

ANIMAL ASSISTED THERAPY INCREASES FINE MOTOR SKILLS

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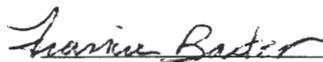
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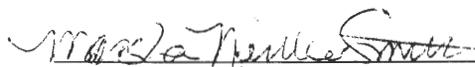
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I am submitting herewith a thesis written by Jillian Roehm entitled "Animal Assisted Therapy Increases Fine Motor Skills." I have examined this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Arts with a major in Occupational Therapy.

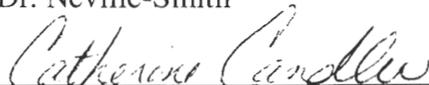


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## ABSTRACT

JILLIAN ROEHM

### ANIMAL ASSISTED THERAPY INCREASES FINE MOTOR SKILLS

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Occupational therapists use animal assisted therapy to address various therapeutic goals, however very little research has been completed regarding how these professionals utilize this intervention. The school setting is one area that occupational therapists utilize this intervention to promote age appropriate fine motor skills.

The purpose of this multiple case study was to discover whether animal assisted therapy incorporated with occupational therapy produces better outcomes than traditional occupational therapy when treating students with fine motor delays. Two kindergarten students identified with delayed fine motor skills participated in four animal assisted therapy sessions with the occupational therapist. Results from both participants revealed slight improvements in fine motor skills. The most improvements were seen in the participants' increased attention and motivation to participate in fine motor tasks. Results of this study provided insight into how occupational therapists can successfully use animal assisted therapy within the school system to improve fine motor skills.

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## CHAPTER I

### INTRODUCTION

Animal assisted therapy (AAT) was introduced to the United States for the treatment of psychiatric patients in 1919 (Hooker, Freeman, & Stewart, 2002). The Delta Society, a nationwide organization involving therapeutic and service animals, defines AAT as an intervention using a certified therapeutic animal directed by a professional to meet specific client goals (Delta Society, n.d.). These goals are set within the professional's area of expertise, which address physical, social, emotional, or cognitive functioning.

Since 1919, AAT has been shown to promote positive physiological, emotional, and physical changes, as well as to build good report with patients (Hoover, et al., 2002; Stoffel & Braun, 2006; Sobo, Eng, & Kassity-Krich, 2006). This intervention also has been shown to decrease loneliness in patients of varying ages and diagnosis (Bouchard, Landry, Belles-Isles, & Gagnon, 2004; Morrison, 2007; Stoffel & Braun, 2006) and to increase literacy skills of students across the United States (Jalongo, Astorino, & Bomboy, 2004; Scott, Haseman, & Hammetter, 2005).

#### Statement of the Problem

Occupational therapists are allied health providers who are known to incorporate AAT into therapy sessions to increase a client's fine motor, visual motor, visual perceptual, and / or sensory processing skills (Delta Society, n.d.). The school setting is one area where an occupational therapist might use AAT, specifically to increase skills required for prewriting tasks

and basic activities of daily living (BADL). Current evidence shows that AAT promotes physiological improvements for pediatric through geriatric patients, however there is little evidence related to the use of AAT for promoting prewriting skills and independence with BADL in kindergarten students.

### Purpose

The purpose of this qualitative study is to add to the growing body of literature related to whether AAT done in collaboration with occupational therapy services produces better outcomes than occupational therapy services without AAT when treating children with delays in prewriting skills and independence with BADL. Results of this study will provide insight into how occupational therapists can successfully use AAT within the school setting to address these delays.

### Research Questions

The research questions for this project are:

- (A) Do children demonstrate increased prewriting skills as a result of occupational therapy with AAT?
- (B) Do children demonstrate increased independence with BADL as a result of occupational therapy with AAT?
- (C) Do children demonstrate increased attention to task when engaging in prewriting activities and BADL directly related to a therapy animal more than traditional therapeutic activities?

## Assumptions

Previous studies report increased motivation and calmness in clients who receive AAT (Jalongo, et al., 2004; Martin & Farnum, 2002; Sams, Fortney, & Willenbring, 2006; Scott, et al., 2005). Based upon these positive results, it is anticipated that participants will demonstrate increased motivation to participate in BADL and prewriting activities when these tasks are directly related to a therapy animal. The therapeutic animal is anticipated to increase intrinsic motivation more than traditional therapeutic activities. Therefore, participants will demonstrate more improvements in the areas of BADL and prewriting skills.

## Definition of Terms

The following key terms are operationally defined for use in this study as:

Animal Assisted Therapy: The Delta Society [DS] (n.d.) formally defines AAT as:

AAT is a goal-directed intervention in which an animal that meets specific criteria is an integral part of the treatment process. AAT is directed and/or delivered by a health/human service professional with specialized expertise, and within the scope of practice of his/her profession. AAT is designed to promote improvement in human physical, social, emotional, and/or cognitive functioning.

(<http://www.deltasociety.org/Page.aspx?pid=320>)

Pet Partner Team: A Pet Partner Team consists of a volunteer pet owner and his or her pet. Both team members have undergone screening and training through the Delta Society to participate in various volunteer opportunities such as those in schools, hospitals, and nursing homes.

Prewriting Skills: Prewriting skills are the basis of handwriting skills, which include in hand manipulation, coloring within lines, copying shapes and basic strokes, copying simple letters, cutting, and drawing. Prewriting skills require coordination of the intrinsic muscles of the hand, muscles of the wrist and forearm, and sensory motor input.

Basic Activities of Daily Living (BADL): BADL are required for daily living and include but are not limited to dressing, bathing, grooming, self feeding, and the correct sequencing and motor planning required to carry these tasks out. BADL addressed in this study were developing the fine motor coordination to manipulate fasteners on clothing.

## CHAPTER II

### LITERATURE REVIEW

#### Historical Background

Animal Assisted Therapy was introduced to the United States in 1919 when dogs were incorporated into the care of psychiatric patients in a Washington, D. C. hospital. However, no documentation of AAT existed until 1961 when Dr. Levinson, a child psychologist, reported his clinical observations of using a dog in his sessions with an adolescent client. Dr. Levinson reported that as the client bonded with the animal, he as the therapist was able to build a stronger rapport with the client, facilitating the client to progress toward set goals (Parish-Plass, 2008; Hooker, et al., 2002).

#### Current Knowledge

More recently studies have shown that interactions with animals can decrease blood pressure, increase survival rates in cardiac patients, improve immune systems, decrease loneliness, and increase spontaneous communication with dementia patients (Morrison, 2007). Within the hospital context, AAT proved to increase relaxation by 85 percent, positive disposition by 29 percent, sleep by 28 percent, and decrease pain by 49 percent in adult patients (Stoffel & Braun, 2006). Other studies report that pediatric patients who received AAT demonstrated decreased pain, increased sense of calmness (Sobo, et al., 2006), confidence, and happiness (Bouchard, et al., 2004). Furthermore, Parish-Plass, found that AAT can improve behavioral

and emotional issues for abused children. She found that the participants demonstrated increased social interactions, feelings of safety and normalcy, self esteem, and ability to develop a healthy attachment (Parish-Plass, 2008).

Animals also appear to have a "sixth sense," which assists with teaching self calming techniques (Roberts, Branberry, & Williams, 2004). Horses involved in an equine-facilitated psychotherapy program were used to teach children between ages 6 and 16 years self calming techniques. These horses only responded to commands given by the child when he or she was relaxed. As a result, each child demonstrated decreased anger and anxiety.

Recently, AAT was introduced to school systems to promote literacy skills (Jalongo, et al., 2004). A Salt Lake City school district reported gains of two to four grade levels of reading skills for all students involved in an AAT literacy program. Similar results were found in a school district in Albuquerque, NM (Scott, et al., 2005). These students demonstrated increased reading skills, interest in reading, school attendance, and self esteem. The researchers also found that each child displayed improved listening skills, ability to work in groups, and were more motivated to participate in writing activities.

Further AAT studies completed within the pediatric setting have focused on children diagnosed with autism. These studies report that children receiving AAT demonstrate more improvements in communication and social skills, including eye contact and happier disposition, than those who participated in occupational therapy services alone (Martin & Farnum, 2002; Sams, et al., 2006).

#### Theoretical Frame of Reference

The Model of Human Occupation focuses on the client's volition (motivation to participate in occupations), habituation (patterns seen in occupations), and performance capacity

(physical and mental state required for success in occupations) (MOHO Clearinghouse, n.d.). When utilizing AAT as an intervention this theoretical model would focus on clients who display an interest and motivation in animals. For example, a client may demonstrate increased volition to manipulate fasteners on an animal's collar to address fine motor skills versus sitting at a table to manipulate fasteners on a board. As a result of utilizing occupation based activities when considering the client's volition, such as the one previously mentioned, an improvement in performance capacity should be expected.

### Summary

Research involving AAT has primarily focused on the elderly and mental health populations; however studies focusing on the pediatric population are increasing. As seen with the studies reviewed, past research has attended to the positive physiological, emotional, and behavioral changes produced by AAT (Hoover, et al., 2002; Stoffel & Braun, 2006; Sobo, et al., 2006) and have primarily been completed by those in the nursing and psychotherapy fields (Hoover, et al., 2002). However, occupational therapists use AAT as a therapeutic intervention to promote increased fine motor, visual motor, visual perceptual, and sensory motor skills (Delta Society, n.d.). Occupational therapy was included in only two articles found related to AAT.

Occupation defined by an occupational therapist is any activity that holds value to someone and helps to shape that person's identity (American Occupational Therapy Association, 2002). Using animals to assist specific clients achieve therapeutic goals in collaboration with occupational therapist, may provide those clients opportunities to participate in occupation based activities rather than traditional therapeutic activities. By using a more occupation based approach with AAT, clients may begin to demonstrate increased progress toward goals.

## CHAPTER III

### METHODOLOGY

#### Introduction

As previously stated, the purpose of this study was to provide insight into how AAT can be utilized within the school context to promote increased motivation and participation in occupational therapy sessions. This volition in turn would promote age appropriate performance capacity in fine motor tasks, BADL, and attention to these tasks. Two participants completed this multiple case study. Data was collected through formal assessments to obtain skills at baseline and post intervention. Other methods of data collection comprised of direct observation, informal interview, and review of archival data. This chapter outlines the methodology of this study by discussing participants, instrumentation, and procedures.

#### Participants

Participants were recruited through purposeful sampling from the Early Intervention Kindergarten class at Joyce Kilmer Academy School 69 in the Indianapolis Public Schools. Specific inclusion and exclusion criterion were considered throughout the sampling process. The inclusion criterion were as follows: students who were ages five to seven years, identified as having delays in prewriting skills and independence with BADL according to recent occupational therapy progress reports, and were already receiving school based occupational therapy to address delays previously mentioned. Exclusion criterion included an expressed fear of dogs, allergies to animals, weak immune system, or a history of aggressive behaviors. Recruitment procedures included sending an informational flyer attached to the consent form home with the qualifying

students in their parent-teacher communication folders, which is the standard form of communication between school staff and parents. Eight students out of ten were identified as meeting all criterion. Only two out of the eight qualifying students returned the consent forms on time to participate in this study. Therefore the sample size for this study included two participants. Participants will be identified by number rather than by name for confidentiality.

### Instrumentation

#### *Peabody Developmental Motor Scales, second edition*

Prewriting skills were measured using the Peabody Developmental Motor Scales, second edition (PDMS-2). This is a developmental standardized assessment which measures fine motor and gross motor skills in children ages birth to six years of age using a three point scale customized for each skill tested. The Fine Motor subtest is divided into two categories (Grasping and VMI) and contains 98 items. The Gross Motor subtest is divided into four categories (Reflexes, Stationary, Locomotion, and Object Manipulation) and contains 151 items. Scores are obtained through scaled scores, percentile ranks, and age equivalents. This assessment has strong reliability and validity (Folio, M.R. & Fewell R.R., 2000).

Only the Fine Motor subtests consisting of Grasping and Visual-Motor Integration (VMI) were administered. Given that the participants' age range falls outside of that required for this assessment, the PDMS-2 was no longer considered standardized. However, their skill levels remained within the age equivalencies allowing this assessment to provide valuable information on current skill levels and on the amount of progress achieved. Age equivalencies were utilized to track progress.

### *Pediatric Evaluation of Disability Inventory*

BADL were measured using the Pediatric Evaluation of Disability Inventory (PEDI). The PEDI is a standardized assessment which measures current functional skills in children ages six months to seven years of age through structured interview. Three separate sections are utilized to provide detailed data on a child's level of independence with age appropriate functional tasks. Part I Functional Skills contains three scales measuring self-care, mobility, and social functions in the form of a checklist containing 197 items. Part II Caregiver Assistance provides data on the amount of assistance a child requires to successfully complete the functional task. This is done through a Likert scale ranging from 0 (dependent) to 5 (Independent) for 20 items. Part III Modifications Scales provides information on the type of modification needed to support the child during the functional tasks assessed and includes 20 items. A list of four choices ranging from no modifications to extensive modifications is provided to categorize the type of support required. Scores are obtained through normative standard scores and scaled scores.

Only the two subtests related to self care were administered. The mean for normative standard scores for both subtests is 50 with a standard deviation of 2, therefore any scores between 30 and 70 are considered within the average range. The scale scores for both subtests range from 0 to 100 with 0 showing no capability and 100 showing independent. Independence of skills tested should be achieved by age 7.5 years.

The PEDI presents with good internal consistency reliability and inter-interviewer reliability. Good construct validity, concurrent validity, discriminant validity, and evaluative validity can also be seen in the PEDI (Haley, S. M., Coster, W. J., Ludlow, L. H., Haltiwanger, J. T., & Andrellos, P. J., 1992).

### *Attention to Task Charts*

Attention to task when participating in prewriting activities and BADL was measured by recording the number of times the participant required redirection to tasks within each 30 minute therapy session. Redirections included verbal cues, physical cues, and / or visual cues. This numerical data was tracked on a chart (see Appendix II). Accuracy of these results were improved by videotaping each session.

### Procedures

Prior to data collection letters of approval to conduct the study were obtained from the IPS Safety and Health Director, the principal of Joyce Kilmer Academy School 69, the Graduate School of Texas Women's University, and the Institutional Review Board for Texas Women's University. The volunteer Pet Partner Team completed the required IPS volunteer forms and background check, which was also required prior to data collection.

The study took place at Joyce Kilmer Academy School 69 within the researcher's office. Participants received intervention together for four 30 minute sessions and completed various BADL and prewriting activities with the occupational therapist and a Pet Partner Team. The same Pet Partner Team participated in all sessions, which allowed for routine. The therapy animal utilized was an 11 year old Golden Retriever.

BADL completed within the area of self care included manipulating fasteners on the dog's vest and collar, completing simple lacing tasks, and feeding treats to the dog. Prewriting activities included stringing small beads, cutting shapes, copying letters, tracing, forming prewriting strokes, and coloring pictures for the therapy dog. After each task participants showed their work to the therapy dog and were allowed to pet him before transitioning to the next task.

Some tasks required the students to be seated at desks, which made the therapy dog a passive contributor. Other tasks required the participants to sit next to the therapy dog and interact directly with him making the therapy dog an active contributor.

#### Data Collection

Baseline and post intervention skill levels were obtained using two formal assessments, the PDMS-2 and the PEDI. Archival data was obtained to provide baseline results of prewriting skills using the PDMS-2. These results were taken from the participants' performance documented in an occupational therapy progress report dated about seven weeks prior to AAT intervention for both participants. Post intervention prewriting skills were obtained less than one week after ending AAT sessions.

The baseline PEDI was administered for participants one week prior to AAT intervention to assess independence with BADL. Post intervention skills were assessed less than one week after completing all AAT sessions. The researcher interviewed the teacher throughout BADL testing to obtain PEDI self-care results.

Tracking attention to task on charts was completed through direct observation by the researcher for all AAT sessions. Participants' attention to task was measured by the number of redirections were required to focus and complete the task. The type of cues required included verbal, visual, and physical cues. Archival data was utilized to provide insight into the participants' attention to task at baseline.

All data collection was completed by the researcher as described above. When data collection and analysis were completed any identifiable information was submitted to the participants' occupational therapy files. All video footage was shredded by the researcher for confidentiality.

## Summary

This multiple case study measured baseline and post intervention skills through formal assessments and review of archival data. Additional post intervention data was collected via direct observations and informal interviews. Both participants completed four AAT sessions together with a familiar occupational therapist to address delays in prewriting skills and independence with BADL. The same Pet Partner Team was utilized throughout all four sessions for consistency. The therapy dog's role transitioned between an active and passive participant during each session. The next chapter will provide details on the findings of this study.

## CHAPTER IV

### RESULTS

#### Introduction

This study sought to increase knowledge on the benefits of using AAT within the school context to increase prewriting skills and age appropriate BADL in kindergarten students. This was achieved by incorporating a therapy dog into four consecutive occupational therapy sessions with progress toward goals measured before and after intervention. This chapter describes results of data collected for the three research questions separately.

#### Background

##### *Case Study 1: Participant One*

Participant One is a six year old Hispanic boy. He presents with a primary diagnosis of autism spectrum disorder and a secondary diagnosis of language impairment. He receives school based occupational therapy services to promote age appropriate fine motor skills and self care skills focusing on manipulating fasteners. Prior to AAT intervention he had a good disposition; however never made eye contact with the therapist, never interacted with a peer, and only repeated a couple phrases during spontaneous speech. Historically he required maximal to moderate verbal and visual cues to attend throughout each session.

##### *Case Study 2: Participant Two*

Participant Two is a six year old African American girl. She presents with a primary diagnosis of mild cognitive disability and a secondary diagnosis of speech impairment. She receives school based occupational therapy services to address fine motor delays related to

prewriting. During therapy sessions the occupational therapist noted that she struggled with manipulating small buttons. Participant Two typically required maximal verbal and visual cues to attend and participate in tasks prior to AAT intervention. She frequently refused participation or would purposefully do the opposite of the direction given. This lack of motivation impacted her progress toward goals.

### Findings

*Research Question 1: Do children demonstrate increased prewriting skills as a result of occupational therapy with AAT?*

Prewriting skills were measured using the grasping and visual-motor integration (VMI) subtests of the PDMS-2. Results of the PDMS-2 report baseline and post intervention performance capacity for Grasping and VMI skills to be below developmental age for both participants. Although delays were still noted post intervention, age equivalents improved. Refer to Table 1 for baseline and post intervention skill levels.

Table 1  
PDMS-2 Age Equivalents

Age Equivalents (months)				
		Baseline	Post Intervention	Difference
<b>Participant One</b>	Chronological Age	73	75	
	Grasp	28	34	+6
	VMI	41	48	+7
<b>Participant Two</b>	Chronological Age	74	76	
	Grasp	40	49	+9
	VMI	47	51	+4

Note. Table 1 explains baseline and post intervention age equivalents for grasping and VMI skills. VMI=Visual-Motor Integration

*Research Question 2: Do children demonstrate increased independence with age appropriate BADL as a result of occupational therapy with AAT?*

BADL were measured using the self-care subtests of the PEDI. Results of baseline and post intervention BADL indicate delayed self care skills as evidenced by normative standard scores and scale scores for both participants. Refer to Table 2 for results of baseline and post intervention self care performance.

Table 2  
PEDI Normative Standard Scores and Scale Scores

<b>Normative Standard Scores</b>				
		<b>Chronological Age</b>	<b>Functional Skills</b>	<b>Caregiver Assistance</b>
<b>Participant One</b>	<b>Baseline</b>	6yrs, 2mth	17.2	32.5
	<b>Post Intervention</b>	6yrs, 3mth	17.2	32.5
<b>Participant Two</b>	<b>Baseline</b>	6yrs, 3mth	18.3	37.5
	<b>Post Intervention</b>	6yrs, 4mth	25	40.7
<b>Scale Scores</b>				
		<b>Chronological Age</b>	<b>Functional Skills</b>	<b>Caregiver Assistance</b>
<b>Participant One</b>	<b>Baseline</b>	6yrs, 2mth	69.1	65.7
	<b>Post Intervention</b>	6yrs, 3mth	69.1	65.7
<b>Participant Two</b>	<b>Baseline</b>	6yrs, 3mth	70	71.1
	<b>Post Intervention</b>	6yrs, 4mth	74.7	74.5

Note. Table 2 explains normative standard scores and scale scores for self-care independence on the functional skills and caregiver assistance subtests. yrs=years; mth=months.

*Research Question 3: Do children demonstrate increased attention to task when engaging in prewriting activities and BADL directly related to a therapy animal more than traditional therapeutic activities?*

Tracking attention to task revealed more redirections were required for both participants when the activities did not directly relate to or involve the dog. Only the number of cues required to stay on task were reported. Cues required for social / language skills or directions rephrased for understanding are not included. Refer to Table 3 for results of attention to task.

Table 3  
Attention to Task

<b>Attention to Task</b>					
		<b>Traditional Therapeutic Activities</b>	<b>Activities Related to Dog</b>	<b>Activities with Direct Interaction with Dog</b>	<b>Transitions Between Tasks</b>
<b>Participant One</b>	<b>Session I</b>	6 cues; 10 min.	2 cues; 10 min.	0 cues; 5 min.	4
	<b>Session 2</b>	2 cues; 3 min., 20 sec.	0 cues; 10 min.	2 cues; 10 min.	0
	<b>Session 3</b>	11 cues; 18 min.	NA	0 cues; 5 min., 20 sec.	1
	<b>Session 4</b>	NA	1 cue; 15 min.	0 cues; 13 min.	0
	<b>Total</b>	<b>19 cues; 31 min., 20 sec.</b>	<b>3 cues; 35 min.</b>	<b>2 cues; 33 min., 20 sec.</b>	
<b>Participant Two</b>	<b>Session I</b>	4 cues; 10 min.	2 cues; 10 min.	0 cues; 5 min.	4
	<b>Session 2</b>	1 cue; 10 min.	0 cues; 10 min.	0 cues; 10 min.	0
	<b>Session 3</b>	19 cues; 18 min.	NA	0 cues; 5 min., 20 sec.	1
	<b>Session 4</b>	NA	1 cue; 15 min.	3 cues; 13 min.	0
	<b>Total</b>	<b>24 cues; 31 min., 20 sec.</b>	<b>3 cues; 35 min.</b>	<b>3 cues; 33 min., 20 sec.</b>	

Note. Table 3 explains attention to task according to the number of redirections required to attend. min.=minutes; sec.=seconds.

## Summary

Both participants' baseline and post intervention skill levels were measured using formal assessments. Results revealed slight improvements in prewriting skills for both participants. Participant Two demonstrated slight improvements with Self Care upon post intervention, while Participant One demonstrated no change according to testing results. Attention to task improved for both when activities were related to the dog or required direct interaction with the dog. Chapter V will provide further analysis of these results.

## CHAPTER V

### DISCUSSION

#### Introduction

Based upon positive effects therapeutic animals have in a variety of settings as found in previous studies, it was anticipated that the use of a therapeutic animal in the school setting would promote positive effects on fine motor skills including prewriting skills and independence with BADL. The previous chapter offered results of baseline and post intervention skill levels for prewriting skills, independence with BADL, and attention to these tasks. This chapter will provide discussions of the findings, implications for practice, and limitations of the study.

#### Discussions of the Findings

##### *Prewriting skills*

Comparison of baseline and post intervention testing of prewriting skills using the PDMS-2 revealed a slight increase of accomplished skills over the course of four AAT sessions for both participants. The timeframe of intervention was short, limiting the amount of time to practice a skill for achievement. This resulted in skills emerging rather than accomplished. It is anticipated that had the AAT sessions continued both participants would have accomplished those emerging skills.

Upon baseline testing Participant One demonstrated difficulty with grasping skills consisting of using a mature pencil grasp, manipulating large buttons at table top, and finger isolation. Difficulties with VMI included folding paper, building a ten block tower, simple lacing, tracing straight lines, imitating six block designs, connecting dots, cutting a square within 1/4 inch of the lines, and coloring within parallel lines. During post intervention testing

Participant One demonstrated emerging skills of imitating six block designs, building a 10 block tower, manipulating large buttons at table top, and folding paper. He was successful with simple lacing, connecting dots, and cutting out a square within 1/4 inch of the lines. When testing post intervention prewriting skills he required no redirections to tasks and maintained visual attention throughout the assessment. Therefore the results from this testing appear to be accurate picture of prewriting skills.

Baseline testing for Participant Two revealed weaknesses in Grasping skills including use of a mature pencil grasp, manipulating a button within 20 seconds, and finger isolation. Areas for improvement with VMI included cutting within 1/2 inch of a 5x1/4 inch line, copying a cross, tracing a straight line, copying a square, imitating six block images, cutting a square within 1/4 inch of the lines, folding paper with edges parallel, and coloring within parallel lines. Post intervention testing revealed emerging skills of building six block images and folding paper with edges parallel. Skills attained included cutting on a line, tracing on a line, and cutting out a square within 1/4 inch of the lines. Participant Two demonstrated poor attention throughout post intervention testing. She required maximal verbal cues to maintain her seat and attend to directions. These behaviors skewed the results as she failed items she has consistently shown independence with over the course of the current school year. Although these behaviors resulted in poor performance on some items, results still indicated slight improvements in both subtests.

Because Participant One's visual attention improved throughout AAT sessions and upon post intervention testing, it is anticipated that improvements of prewriting skills were due to AAT intervention rather than typical development. At baseline Participant Two frequently refused to participate in prewriting tasks making progress within this area slow. Given that her cooperation

and attention improved throughout AAT sessions she became more engaged in learning. Because she was more engaged during AAT sessions it is believed that improvements were due to AAT sessions and not typical development.

### *BADL*

Baseline results indicated Participant One was not capable of multiple self care items, however the most important items for the school context were manipulating all fasteners on clothing. Participant Two was not capable of managing small buttons on clothes within a reasonable amount of time.

Baseline and post intervention testing of independence with BADL using the PEDI demonstrated no improvements for Participant One. Although no change was seen according to results, emerging skills were noted. The PEDI is not sensitive to emerging skills and therefore did not provide an accurate picture of skills attained. At baseline Participant One required maximal assistance with increased time to manipulate buttons and snaps and to engage a zipper on self. Post intervention he required minimal assistance with increased time to fasten large buttons 50% opportunity and was independent 50% opportunity. He required minimal assistance to fasten snaps 75% opportunity and was independent 25% opportunity. He required minimal assistance to engage a zipper 100% opportunity. He was independent with unfastening all items on self 100% opportunity. Participant Two demonstrated improvements with Self Care according to PEDI results. At baseline she demonstrated inconsistent skills with manipulating small buttons on self independently. Post intervention this skill was attained.

Participant One does not have opportunities other than during occupational therapy sessions to increase independence with fasteners as he typically wears clothing that does not require fasteners. Due to this it is believed that his emerging skills of manipulating fasteners is a

result of AAT intervention rather than typical development. Participant Two has opportunities to work on this skill and was demonstrating emerging skills at baseline. It is unclear whether her progress was due to AAT intervention or typical development.

### *Attention*

When comparing archival data related to attention during prewriting and BADL tasks prior to AAT intervention to the Attention to task Charts during AAT intervention, gains were noted. Prior to AAT sessions both participants required maximal to moderate verbal and visual cues to attend and participate. Participant Two refused multiple times to participate in therapy sessions. Once the therapy dog was introduced, both participants demonstrated improvements with attending during both prewriting and BADL tasks. The largest difference was seen in attention to BADL tasks as these tasks required direct interaction with the dog. Both participants focused on prewriting tasks when these activities were directly related to the dog such as tracing pictures of the dog's toys rather than tracing simple animals or shapes. Because both participants required maximal verbal cues for attention at baseline and required more cues during AAT sessions when tasks were non-related to the dog, it is expected that improvements of attention were related to AAT intervention.

Both participants also demonstrated improved social functions based upon direct observations. Participant One began using more eye contact, initiated spontaneous speech, and interacted with a peer by asking for help when needed. Participant Two began using longer sentences and offered help to a peer even at times when he didn't ask but help was clearly needed.

### Limitations

The limitations of this study include a small sample size of two participants which limits generalization of results. The study was brief including a total of four sessions which did not

allow students enough time to generalize skills gained during the AAT sessions into the classroom context. Additionally the assessment utilized to measure self care independence was not sensitive to emerging skills. These results did not provide an accurate picture of skills attained during AAT intervention as changes were clinically noted that were not measured by the PEDI. Also, the researcher acted as the occupational therapist guiding each session and data collection, thus creating bias. To limit bias of data collection the researcher interviewed the teacher to assess both participants' independence with age appropriate BADL.

Future research should utilize a larger sample population with a control and experimental group for comparison. The number of therapy sessions should be increased to allow participants opportunity to fully master a new skill and integrate the new skill into other settings within the school context. Other forms of self care measurement should be considered to accurately assess post intervention skills. Using the PEDI requires a longer timeframe for changes to be accurately measured. Further research is indicated to promote benefits of utilizing therapeutic animals to progress fine motor skills.

#### Implications for Practice

Therapeutic animals have been used in the school setting to promote literacy skills. The findings of this study have shown how therapeutic animals could be utilized to address delays in other school related areas, specifically fine motor skills addressed by the school's occupational therapist. Occupational therapists could also use AAT intervention to promote good sensory regulation by incorporating various grooming activities with the therapeutic animal allowing for tactile, proprioceptive, and vestibular input. The use of a therapeutic animal may also provide opportunities for small group sessions to promote appropriate peer interaction and problem solving skills.

## Conclusion

Although there were only slight improvements of prewriting skills and independence with BADL for both participants, there were major improvements noted in volition including attention to task, participation, and cooperation as a result of AAT intervention. This study has indicated need for further research, however has shown benefits of using therapy animals in the school context to promote increased attention and participation in fine motor tasks.

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APPENDIX A

Attention to Task Chart

### ATTENTION TO TASK CHART

<b>Participant One</b>							
Session	Redirection			Type of Redirection			Comments
	Yes	No	# Times	Visual	Verbal	Physical	
One							
Two							
Three							
Four							

<b>Participant Two</b>							
Session	Redirection			Type of Redirection			Comments
	Yes	No	# Times	Visual	Verbal	Physical	
One							
Two							
Three							
Four							