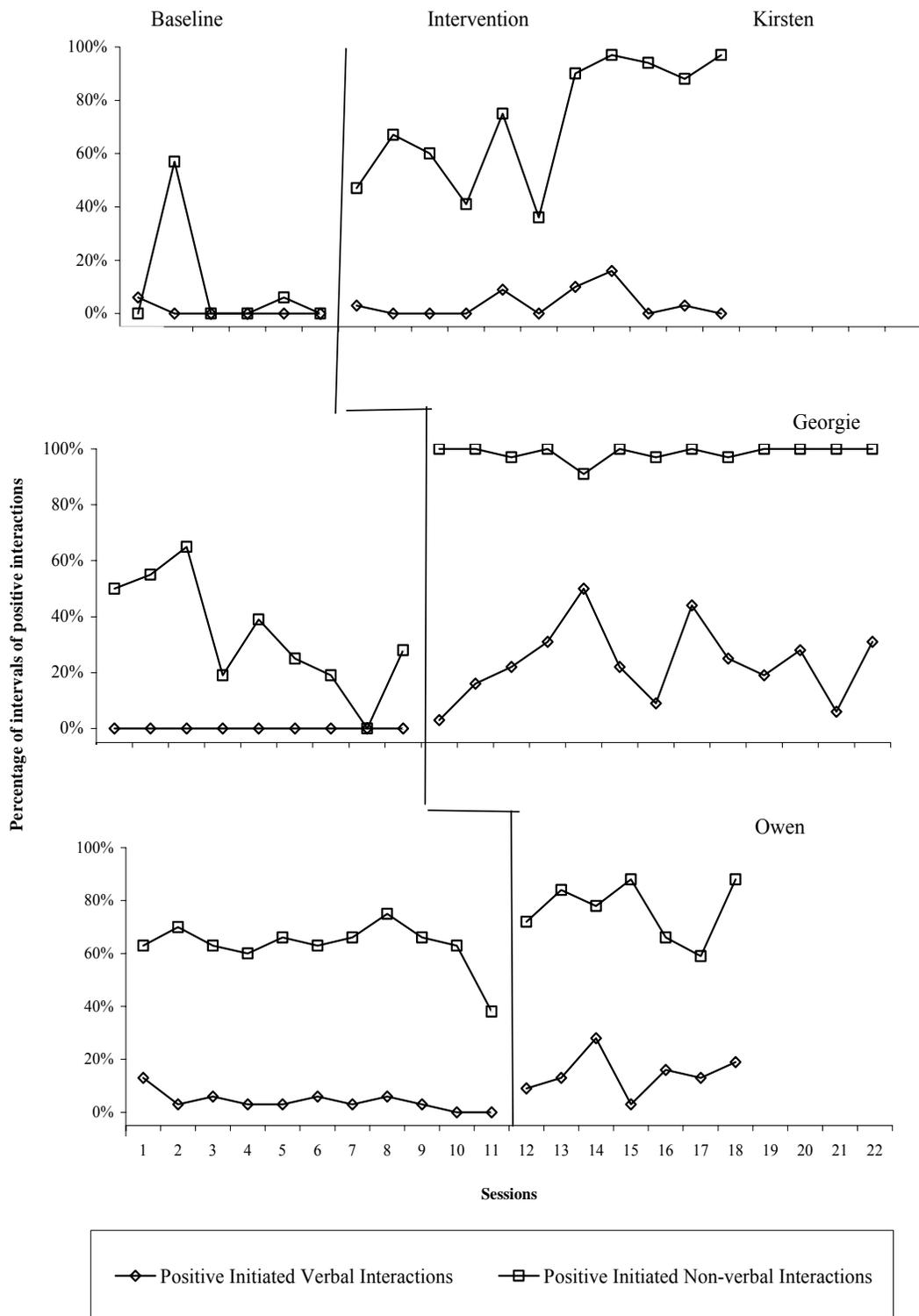
Figure 1. Multiple baseline across participants of overall positive interactions

positive initiated non-verbal interactions (mean 63%) for Owen were moderate and level (range 38%-75%) during the baseline condition.

When the intervention was introduced, positive initiated non-verbal interactions increased for all three participants with an upward trend noted. Kirsten's positive initiated non-verbal interactions increased to a mean of 72% and with a range of 41%-97%, Georgie's positive initiated non-verbal interactions increased to a mean of 99% and a range of 91%-100% and Owen's positive initiated non-verbal interactions increased to a mean of 76% and a range of 59%-88%.

Positive Initiated Interactions With the Teacher

Figure 2 shows the percentage of positive initiated verbal or nonverbal interactions that occurred between the child and teacher for all three participants during baseline and intervention within the sessions.

Kirsten demonstrated a low (mean 1%), stable (range 0%-6%) occurrence of positive initiated verbal interactions with the teacher during baseline.

During intervention there was a slight increase in the occurrence of positive initiated verbal interactions with the teacher (mean 2%). The range was 0%-13%. She showed a more moderate (mean 11%) occurrence of positive initiated non-verbal interactions with the teacher in baseline, although there was slightly more variability to the data (range 0%-57%) and during intervention positive initiated non-verbal interactions with the teacher increased (mean 22%) with a range of 7%-97%.
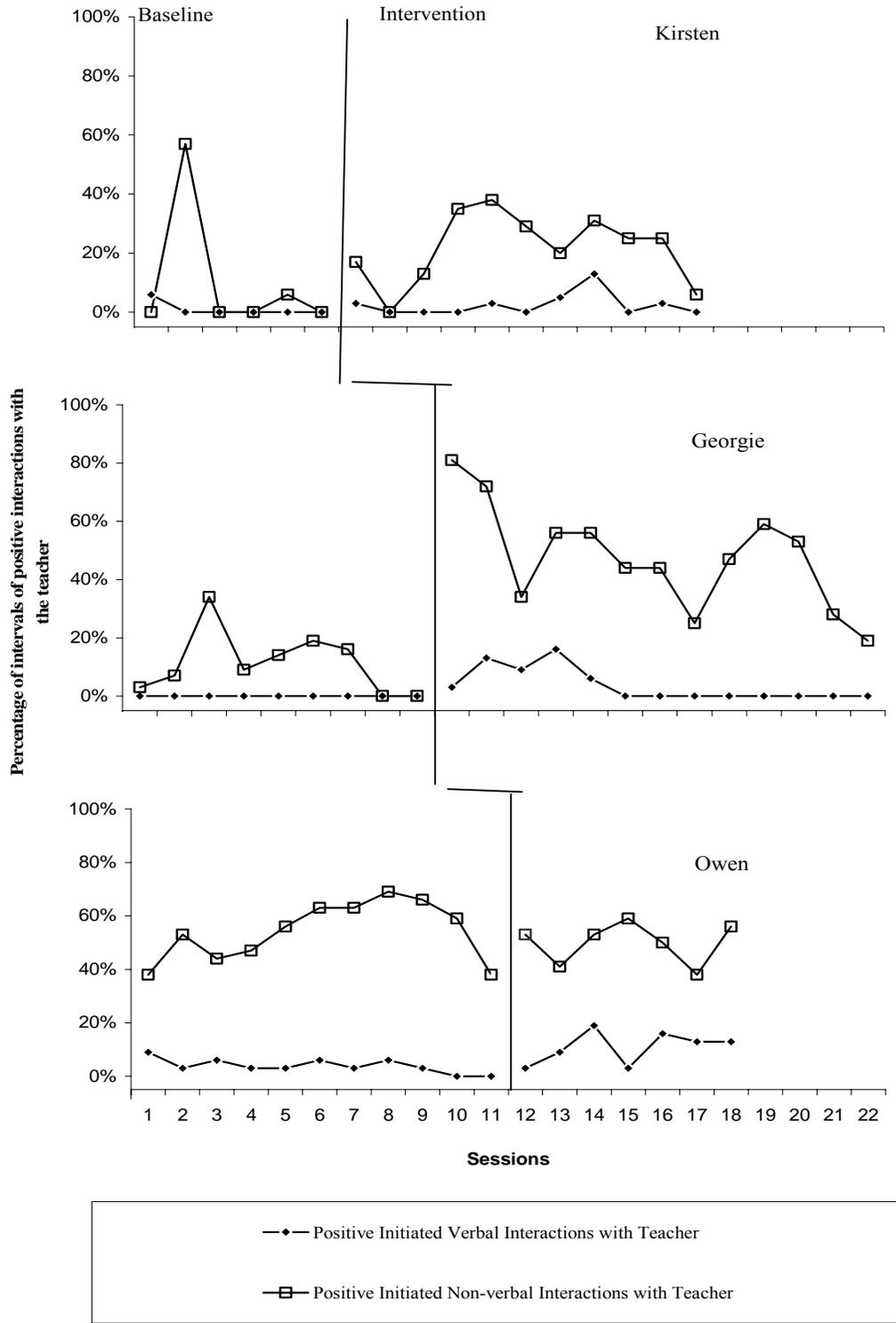
Figure 2. Multiple baseline across participants of positive child initiated interactions directed toward the teacher.

Georgie showed a stable baseline condition with a mean and range of 0% for positive initiated verbal interactions with the teacher and a mean of 11% for positive initiated non-verbal interactions with the teacher with a range of 0%-34%.

When the intervention condition was introduced at the 10th session, there was an immediate and sustained increase in positive non-verbal interactions with the teacher (mean 48%). The range was 19%-81%. There was an initial increase in positive initiated verbal interactions with the teacher (mean 4%) as well however, the occurrence of that behavior declined over the course of the study (range 0%-16%).

Owen demonstrated a stable baseline with the highest occurrence of positive initiated non-verbal interactions with the teacher (mean 54%) during baseline compared with Kirsten and Georgie. The range was 38%-68%. Owen also demonstrated a stable baseline for positive initiated verbal interactions with the teacher (range 0%-9%) and had a mean of 4%.

Intervention was introduced at the 12th session for Owen. Owen demonstrated a level, though slightly lower occurrence of positive initiated non-verbal interactions with the teacher (mean 50%)with little variability (range 38%-59%) and a slightly higher occurrence of positive initiated verbal interactions with the teacher (mean 11%) with little variability (3%-19%).

Positive Initiated Interactions with the Dog

Figure 3 shows the percentage of positive verbal or nonverbal interactions that occurred between the child and dog for all three participants during baseline and intervention within intervention sessions.
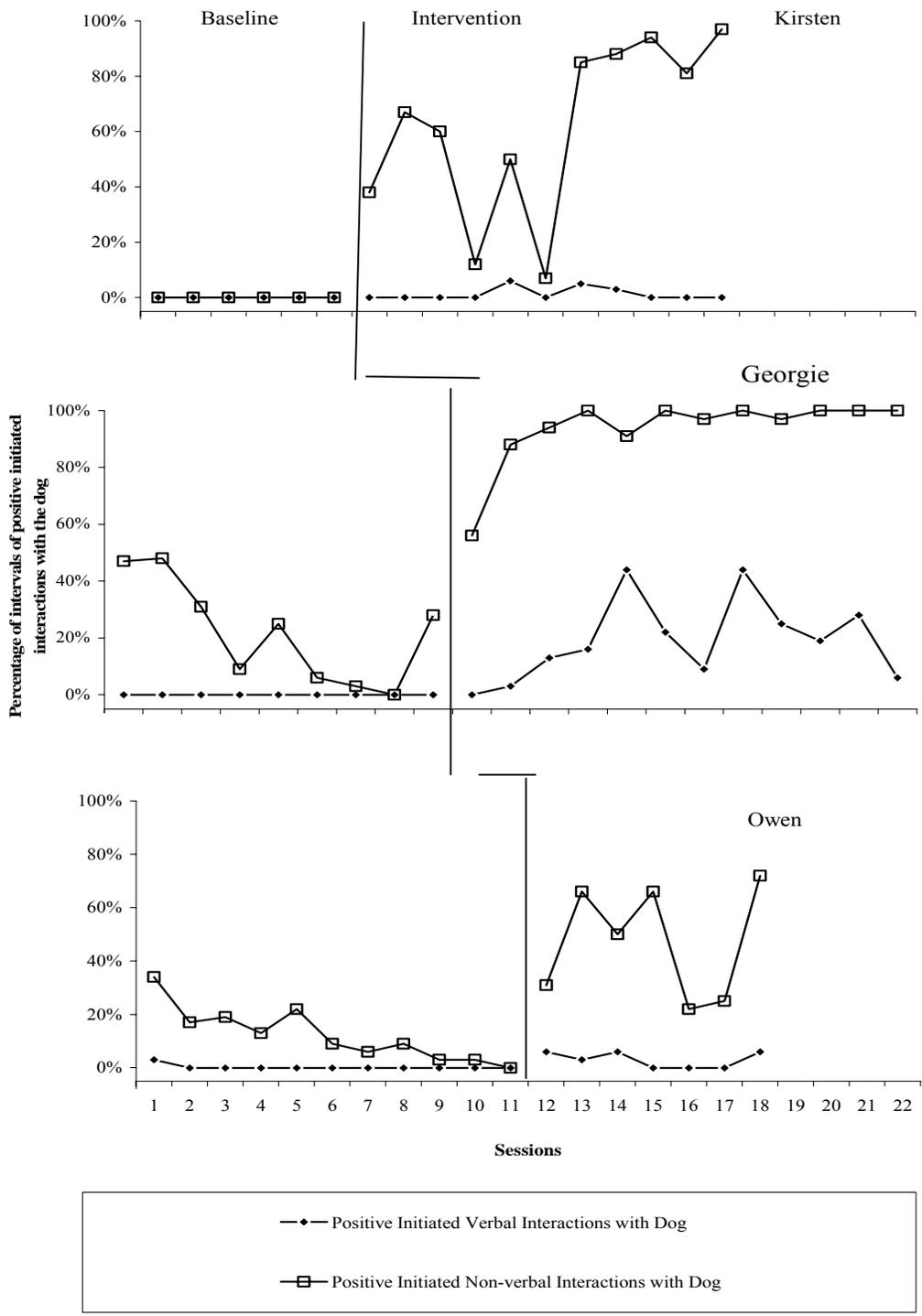
Figure 3. Multiple baseline across participants for positive child initiated interactions directed toward the dog.

Kirsten demonstrated a mean and range of 0% for positive initiated verbal interactions with the dog and positive initiated non-verbal interactions with the dog during baseline.

During intervention there was a slight increase in the occurrence of positive initiated verbal interactions with the dog (mean 1%) with little variability (range 0%-6%). Positive initiated non-verbal interactions with the dog increased immediately (mean 62%) and although variable (range 7%-97%), continued to show an upward trend during the intervention sessions.

For Georgie, positive initiated non-verbal interactions with the dog (mean 22%) showed a downward trend in occurrence with variability (range 0%-48%) during baseline. Positive initiated verbal interactions with the dog had a mean and a range of 0% during baseline.

With the introduction of intervention there was an immediate and sustained increase in positive initiated non-verbal interactions with the dog (mean 94%) with little variability (range 56%-100%). There was also an increase in positive initiated verbal interactions with the dog (mean 20%) with a higher level of variability (range 0%-44%) but showing a slight upward trend.

Owen demonstrated a downward trend in baseline with a mean of 12% and a range of 0%-34% for positive initiated non-verbal interactions with the dog and a mean of 0% for positive initiated verbal interactions with the dog with a range of 0%-3%. When the intervention was applied Owen demonstrated an increase in positive initiated non-verbal interactions with the dog (mean 47%) with an upward trend and a high degree of variability (range 22%-72%). Positive initiated verbal interactions with the dog (mean 3%) slightly increased and remained stable (range 0%-6%).

Overall Negative Initiated Interactions

Figure 4 shows the percentage of overall negative verbal or nonverbal interactions that occurred for all three participants during baseline and intervention within intervention sessions.

At baseline Kirsten displayed a high mean percentage of negative initiated non-verbal interactions (mean 86% and range 35%-100%) and a low (mean 2%), stable (range 0%-12%) baseline for negative initiated verbal interactions.

During intervention negative initiated non-verbal interactions declined (mean 16%) and showed a downward trend with some initial variability (range 0%-53%). Negative initiated verbal interactions remained low with a mean and range of 0%.

Baseline and intervention conditions for Georgie showed similarly low to zero occurrence of both negative initiated verbal interactions (0% baseline and intervention means with a 0% range for each) and negative initiated non-verbal interactions (baseline mean 1% range 0%-3%, intervention mean 0% and range 0%-6%).

Owen demonstrated a 0% mean and range in baseline for both negative initiated verbal interactions and negative initiated non-verbal interactions.

At the introduction of the intervention, there was an initial increase in both negative initiated verbal interactions (mean 1%, range 0%-9%) and negative initiated non-verbal interactions (mean 15% and range 6%-25%). Negative initiated verbal interactions did not maintain that increase and declined back to 0% for the majority of the intervention sessions.
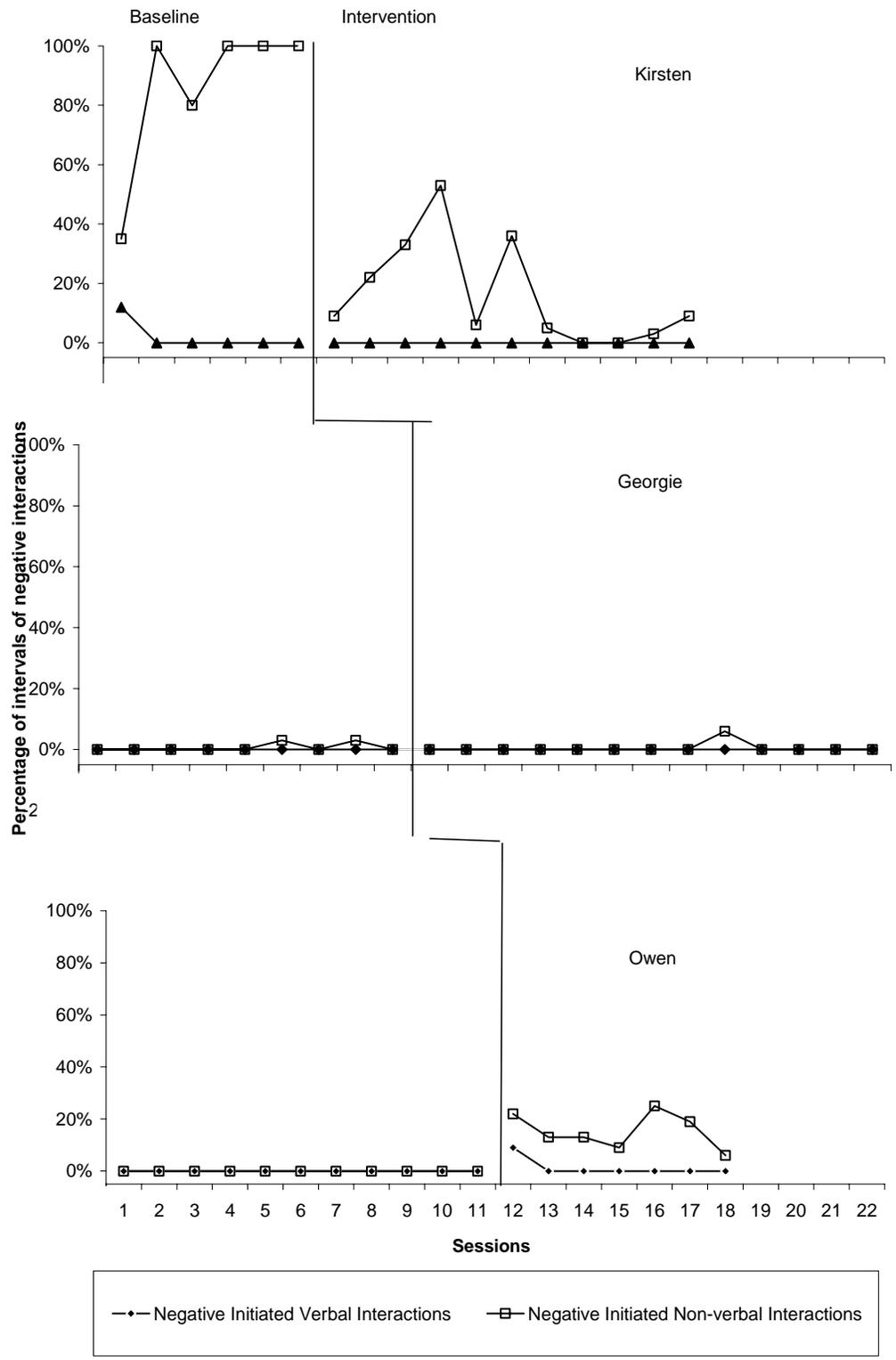
Figure 4. Multiple baseline across participants of overall negative interactions.

Negative Initiated Interactions with the Teacher

Figure 5 shows the percentage of negative verbal or nonverbal interactions that occurred between the child and teacher for all three participants during baseline and intervention within intervention sessions.

Kirsten showed a high and stable occurrence of negative initiated non-verbal interactions with the teacher during baseline with a mean of 86% and a range of 35%-100%. Negative initiated verbal interactions with the teacher had a mean of 2% and a range of 0%-12%. There was little variability to the baseline data.

At the point of intervention negative initiated non-verbal interactions with the teacher (mean 11%) showed an immediate decline with some initial variability but becoming level at near 0% during the last five sessions of the intervention condition. The range was from 0-53% for negative initiated non-verbal interactions with the teacher. Negative initiated verbal interactions with the teacher declined to a mean of 0%. Negative initiated verbal interactions with the teacher had a range of 0%.

Georgie showed very little to no negative interactions toward his teacher in either baseline or intervention. In baseline, negative initiated non-verbal interactions with the teacher had a mean of 1% and a range of 0%-3% and negative initiated verbal interactions with the teacher had a mean of 3% and a range of 0%-3%.

In the intervention condition, negative initiated non-verbal interactions with the teacher and negative initiated verbal interactions with the teacher remained at a mean of 0% and a range of 0%.

In the baseline condition for Owen, negative initiated non-verbal interactions with the teacher and negative initiated verbal interactions with the teacher each had a mean of 0% and a range of 0%.

When intervention was introduced, there was a slight increase in negative initiated non-verbal interactions with the teacher (mean of 2%) with a range of 0%-6%. Negative initiated verbal interactions with the teacher remained at a mean of 0% with a range of 0%-3%.

Negative Initiated Interactions with the Dog

Figure 6 shows the percentage of negative verbal or nonverbal interactions that occurred between the child and dog for all three participants during baseline and intervention within intervention sessions. Kirsten had a mean of 0% and a range of 0% for negative initiated non-verbal interactions with the dog and negative initiated verbal interactions with the dog during baseline.

At the point of intervention negative initiated non-verbal interactions with the dog increased slightly to a mean of 1% with a range of 0%-33%. Negative initiated verbal interactions with the dog remained at a mean and range of 0%.

In the baseline condition for Georgie, negative initiated non-verbal interactions with the dog and negative initiated verbal interactions with the dog each had a mean and range of 0%.

When intervention was introduced the mean remained at 0% for negative initiated non-verbal interactions with the dog and negative initiated verbal interactions with the dog.
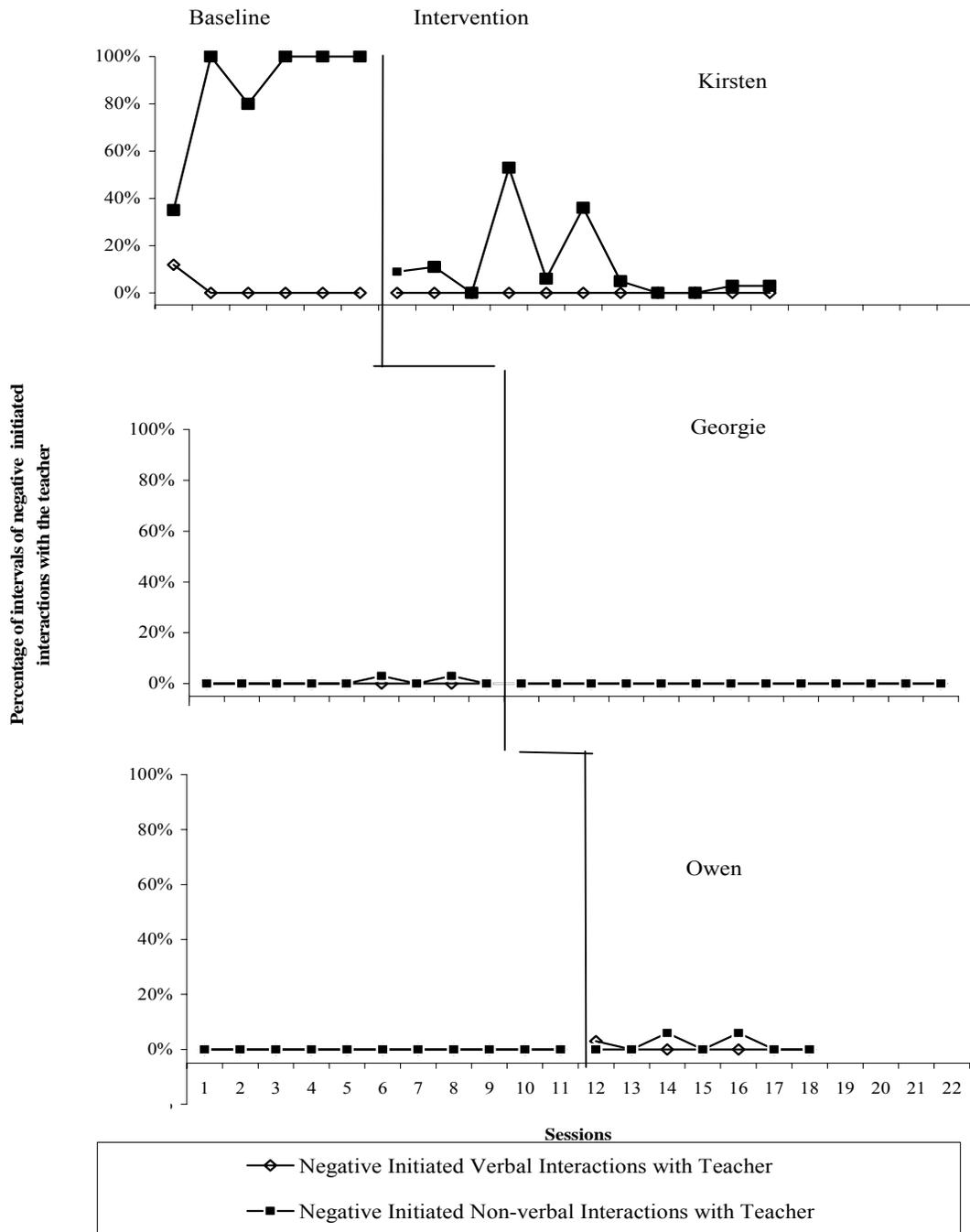
Figure 5. Multiple baseline across participants of negative child initiated interactions directed toward the teacher.
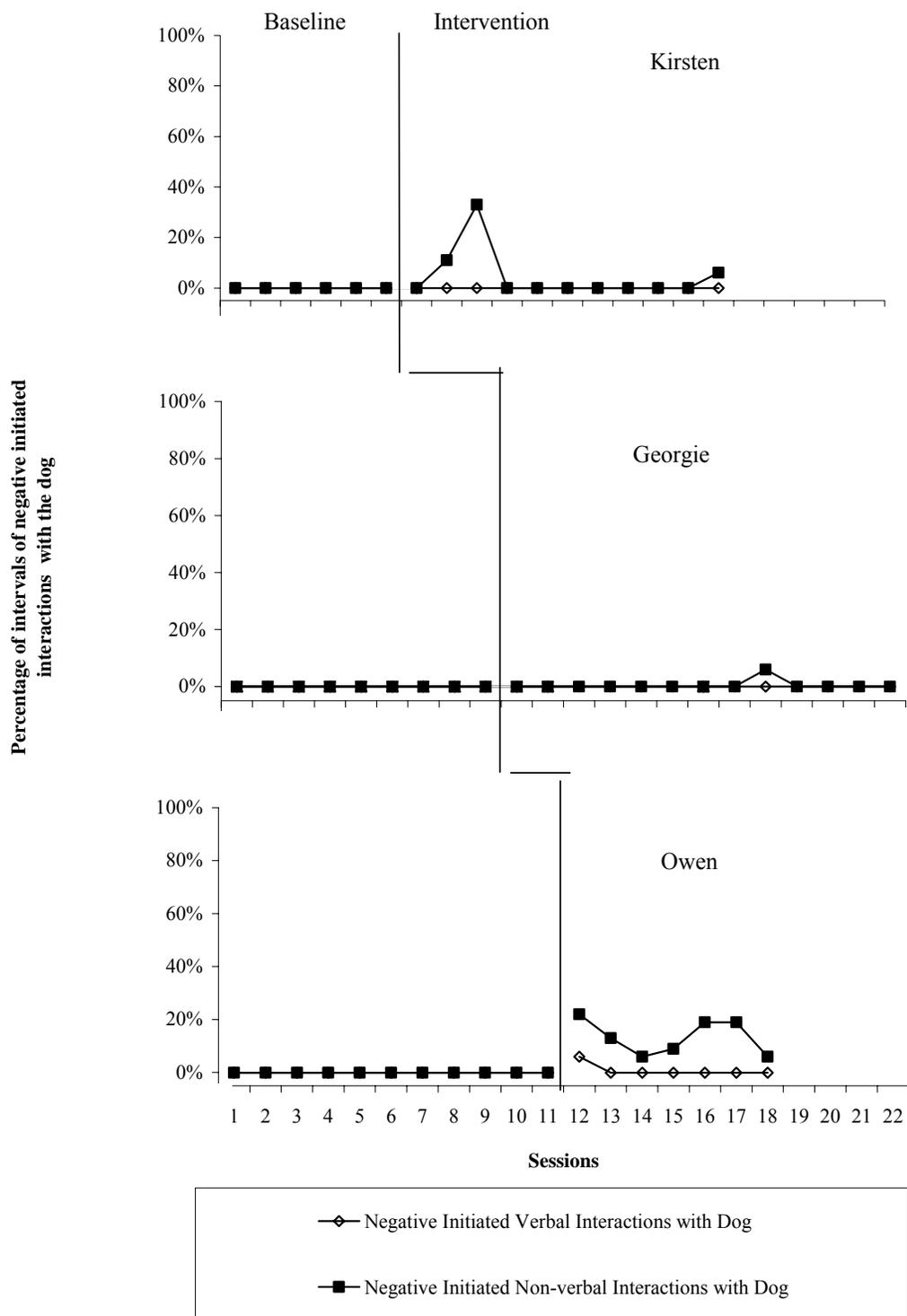
Figure 6. Multiple baseline across participants of child inititated negative interactions

Negative initiated non-verbal interactions with the dog had a range of 0%-6% and negative

initiated verbal interactions with the dog had a range of 0%.

In the baseline condition for Owen, negative initiated non-verbal interactions with

the dog and negative initiated verbal interactions with the dog each had a mean and range

of 0%.

When intervention was introduced, there was a slight increase in negative initiated

verbal interactions with the dog with a mean of 1% and a range of 0%-6%. Negative

initiated non-verbal interactions with the dog increased to a mean of 13% and a range of

6%-22%.

The mean session percentages of each dependent variable for all three participants

in baseline and intervention conditions are presented in Table 1.

Table 1

Mean baseline and intervention session percentages of each dependent variable for each participant.

Dependent Variable	Kirsten		Georgie		Owen	
	BL	Interv.	BL	Interv.	BL	Interv.
Positive Initiated Verbal Interactions with Teacher	1%	2%	0%	4%	4%	11%
Positive Initiated Non-verbal Interactions with Teacher	11%	22%	11%	48%	54%	50%
Positive Initiated Verbal Interactions with Dog	0%	1%	0%	20%	0%	3%
Positive Initiated Non-verbal Interactions with Dog	0%	62%	22%	94%	12%	47%
Negative Initiated Verbal Interactions with Teacher	2%	0%	0%	0%	0%	0%
Negative Initiated Non-verbal Interactions with Teacher	86%	11%	1%	0%	0%	2%
Negative Initiated Verbal Interactions with Dog	0%	0%	0%	0%	0%	1%
Negative Initiated Non-verbal Interactions with Dog	0%	5%	0%	0%	0%	13%

Figure 7 presents the total number of intervals (10 seconds each) completed for each session for all three participants.

Kirsten did not complete a full session of 32 intervals during baseline. Sessions were terminated for the following reasons: leaving the room or attempts to leave the room (5 sessions) and property destruction (1 session). The mean length of time Kirsten remained in the room during baseline was 8.83 intervals. During the intervention condition, Kirsten remained in the room for all 32 intervals 6 times. The four sessions that were terminated early for the following reasons: leaving the room or attempts to leave the room (4 sessions). The mean length of time Kirsten remained in the room during intervention was 24.27 intervals. Therefore when the dog was present, Kirsten's time spent in the room increased.

Georgie remained in the room for all 32 intervals for all sessions except session 5 where he left after 28 intervals for no response to three consecutive dog related questions or task suggestions (prior to the change in criteria to terminate sessions). Owen remained in the room for all 32 intervals for all sessions.

During the sessions, questions and task suggestions were offered only when there was a 10 second period of no child interaction with the teacher, dog or toys. Table 2 presents the mean number of questions or task suggestions per session and the mean number of responses to questions or task suggestions for baseline and intervention for each participant. For Kirsten and Georgie, less questions or task suggestions were needed to encourage the child to interact when in the presence of the dog. With Owen, more questions or task suggestions were required to encourage interaction.

Table 2

Mean number of questions or task suggestions per session for baseline and intervention for each participant.

Questions Or Task Suggestions And Responses	Kirsten		Georgie		Owen	
	BL	*Interv.*	*BL*	*Interv.*	*BL*	*Interv.*
Mean Number Of Questions Or Task Suggestions Per Session	4.2	3.1	9.1	0.4	0.0	2.3
Mean Number Of Responses To Questions Or Task Suggestions Per Session	0.5	1.3	3.0	0.3	0.0	1.0

Table 3 presents the mean number of positive, negative, verbal and non-verbal

responses to questions or task suggestions directed toward the teacher and dog per session.

Table 3

Mean number of positive, negative, verbal and non-verbal responses to questions or task suggestions directed toward the teacher and dog per session.

Verbal and Non-verbal Responses	Kirsten		Georgie		Owen	
	BL	Interv.	BL	Interv.	BL	Interv.
Positive Verbal Responses with Teacher	0.0	0.8	1.2	0.2	N/A	0.7
Positive Non-verbal Responses with Teacher	0.0	0.1	0.7	.08	N/A	0.1
Negative Verbal Responses with Teacher	0.5	0.0	0.1	0.0	N/A	0.1
Negative Non-verbal Responses with Teacher	0.0	0.2	0.1	0.0	N/A	0.0
Positive Verbal Responses with Dog	0.0	0.0	0.1	0.0	N/A	0.0
Positive Non-verbal Responses with Dog	0.0	0.0	0.8	0.0	N/A	0.0
Negative Verbal Responses with Dog	0.0	0.0	0.0	0.0	N/A	0.0
Negative Non-verbal Responses with Dog	0.0	0.2	0.0	0.0	N/A	0.0

Figures 8 and 9 present the teacher assistant's ratings in the classroom for 30 minutes

immediately following each session.

Table 4 presents the condition means for each dependent variable as rated by the teacher's assistant.

Table 4

Mean rating of each dependent variable during classroom data collection following each session for each participant.

Dependent Variable	Kirsten		Georgie		Owen	
1=not at all *3=sometimes* *5=most of the time*	BL	Interv.	BL	Interv.	BL	Interv.
Positive Initiated Verbal Interactions	1.67	2.18	1.56	2.85	1.82	4.00
Positive Initiated Non-verbal Interactions	1.83	2.27	2.89	3.23	2.45	2.71
Positive Verbal Responses	2.83	2.36	3.56	4.31	2.64	3.86
Positive Non-verbal Responses	2.83	3.20	3.00	3.62	2.91	3.71
Negative Initiated Verbal Interactions	3.17	1.91	1.22	1.00	1.73	1.71
Negative Initiated Non-verbal Interactions	3.17	3.45	1.56	1.38	3.00	2.86
Negative Verbal Responses	3.17	2.64	1.11	1.38	2.55	1.86
Negative Non-verbal Responses	3.33	2.40	1.56	1.31	3.45	3.00

Classroom Rating For Positive Interactions Following Sessions

Kirsten demonstrated a mean of 1.67 for positive initiated verbal interactions, 1.83 for positive initiated non-verbal interactions, 2.83 for positive verbal responses and 2.83 for positive non-verbal responses in baseline. In the intervention condition, positive initiated verbal interactions increased to a mean of 2.18, positive initiated non-verbal interactions increased to a mean of 2.27, positive verbal responses decreased to a mean of 2.36 and positive non-verbal responses increased to a mean of 3.20.

Georgie demonstrated a mean of 1.56 for positive initiated verbal interactions, 2.89 for positive initiated non-verbal interactions, 3.56 for positive verbal responses and 3.00 for positive non-verbal responses in baseline. In the intervention condition, positive initiated

Figure 7. Multiple baseline across participants of intervals completed per session
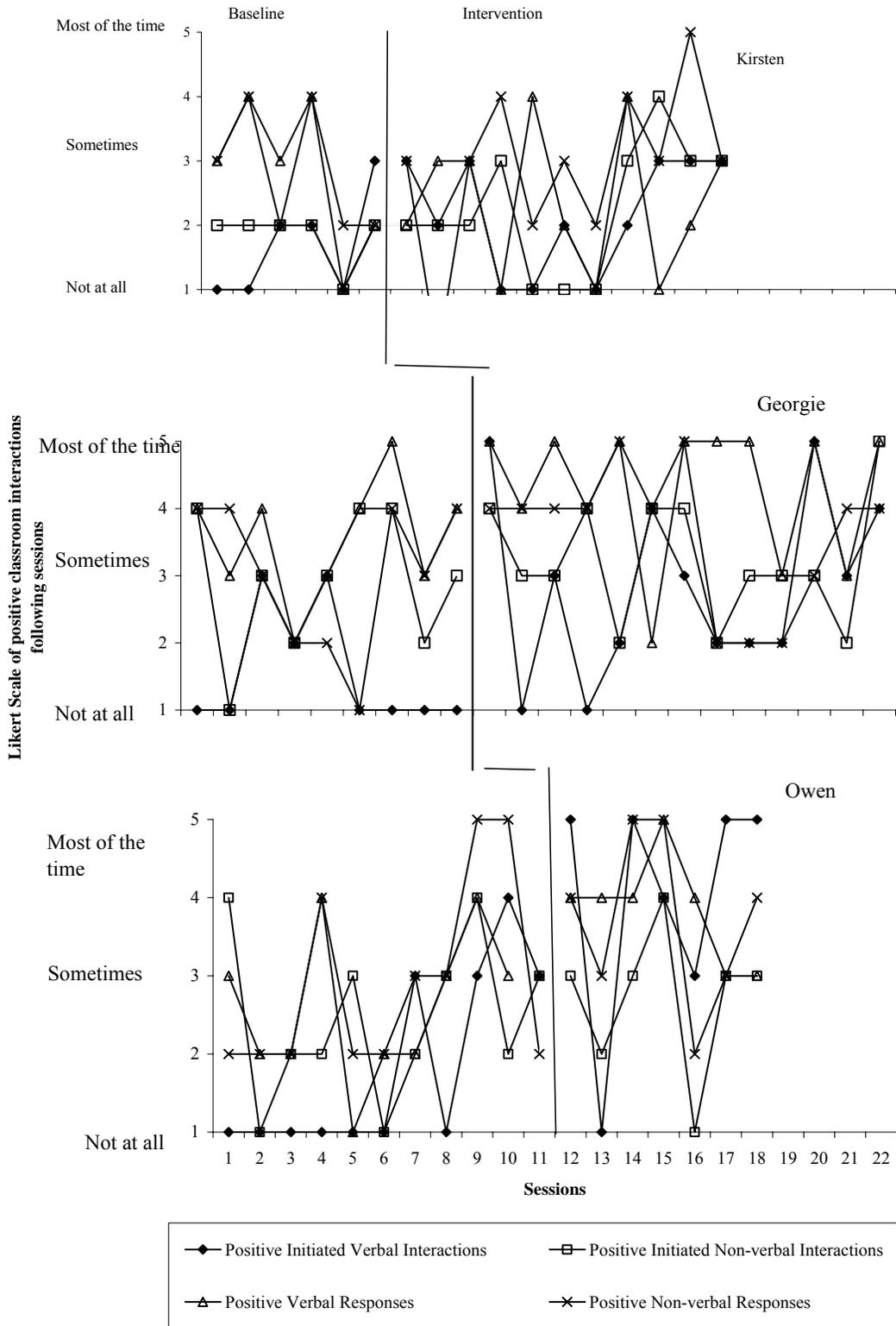
Figure 8. Multiple baseline across participants of positive classroom interactions
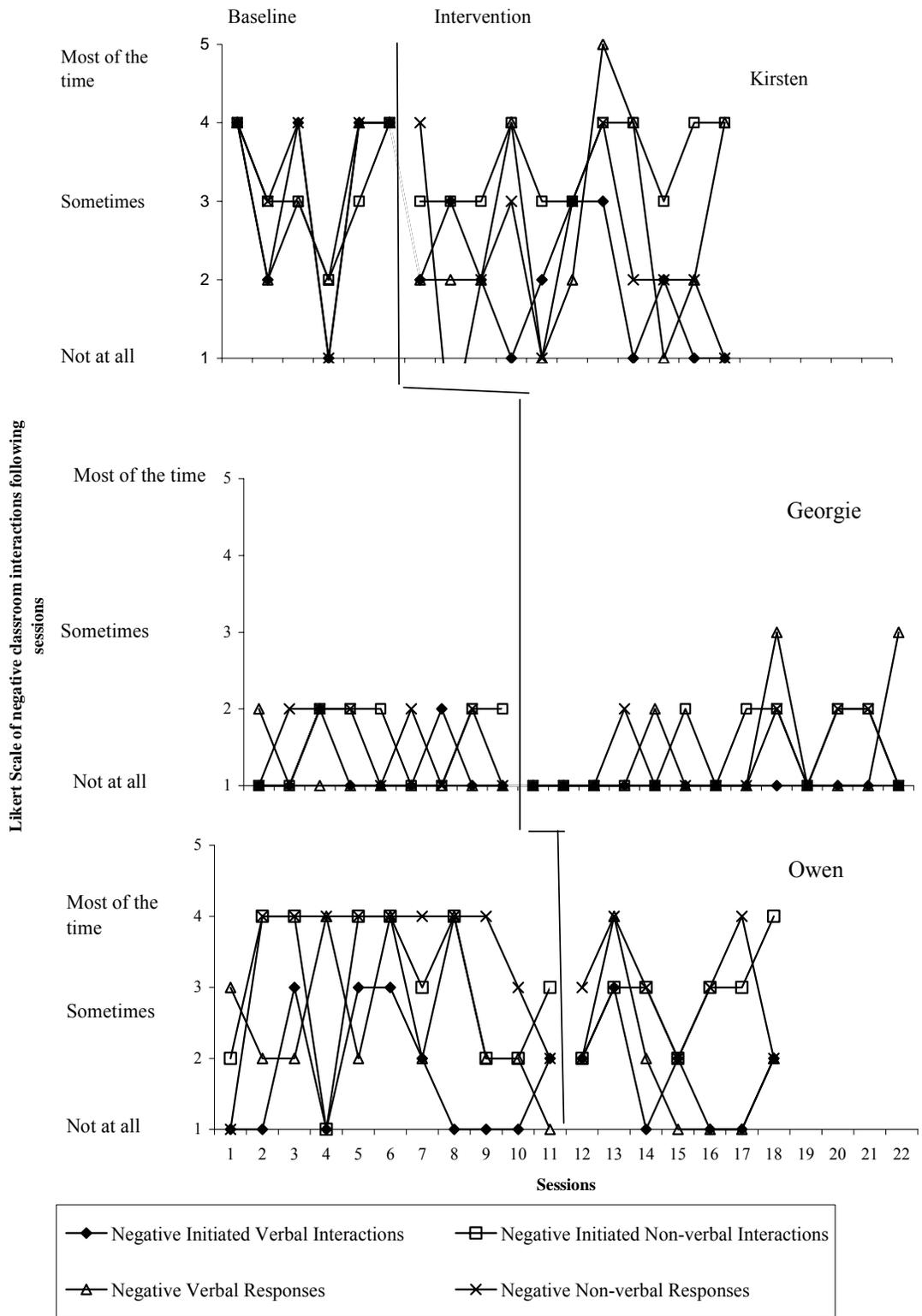
Figure 9. Multiple baseline across participants of negative classroom interactions following sessions.

verbal interactions increased to a mean of 2.85, positive initiated non-verbal interactions increased to a mean of 3.23, positive verbal responses increased to a mean of 4.31 and positive non-verbal responses increased to a mean of 3.62.

Owen demonstrated a mean of 1.82 for positive initiated verbal interactions, 2.45 for positive initiated non-verbal interactions, 2.64 for positive verbal responses and 2.91 for positive non-verbal responses in baseline. In the intervention condition, positive initiated verbal interactions increased to a mean of 4.00, positive initiated non-verbal interactions increased to a mean of 2.71, positive verbal responses increased to a mean of 3.86 and positive non-verbal responses increased to a mean of 3.71.

Classroom Rating For Negative Interactions Following Sessions

Kirsten demonstrated a mean of 3.17 for negative initiated verbal interactions, 3.17 for negative initiated non-verbal interactions, 3.17 for negative verbal responses and 3.33 for negative non-verbal responses in baseline. In the intervention condition, negative initiated verbal interactions decreased to a mean of 1.91, negative initiated non-verbal interactions increased to a mean of 3.45, negative verbal responses decreased to a mean of 2.64 and negative non-verbal responses decreased to a mean of 2.40.

Georgie demonstrated a mean of 1.22 for negative initiated verbal interactions, 1.56 for negative initiated non-verbal interactions, 1.11 for negative verbal responses and 1.56 for negative non-verbal responses in baseline. In the intervention condition, negative initiated verbal interactions decreased to a mean of 1.00, negative initiated non-verbal interactions decreased to a mean of 1.38, negative verbal responses increased to a mean of 1.38 and negative non-verbal responses decreased to a mean of 1.31.

Owen demonstrated a mean of 1.73 for negative initiated verbal interactions, 3.00 for negative initiated non-verbal interactions, 2.55 for negative verbal responses and 3.45 for negative non-verbal responses in baseline. In the i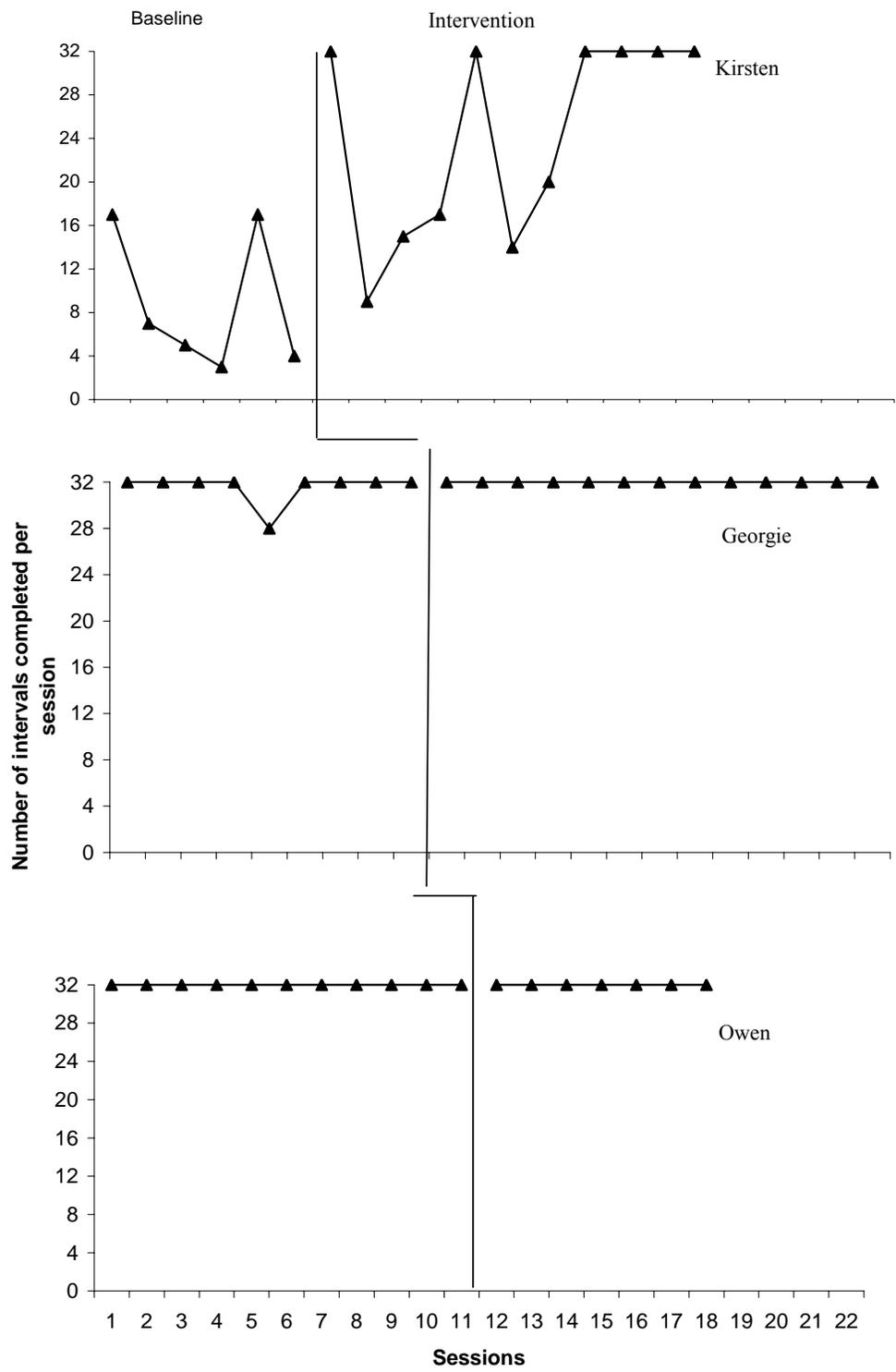ntervention condition, negative initiated verbal interactions decreased to a mean of 1.71, negative initiated non-verbal interactions decreased to a mean of 2.86, negative verbal responses decreased to a mean of 1.86 and negative non-verbal responses decreased to a mean of 3.00.

Interobserver Agreement

The interobserver agreement for each dependent variable was assessed in 65% of the sessions for Kirsten, in 68% of Georgie's, and 44% of Owen's sessions.   The mean percent interobserver agreement score for the measured dependent variables for each of the participants ranged from 77% to 100%.   Table 5 presents the mean percent observer agreement scores by dependent variable and child.

The range of the interobserver agreement scores were as follows: positive initiated verbal interactions with the teacher was 94%-100% for Kirsten and Georgie and 88%-100% for Owen, positive initiated verbal interactions with the dog was 94%-100% for Kirsten and Georgie and 97%-100% for Owen, positive initiated non-verbal interactions with the teacher was 91%-100% for Kirsten, 22%-100% for Georgie and 41%-100% for Owen, positive initiated non-verbal interactions with the dog was 97%-100% for Kirsten, 50%-100% for Georgie and 84%-100% for Owen, positive verbal responses with the teacher was 94%-100% for Kirsten and Georgie and 100% for Owen, positive verbal responses with the dog was 100% for Kirsten and Owen and 97%-100% for Georgie, positive non-verbal responses with the teacher was 100% for Kirsten and Owen and 97%-100% for Georgie, positive non-verbal responses with the dog was 100% for Kirsten and

Owen and 88%-97% for Georgie, negative initiated verbal interactions with the teacher and negative initiated verbal interactions with the dog had a range of 100% for all three participants. Negative initiated non-verbal interactions with the teacher had a range of 71%-100% for Kirsten and 100% for Georgie and Owen, negative initiated non-verbal interactions with the dog had a range of 100% for Kirsten and Georgie and 94%-100% for Owen, negative verbal responses with the teacher had a range of 88%-100% for Kirsten and 100% for Georgie and Owen, negative verbal responses with the dog, negative non-verbal responses with the teacher and negative non-verbal responses with the dog each had a range of 100% for all three participants. The interobserver ratings show a wide range with a high mean. The wide range usually reflected one low point in reliability.

Table 5

Mean percentage of interobserver agreement scores for each dependent variable for each participant.

Dependent Variable	Kirsten	Georgie	Owen
Positive Initiated Verbal Interactions with Teacher	99%	100%	97%
Positive Initiated Non-verbal Interactions with Teacher	98%	77%	86%
Positive Verbal Responses with Teacher	99%	99%	100%
Positive Non-verbal Responses with Teacher	100%	99%	100%
Positive Initiated Verbal Interactions with Dog	99%	99%	99%
Positive Initiated Non-verbal Interactions with Dog	99%	91%	95%
Positive Verbal Responses with Dog	100%	99%	100%
Positive Non-verbal Responses with Dog	100%	93%	100%
Negative Initiated Verbal Interactions with Teacher	100%	100%	100%
Negative Initiated Non-verbal Interactions with Teacher	97%	100%	100%
Negative Verbal Responses with Teacher	99%	100%	100%
Negative Non-verbal Responses with Teacher	100%	100%	100%
Negative Initiated Verbal Interactions with Dog	100%	100%	100%
Negative Initiated Non-verbal Interactions with Dog	100%	100%	99%
Negative Verbal Responses with Dog	100%	100%	100%
Negative Non-verbal Responses with Dog	100%	100%	100%

Social Validity Ratings

 Table 6 displays the results of the post intervention social validity ratings. The

social validity data showed that both the teacher and teacher's assistant found the

intervention to be appropriate, easy to use, and socially significant. They also strongly

agreed that the intervention was effective and led to improved interactions with their

teacher.

Table 6

Post intervention social validity ratings by the teacher and teacher's assistant using a Likert Scale.

1=strongly disagree 2=disagree 3=slightly disagree 4=slightly agree 5=agree 6=strongly agree	Teacher	Teacher's Assistant
Appropriateness of Procedures		
This intervention was easy to use.	5	5
I would recommend this intervention to other educators and parents.	5	6
I liked the procedures used in this intervention.	5	6
Social Significance of the Goals		
It is important to increase the social responsiveness of students with their teacher.	6	6
It is important to learn new interventions to change the behavior of children with mental retardation.	6	6
It is useful to examine how a child's interactions with a dog can lead to positive outcomes.	5	6
Social Importance of the Effects		
I would use this intervention in the classroom setting again because it is effective.	6	6
The presence of a dog led to an improvement in the social interactions of the children with their teacher.	6	6
This intervention was valuable for the child	6	6

Chapter Four

Discussion

The purpose of this study was to assess the effects of the presence of a dog on the positive and negative interactions (both verbal and non-verbal) of children with developmental disabilities toward their teacher. The study showed that the presence of the dog during sessions increased positive initiated verbal and non-verbal interactions with the teacher in all three participants. The presence of a dog also contributed to an increase in participation in the sessions by one participant who was not participating fully. In addition, when there was a high rate of occurrence of negative interactions, those decreased with the intervention. Furthermore, most of the mean ratings within the classroom following the intervention session showed consistent improvement in positive interactions and decrease in negative interactions within the classroom. In addition, social validity assessment established positive ratings of procedures, goals, and effects in this research.

The multiple baseline design across three participants was used to demonstrate the effects and generalization of the treatment in an experimentally controlled manner. The controlled effects were determined by systematically introducing the intervention to different participants, at different points in time, and showing the changes in behavior demonstrated after intervention. Controlled effects were demonstrated with the dependent variables in the intervention setting as well as improvements within the generalization setting, the children's classroom.

The data show that with regard to interaction with the teacher, when interactions were low in frequency during baseline, there was an increase in interactions, yet when there was a higher level of interaction (Owen) there was not a large change in positive initiated interactions. With Georgie, there was also a declining trend in positive initiations. It is probable that the level of positive interactions would settle into a stable level of about 20-40% although this would need to be documented over a longer period of time than was assessed in this study.

Although there was an increase in verbal interactions among the participants of this study it should be noted that those interactions consisted mostly of one word utterances rather than full sentences. This limited improvement may reflect the verbal deficits associated with the diagnosis of mental retardation.

Negative initiated interactions seen in this study primarily were turning away or moving away from the teacher or dog. In addition, Kirsten attempted or actually left the room. During baseline when Kirsten left the room she did not turn back. However, during intervention on one occasion Kirsten attempted to leave the room, stating 'mom' as she was leaving with the dog and when told the dog could not go with her she left on her own.

With regard to overall negative behaviors, Kirsten showed a decrease, Georgie showed no change, and Owen showed an increase in negatives. Kirsten's negative interactions were primarily toward her teacher whereas Owen's negative interactions were directed at the dog. Owen was initially both excited and intimidated by the dog. The teacher needed to modify how he interacted with the dog by holding the dog leash and keeping the dog from climbing on or licking Owen. By the end of the treatment sessions

Owen was very comfortable with Arrow, shown by his holding of the leash and his brushing of the dog.

During baseline sessions Owen and Georgie interacted with all the toys while Kirsten did not interact with any toys. Baseline data reflects only those interactions directed toward the toy dog, not the other toys.

Relation to Literature

In comparison with the previous literature, this study supports the research by Martin and Farnum (2002) in which prosocial behaviors were measured under three conditions, one of which was the presence of a real dog. This study differs in design, diagnosis of participants, procedures and operational definitions. Although operational definitions of positive behaviors vary between both studies, laughing, giving treats and talking to the dog were included in this study as well. As with Martin and Farnum's study, this study demonstrated an increase in those behaviors as well for all participants when in the presence of the dog.

Although different designs were used this study was procedurally more similar to the study done by Limond et al.(1997). Limond et. al used a repeated measures design with two conditions, one of which was the presence of a real dog. The therapist followed a predetermined guideline for interactions as well and the participants in both studies were similar in age and diagnosis. The behaviors of interest in Limond et. al's study had some similarities to those in this study including, initiations and responses that were rated as positive and negative verbal and non-verbal. Operational definitions varied slightly between both studies. Limond et al's study found that the children responded non-verbally more often and more positively, they responded to the therapist more frequently and they

initiated verbal interactions more frequently when in the presence of the real dog, which is supported by the current study.

Limitations

Some limitations became evident during this study. The data collection system used in this study does not reliably indicate the number of questions/task suggestions offered or responses; however, the teacher's procedural checklist was used to obtain data on the number of questions and task suggestions offered per session. Some responses and questions occurred during recording intervals therefore although the teacher may have indicated that a question was asked or a task suggestion was offered, the data may not reflect the participant's response when that response occurred during the recording interval. A better measure of responsiveness would have been the number of responses per opportunity which might have shown a larger effect. It may be noted, however, that Table 2 shows that the mean of the participants responding during intervention was higher than the responsiveness during baseline. That is, during intervention, fewer questions were asked, while more questions were answered, which is a higher "hit" rate for questions.

Although the teacher did not respond to child-initiated interactions to avoid a confounding variable, it is not recommended that the teacher not respond in a real setting as this is not natural and does not reinforce initiated communication. Future studies could control for this potential confounding variable by introducing one praise statement for each positive initiated interaction across participants and sessions. By reinforcing initiated communication we may have seen a greater effect over time.

Furthermore, non-verbal behaviors were more difficult to score. Also, it is recommended that future studies conduct observations of the children prior to conducting

the study in order to develop more comprehensive and inclusive operational definitions of the target behavior.

Procedurally, the teacher did not ask a dog related question or task suggestion when the child was playing with any of the toys offered. However, in retrospect, having the teacher ask the questions when the child was interacting with the toys and neither the toy dog, the real dog nor the therapist would have provided more of an opportunity to observe positive and negative responses in baseline and intervention.

Treatment concerns arising in this study include the carryover effects demonstrated with Kirsten. Anecdotally, it appeared as though Kirsten's time spent in the sessions was influenced by events occurring either before or during her sessions. For example, if Kirsten was reprimanded or went to time out prior to a session or heard a preferred activity such as circle time occurring during her session she was more likely to leave the sessions early. Future studies may consider examining these context variables and running sessions in a room further from the classroom or during a free period.

The present study also examined the generalization of effects across settings (Stokes & Baer, 1977). Ratings in the classroom showed improvements, although it is important to recognize that systematic observations of behavior were not completed. Although unanalyzed in terms of the factors controlling generalization, there was an important common salient stimulus present in both the intervention setting and the classroom, the teacher. Further evaluation of this discriminative stimulus variable controlling the occurrence of generalization is warranted.

As a single case experimental design, the generalizability of these data would be established by further replication. It is interesting to note that two of the three participants

were children with Down syndrome and the third was a child with a hearing impairment, although all were children with retardation. It is possible that the differences between the children relate to the characteristics of the participants but replication is important to establish generalizability, as in any one study.

Recommendations for Future Research and Practice

One parent's anecdotal report was that her child had begun talking much more at home during the intervention condition of this study. Future studies should look at the effects of the intervention and generalization of the behaviors across various settings and times of day. One suggestion is that classroom data be evaluated 30 minutes following each session as done in this study and again at the end of the school day to determine how long lasting the effects are following the sessions.

Interactions with peers were not studied in this research. Anecdotally, the teacher and teacher's assistant reported that they had observed more positive interactions among the children in this study and their peers in the classroom including more sharing, talking and positive statements.

Another area of recommended future study is to look at interactions with the teacher regarding specific tasks i.e. academics, to determine if the child's academic tasks improve either as a result of the sessions or as a result of the increased positive communication with the teacher resulting from this study. The dog can be used to establish stimulus control with the teacher over sessions because the teacher is so actively involved in the therapeutic sessions with the dog. The teacher occasions the presentation of the dog and the positive consequences of its presence. This may serve to improve interactions between the teacher and child, thus aiding in teaching academic skills. In this manner, generalization from the

treatment session to the classroom can be facilitated as the teacher, as a common salient stimulus, moves with the child from one setting to another (Stokes & Baer, 1977). In a similar manner, it may be valuable to consider how the increase in the interactions with the dog may lead to increased opportunities for the teacher to provide positive consequences, exemplifying the value of coming into contact with natural communities of reinforcement (Stokes & Baer, 1977).

When working with children with developmental disabilities it is important to discover various ways of teaching them. This study is significant in demonstrating that the presence of a dog can increase communication between a teacher and a child with developmental disabilities. This increased communication can then be focused on educational tasks and training. It would be beneficial to use dogs in schools as assistants to the school counselor, psychologist or speech and physical therapists to assist in increasing communication, speech or motor skills. Dogs can also be used as assistants in the classroom in teaching specific tasks such as daily living skills, or as part of a curriculum such as reading, writing, story time, circle time, etc. A dog can act as the subject for creative writing, for reading stories about dogs or can participate with children in group activities with the dog being counted as a member of the group. This may increase participation for the children in some activities.

It may not be beneficial to have a dog present throughout the school day as this would be exhausting for the dog and disruptive to the children.

Conclusion

There are very few studies to date on the effects of dogs on social interactions. Much of the current literature is anecdotal in nature. This study supports previous findings

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that the presence of a dog can increase communication and positive non-verbal behaviors which will enable children with developmental disabilities to recruit reinforcement from their natural environments.   This study suggests that children with developmental disabilities may greatly benefit from the use of dogs as teaching assistants and adjuncts to therapy.

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Appendices

Appendix A: Baseline Session Guidelines

Prior to Beginning Each Session
1. The toy dog and two other toys will be brought to the session room.
2. The teacher will gather the following items and place them on the floor for the session: a toy dog leash, biscuits, brush, and dog toy.
3. The teacher will then go to the classroom and walk the child back to the session room.

During the Session
1. Once in the room the teacher will ask the child to be seated in the designated area and the child will be prompted: "Let's play with the dog today".
2. The teacher will wait 10 seconds for the child to initiate interactions with the toy dog or with the teacher.
3. If no interactions with the toy dog or with the teacher are initiated within ten seconds, the teacher will ask the child a dog related question from the Protocols for Interactions (Appendix F).
4. The teacher will wait 10 seconds for a response.
5. If no response is made the teacher will ask the child to do a task from the Protocols for Interactions (Appendix F) with the dog.
6. If there is still no response the teacher will ask the child the next dog-related question from the protocol.
7. If the child does not respond the session will be terminated.
8. Questions and tasks will be alternated throughout the session. Once a question or task from the Protocol for Interactions (Appendix F) has been asked or offered, the question or task will be checked off to ensure the teacher does not ask the same question or task suggestion more than once per session.

Ending the Session
1. Sessions will be discontinued if the child engages in any inappropriate behaviors such as attempts to leave the room, physical aggression toward the teacher or dog such as grabbing, hitting or kicking, property destruction or if the child does not respond to three consecutive dog related questions or task suggestions.
2. *The teacher will end the session by saying* "The dog is tired, it's time to say goodbye".
3. The teacher will then lead the child back to the classroom.
4. The camera will be turned off after the child has left the room.

Appendix B: Intervention Session Guidelines

Prior to Beginning Each Session
1. The dog will be brought to the session room, while the children are out of the classroom to avoid disruptions.
2. The teacher will gather the following items and place them on the floor for the session: a dog leash, biscuits, brush, and dog toy.
3. The teacher will then go to the classroom and walk the child back to the session room.

During the Session
1. Once in the room the teacher will ask the child to be seated in the designated area and the child will be prompted: "Let's play with the dog today".
2. The teacher will wait 10 seconds for the child to initiate interactions with the dog or with the teacher.
3. If no interactions with the dog or with the teacher are initiated, the teacher will ask the child a dog related question from the Protocols for Interactions (Appendix F).
4. The teacher will wait 10 seconds for a response.
5. If there is still no response the teacher will ask the child the next dog-related question from the protocol.
6. If the child does not respond the session will be terminated.
7. Questions and tasks will be alternated throughout the session. Once a question or task from the Protocol for Interactions (Appendix F) has been asked or offered, the question or task will be checked off to ensure the teacher does not ask the same question or task suggestion more than once per session.

Ending the Session
1. Sessions will be discontinued if the child engages in any inappropriate behaviors such as attempts to leave the room, physical aggression toward the teacher or dog such as grabbing, hitting or kicking, property destruction or if the child does not respond to three consecutive dog related questions or task suggestions.
2. The teacher will end the session by saying "The dog is tired, it's time to say goodbye".
3. The teacher will then lead the child back to the classroom and return for the dog. The camera will be turned off after the child has left the room.

When sessions will occur consecutively the dog will be given a 10 minute break every 30 minutes to go outside for a drink of water and a short walk. When sessions are completed for the day, the dog will be brought into the classroom for all of the children to play with for 10 minutes. He will then be brought outside for a walk and some water and returned to an area with no children (such as the session room) to rest.

Appendix C: Baseline Session Guidelines Checklist

Date:_____   Session #:_____   Rater:_____

+ correct   - incorrect

Prior to Beginning Each Session
1. The toy dog and two other toys will be brought to the session room.
2. The teacher will gather the following items and place them on the floor for the session: a toy dog leash, biscuits, brush, and dog toy.
3. The teacher will then go to the classroom and walk the child back to the session room.

During the Session
1. Once in the room the teacher will ask the child to be seated in the designated area and the child will be prompted: "Let's play with the dog today".
2. The teacher will wait 10 seconds for the child to initiate interactions with the toy dog or with the teacher.
3. If no interactions with the toy dog or with the teacher are initiated, the teacher will ask the child a dog related question from the Protocols for Interactions (Appendix F).
4. The teacher will wait 10 seconds for a response.
5. If there is still no response the teacher will ask the child the next dog-related question from the protocol.
6. If the child does not respond the session will be terminated.
7. Questions and tasks will be alternated throughout the session. Once a question or task from the Protocol for Interactions (Appendix F) has been asked or offered, the question or task will be checked off to ensure the teacher does not ask the same question or task suggestion more than once per session.

Ending the Session
1. Sessions will be discontinued if the child engages in any inappropriate behaviors such as attempts to leave the room, physical aggression toward the teacher or dog such as grabbing, hitting or kicking, property destruction or if the child does not respond to three consecutive dog related questions or task suggestions.
2. The teacher will end the session by saying "The dog is tired, it's time to say goodbye".
3. The teacher will then lead the child back to the classroom.
4. The camera will be turned off after the child has left the room.

_____% Proficiency

Proficiency = number of correct ÷ number of correct plus incorrect × 100 = _____%

Appendix D: Intervention Session Guidelines Checklist

Date:_____   Session #:_____   Rater:_____

      + correct   - incorrect

Prior to Beginning Each Session
1. The dog will be brought to the session room, while the children are out of the classroom to avoid disruptions.
2. The teacher will gather the following items and place them on the floor for the session: a dog leash, biscuits, brush, and dog toy.
3. The teacher will then go to the classroom and walk the child back to the session room.

During the Session
1. Once in the room the teacher will ask the child to be seated in the designated area and the child will be prompted: "Let's play with the dog today".
2. The teacher will wait 10 seconds for the child to initiate interactions with the dog or with the teacher.
3. If no interactions with the dog or with the teacher are initiated, the teacher will ask the child a dog related question from the Protocols for Interactions (Appendix F).
4. The teacher will wait 10 seconds for a response.
5. If there is still no response the teacher will ask the child the next dog-related question from the protocol.
6. If the child does not respond the session will be terminated.
7. Questions and tasks will be alternated throughout the session. Once a question or task from the Protocol for Interactions (Appendix F) has been asked or offered, the question or task will be checked off to ensure the teacher does not ask the same question or task suggestion more than once per session.

Ending the Session
1. Sessions will be discontinued if the child engages in any inappropriate behaviors such as attempts to leave the room, physical aggression toward the teacher or dog such as grabbing, hitting or kicking, property destruction or if the child does not respond to three consecutive dog related questions or task suggestions.
2. The teacher will end the session by saying "The dog is tired, it's time to say goodbye".
3. The teacher will then lead the child back to the classroom and return for the dog. The camera will be turned off after the child has left the room.

4. When sessions will occur consecutively the dog will be given a 10 minute break every 30 minutes to go outside for a drink of water and a short walk.

Appendix D: Treatment Session Guidelines Checklist continued

5. When sessions are completed for the day, the dog will be brought into the classroom for all of the children to play with for 10 minutes. He will then be brought outside for a walk and some water and returned to an area with no children (such as the session room) to rest.

_____% Proficiency

Proficiency = number of correct ÷ number of correct plus incorrect × 100 = _____%

Appendix E: Session Data Collection

Date:_____   Participant:_____   Session #:_____   Rater:_____

√= Child-initiated Responses   X= Teacher-prompted Responses
√D= Child-initiated behaviors toward the dog   Xd= Teacher-prompted responses toward dog
Record if the behavior occurred at any time during the interval. Interval size is 10 seconds.

Interval #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Positive Verbal Statements																
Negative Verbal Statements																
Positive Nonverbal Behaviors																
Negative Nonverbal Behaviors																
Interval #	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
Positive Verbal Statements																
Negative Verbal Statements																
Positive Nonverbal Behaviors																
Negative Nonverbal Behaviors																

1. *Positive verbal statements*= statements indicating enjoyment or interest in the situation example: "that was fun", "I like it", "more", "can I stay?", and "I love the dog" or requests for help.
2. *Negative verbal statements*= statements indicating disinterest of a lack of enjoyment in the situation example: "This sucks", "I hate this", "Can I leave?", "I hate the dog", "Get me out of here" or refusals "I don't want to", "No", "no more".
3. *Positive nonverbal behaviors*=smiling, laughing, touching the dog (i.e. petting, hugging or kissing, et cetera.), clapping hands nodding head, complying with a request non-verbally and social agreement "uh-huh", sharing or handing things to teacher, holding the leash or walking the dog.*Negative nonverbal behaviors*= turning body or face away from the teacher, crying, frowning (corners of lips turned down, hiding face, attempts to leave the room, physical aggression, property destruction (throwing things, knocking things off shelves/table, playing with computer if these actions would cause damage if uninterrupted) or threats or no response to dog-related questions or task suggestions.

Appendix F. Observer Proficiency

Observer name:_____   Date:_____

+ correct   - incorrect

Observer correctly identified examples of the following during role play:

1. ____ positive verbal behavior

2. ____ positive verbal behavior

3. ____positive non-verbal behaviors

4. ____positive non-verbal behaviors

5. ____negative verbal behaviors

6. ____negative verbal behaviors

7. ____negative nonverbal behaviors

8. ____negative nonverbal behaviors

9. ____initiations

10. ____initiations

11. ____responses

12. ____responses

Proficiency = number of correct ÷ number of correct plus incorrect × 100 = _____%

Appendix G: Protocols for Interactions

Check off each item as it is used. Do not repeat items in the same session.

Dog Related Questions

1. ____Do you know the dog's name?

2. ____What color is the dog?

3. ____Is the dog a boy or girl?

4. ____How many legs does the dog have?

5. ____What color is the dog's collar?

6. ____What color is the dog's leash?

7. ____What color eyes does the dog have?

8. ____How does the dog's hair feel?

9. ____How old is the dog?

10. ____Does the dog look happy?

11. ____Is the dog big or small?

12. ____What would you call the dog if he were yours?

13. ____What does the dog's toy look like?

14. ____Does the dog want to play?

15. ____Does the dog want to eat?

16. ____Was the dog good today?

17. ____Do you like the dog?

Appendix G: Protocols for Interactions continued

Dog Related Task Suggestions

1. ____Can you call the dog?

2. ____Can you please give the dog a treat?

3. ____Can you shake hands with the dog?

4. ____Can you put the dog's leash on him?

5. ____Can you give the dog his toy?

6. ____Can you play with the dog?

7. ____Can you brush the dog's hair?

8. ____Can you tell the dog to sit?

9. ____Can you pet the dog?

10. ____Can you give the dog a hug?

Appendix H: Classroom Data Collection

Date:_____   Participant:_____

Session #:_____   Rater:_____

Time began:_____   Time ended:_____

Please answer the following questions 30 minutes after the child has completed a session and has reintegrated into the classroom.

1. Did the child initiate positive verbal statements?

        1   2   3   4   5

not   sometimes   most
at all   of the time

2. Did the child initiate negative verbal statements?

        1   2   3   4   5

not   sometimes   most
at all   of the time

3. Did the child initiate positive nonverbal behaviors?

        1   2   3   4   5

not   sometimes   most
at all   of the time

4. Did the child initiate negative nonverbal behaviors?

        1   2   3   4   5

not   sometimes   most
at all   of the time

5. Did the child respond to a request or answer a question when asked using positive verbal statements?

        1   2   3   4   5

not   sometimes   most
at all   of the time

Date:_____   Participant:_____

Session #:_____   Rater:_____

Time began:_____   Time ended:_____

Please answer the following questions 30 minutes after the child has completed a session and has reintegrated into the classroom.

6. Did the child respond to a request or answer a question when asked using negative verbal statements?

     1   2   3   4   5

not   sometimes   most
at all   of the time

7. Did the child respond to a request or answer a question when asked using positive nonverbal behaviors?

     1   2   3   4   5

not   sometimes   most
at all   of the time

8. Did the child respond to a request or answer a question when asked using negative nonverbal behaviors?

     1   2   3   4   5

not   sometimes   most
at all   of the time

Positive Verbal Statements =statements indicating enjoyment or interest in the situation example: "that was fun", "I like it", "more", "can I stay?", and "I love the dog".
Negative Verbal Statements= statements indicating disinterest of a lack of enjoyment in the situation example: "This sucks", "I hate this", "Can I leave?", "I hate the dog", "Get me out of here" or refusals "I don't want to", "No", "no more".
Positive Nonverbal Behaviors=smiling, laughing, touching the dog (i.e. petting, hugging or kissing, et cetera.), clapping hands, nodding head, complying with a request non-verbally and social agreement "uh-huh" .
Negative Nonverbal Behaviors=turning body or face away from the teacher, crying, frowning (corners of lips turned down), hiding face, attempts to leave the room, physical aggression, property destruction or threats or refusals to respond to dog-related questions or task suggestions.

Appendix I: Social Validity

Name:_____   Date:_____

1=strongly disagree   2=disagree   3=slightly disagree   4=slightly agree   5=agree
6=strongly agree

Appropriateness of Procedures

1. This intervention was easy to use. 1   2   3   4   5   6

2. I would recommend this intervention to other educators and parents.

    1 2 3 4 5 6

3. I liked the procedures used in this intervention. 1   2   3   4   5   6

Social Significance of the Goals

4. It is important to increase the social responsiveness of students with their teacher.

     1 2 3 4 5 6

5. It is important to learn new interventions to change the behavior of children with

     mental retardation. 1   2   3   4   5   6

6. It is useful to examine how a child's interactions with a dog can lead to positive

     outcomes. 1   2   3   4   5   6

Social Importance of the Effects

7. I would use this intervention in the classroom setting again because it is effective.

     1 2 3 4 5 6

8. The presence of a dog led to an improvement in the social interactions of the

     children with their teacher. 1   2   3   4   5   6

9. This intervention was valuable for the child. 1   2   3   4   5