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The Effects of a Dog Reading Visitation Program on Academic Engagement Behavior in Three Elementary Students with Emotional and Behavioral Disabilities: A Single Case Design

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Abstract

Background Children with emotional and behavioral disabilities (EBD) struggle with behavioral problems during reading activities in school. One way to address these concerns may be through dog reading programs which are increasing in popularity in schools and libraries. Preliminary anecdotal research suggests dog reading programs may improve academic engagement behavior for students with EBD who struggle with reading.

Objective The purpose of this pilot study was to systematically evaluate the effects of a dog reading visitation program on academic engagement behaviors of elementary aged children with emotional and behavioral disabilities.

Methods Participants included three elementary aged students with emotional behavioral disabilities. A multiple probe single case design across students was used to examine the impact of the dog reading program on on-task-reading aloud behaviors. During baseline and maintenance conditions, students read aloud to themselves while during intervention, students read aloud to a therapy dog.

Results The results indicated that all three students experienced increases in on-task behaviors during intervention and maintained improvements over time.

Conclusion Students indicated they enjoyed the dog reading program and increased on-task behavior was observed. Social validity was conferred by the teacher who observed improvements in behavior during intervention. Suggestions for future research include expanding the study with more participants, examining the students reading skills in addition to behavior, incorporating dogs or other animals into other reading activities, and examining the impact of animals in other academic interventions.

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Keywords Emotional behavioral disabilities · On-task behavior · Animal-assisted interventions

Introduction

People with emotional and behavioral disabilities (EBD) frequently experience difficulties both as children in school as well as throughout adulthood. As children, typical behavior problems in school can include aggression towards peers and teachers as well as a lack of social skills and inability to make friends (Cullinan and Sabornie 2004). In addition to a lack of interpersonal skills, these children may receive special education services as a result of their academic difficulties but, despite the educational services received, they frequently continue to receive lower grades and may ultimately drop out of school (Wagner and Cameto 2004). As a result of poor educational experiences and difficulties during childhood and adolescence, as adults, people with EBD may experience difficulty securing/maintaining a job, may abuse illegal substances, and often require mental health services (Bullis and Yovanoff 2006; Walker et al. 2004).

Research seeking to identify the source of difficulty in post-school outcomes for people with EBD found that while in school, many students with EBD experience a lack of sufficient reading skills. Kauffman et al. (1987) suggest a relationship exists between children with reading difficulties and those who experience challenges in dealing with authority figures as adults. Furthermore, although reading difficulties are often first observed in students with EBD during elementary school, the suggested causes of poor reading skills in these students continue to impact the children as they age. Specifically, as children with EBD progress through school, they frequently struggle with reading as a result of difficulties with attention and externalizing problem behaviors (e.g., hyperactivity, aggression). Furthermore, these students tend to have a lower verbal IQ resulting in ineffective verbal skills and challenges with reading and writing tasks. Many students with EBD also experience great difficulty with reading comprehension in middle school and high school. This struggle is a result of the transition from “learning how to read” in elementary school to “reading to learn” which is required for a student to learn new content information in middle and high school (e.g., high school level social studies courses require strong reading comprehension skills) (Lane et al. 2008).

Previous research identifying effective interventions for students with EBD found improvements in reading skills in elementary students at risk for developing EBDs however, the effects were not maintained once the interventions ended (Barton-Atwood et al. 2005; Lane et al. 2007; Wehby et al. 2003). Concomitant to reading difficulties, students with EBD experience challenges with academic engagement and on-task behaviors (Bowman-Perrott et al. 2007). Specifically, behavior is frequently a concern for teachers of children with EBD and previous research suggests reading interventions should seek to target academic engagement behaviors during reading activities in addition to reading skills (Landrum et al. 2003).

Academic engagement can be defined as answering questions and participating in class as well as reading aloud (active engagement) and silent reading behaviors (passive engagement) (Stanley and Greenwood 1983). Greenwood et al. (1984) noted students with disabilities who struggle academically experience fewer opportunities to respond to academic material presented during academic lessons and are therefore less engaged. Furthermore, students who struggle academically are frequently more off-task as the

difficulty of the academic task increases (Cramer and Rosenfield 2008; Gickling and Armstrong 1978; Gilbertson et al. 2008; Treptow et al. 2007).

Increasingly popular approaches for improving behavioral challenges and academic engagement for children with disabilities are animal-assisted interventions (Katcher and Wilkins 2000; Rud and Beck 2000). Animal assisted interventions are also known as animal assisted activities (AAA) and animal assisted therapies (AAT). AAAs are defined as opportunities for motivational, educational, recreational, and/or therapeutic benefits to enhance quality of life. AAAs are delivered in a variety of environments by specially trained professionals, paraprofessionals, and/or volunteers, in association with animals that meet specific criteria “while” 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 (Pet Partners 2012, para 1).

Previous research in animal assisted interventions examined the effects of incorporating therapy dogs may benefit children in a variety of educational settings (Hergovich et al. 2003; Kotschal and Ortbauer 2003). To begin, Kotschal and Ortbauer (2003) found elementary students demonstrated reduced problem behaviors (i.e., aggression and hyperactivity) and increased positive social interactions following exposure to a dog in their classroom. Hergovich et al. (2003) found the presence of a dog in a first grade immigrant classroom had positive behavioral effects on the children in the classroom including decreased aggression and increased empathy. Limond et al. (1997) examined the effects of a real dog and a toy dog on behaviors of eight children with Down syndrome and found the children were more focused on the activity and less distracted by external stimuli during the live dog condition. Specifically in regards to students with EBD, Kogan et al. (1999) examined the impact of animal assisted therapy on two elementary children diagnosed with an emotional disability. During intervention, students worked on problematic behaviors including: lack of attention, hyperactivity, poor social skills, and high rates of opposition. Results indicated the students gained confidence and self-esteem when taught how to correctly give the dog commands and demonstrated an improved sense of control and less learned helplessness following the animal assisted intervention.

In addition to the impact of therapy dogs on children’s behavior in school classrooms, preliminary anecdotal research suggests children may benefit behaviorally from reading to dogs (Newlin 2003). Descriptive reports indicate dog reading programs can improve confidence and motivation (Bueche 2003; Hughes 2002; Jalongo 2005; Jalongo et al. 2004; Newlin 2003). One example, *Reading with Rover*, is a program where children are able to read to volunteers and their dogs in a variety of settings. An examination of the program found students reading below grade level had increased learning and improved reading abilities after reading to the live dogs (Snider 2007). Furthermore, children who participated reported they felt that reading to the dog was less threatening than reading alone with an adult because the dog was not judgmental. Teachers involved with the program indicated improvements in student’s self confidence, increased attendance rate during program implementation, and increased interest in reading (Snider 2007). Similarly, teachers and reading specialists anecdotally reported improvements in struggling readers who participated in the Reading Education Assistance Dogs (R.E.A.D.) (a structured opportunities dog reading programs for libraries and schools) (Jalongo 2005).

Given the previous research in school-based animal assisted interventions and dog reading visitation programs, the purpose of the present investigation was to examine the effects of a dog reading program on the academic engagement behaviors of elementary students with emotional and behavioral disabilities (EBD) in a special education classroom

setting. Specifically, the research question asked “To what degree does a dog reading program impact on-task-reading aloud behavior in elementary students with EBD?”

Method

Participants

Three elementary aged students primarily identified as having an EBD in their individualized education program (IEP) were selected for the study. After receiving Institutional Review Board (IRB) approval for the study, students were selected to participate through a purposive sample involving a recommendation by their special education teacher. Recommendation criteria for the students included: a primary diagnosis of EBD, behavioral difficulties during independent reading activities, willing and interested in participating, and not being fearful or allergic to dogs. Prior to the start of the study, parent/guardian(s) and the three students agreed to the terms of the study through written informed consent/assent. The target students each had one or more pet dogs at home and were not fearful or allergic to dogs. Demographic information for each student is provided in Table 1. All three participated in independent reading time as part of their regular elementary school instruction in their special education classroom. Prior to the study, the three students were grouped homogenously together for reading instruction by their teacher based on similarities in reading ability level.

Student 1 was a 7 year-old 2nd grader who read at grade level; however, the special education teacher reported she often read too quickly, did not decode properly, and would miss words resulting in significant difficulties with comprehension during independent reading activities. She received reading instruction in the special education classroom but was included in general education classes for specials (art and gym), math, science, lunch and recess. Behaviorally, she typically sought to please adults, however, she could become defiant at times when asked to do things she did not want to do. Furthermore, if a task was challenging she would become argumentative and refuse to complete the assignment. Preliminary direct observations of Student 1's behavior during independent reading activities prior to the start of study, found that she would remain on-task initially for

Table 1 Student Information

Student/ gender	Age/ grade	Ethnicity	IQ	Secondary disability	STAR reading grade level	Time in general education (%)	BASC-2 behavioral symptoms index	Dog(s) at home
Student 1 Female	7 years 2nd	White	74	Language impairment, speech impairment	1.3–2.3	45	70 Clinically significant	Yes 1 dog
Student 2 Male	11 years 5th	Af. Am.	79	Learning disability	2.2–3.2	25	79 Clinically significant	Yes 2 dogs
Student 3 Male	11 years 5th	White	72	Learning disability, speech impairment	0.8–1.8	15	65 At-risk	Yes 1 dog

approximately 5 min before becoming off-task. Once off-task, Student 1 would initiate conversations with other students, engage in out of seat behavior, and was often difficult to redirect back to the reading activity.

Student 2 was an 11 year-old, 5th grader who struggled with reading. According to his teacher, he read at a 2nd grade level, demonstrated poor adaptive skills, and struggled with anxiety, particularly when he exposed to a difficult task. He received instruction primarily in the special education classroom but was in general education for specials (gym and art), lunch, and recess. His teacher indicated he could be sensitive to failure and when he did not perform well he would either become visibly upset (e.g., clenched face and fists) or uncharacteristically quiet. Overall, he was compliant but became oppositional with directions and argued with the teacher when tasks were difficult and he became frustrated or angry. Prior to beginning this study, he was observed by the researchers, reading aloud for a short period of time during independent reading time (e.g., 5 min) before asking his teacher how much longer he was required to read. He also would frequently flip through his book without reading the text.

Student 3 was an 11 year-old 5th grader who had difficulties socially and academically. His teacher reported he demonstrated challenges with interacting appropriately with his peers (e.g., would interrupt others when talking or verbally insult other students in the class). In regards to academics, he read at a 1st grade level and did not pass the state standardized test in language arts the year prior to the study. He received instruction primarily in the special education classroom but was included in general education for lunch, recess, and physical education. Student 3 struggled with decoding words and thus, reading comprehension. As a result of his academic struggles he often exhibited learned helplessness behavior and frequently argued about beginning or completing an assignment that he viewed as challenging. He became easily frustrated during reading activities, would say “I don’t know” when asked questions about an assignment, and was frequently distracted and off-task when reading independently. For example, instead of reading independently when assigned, he would talk with neighboring students or get up from his seat and move around the classroom.

Setting

All students attended a special education class for children with EBD during the same class period and the students’ primary special education teacher oversaw all independent reading activities. Additionally, two paraprofessionals were also present in the classroom. In addition to the teacher, paraprofessionals, and the three target students, seven other students participated in academic activities in the classroom at the same time (these students were not included in the study because they did not meet the criterion for inclusion; however, all students had the opportunity to interact with the therapy dogs).

The three students were taught reading using the Harcourt Trophies Reading Series (grade K-5) (Houghton Mifflin Harcourt School Publishers, Houghton Mifflin Harcourt School Publishers 2009) and all three worked at the 2nd grade level. Daily literacy instruction involved three different stations including: small group instruction with the teacher, independent worksheets, and independent reading. This study took place during the independent reading time during daily literacy instruction. During independent reading activities, students read in the classroom library area that included two chairs and two large bookshelves containing a wide range of books. The books were organized by topic (i.e., animals, holidays, sports, etc.) and accelerated reader (AR) (AR; Accelerated Reader Enterprise 2012) level. During baseline and maintenance conditions, students read at their

desk or in the library area. During intervention, students read to the therapy dog in a private corner of the classroom and sat next to the dog. In addition to the researcher and the student, the volunteer dog handler also sat near the dog to help ensure the dog laid/sat quietly while the student read.

Independent and Dependent Variable

The dog reading program was the independent variable for the study. The dependent variable targeted during this study was the **percent of intervals of on-task-reading aloud behavior, which was determined through direct observations of the students.** On-task reading aloud was operationally defined as: Eyes on the book (cover or book opened looking at pages) and reading loud enough that the observer(s) could easily hear the words read by the student. Any correct verbalizations of target words or attempts to correctly verbalize the words in the book were marked as on-task. If the student did not have his or her eyes looking at the book for three or more seconds; or if (s)he engaged in an incompatible behavior such as approaching the teacher, talking (saying anything other than the words in the book), got out of their seat, or put the book down, the student was marked as off-task. Inaudible murmurs were also marked as off-task.

Materials

Pet partner teams (dogs and their owners) were recruited to implement the dog visitation reading program intervention through a local animal assisted activity organization which provides opportunities for people to interact with therapy animals. All volunteers owned their dogs and the handle/dog teams dogs were certified by the Delta Society (now Pet Partners), a certification organization that ensures therapy animals are properly trained and tested for safety (Delta Society 2009). Teams certified by Pet Partners require the human handler complete coursework, the animal to pass a health screening assessment, and the animal/human team to complete an evaluation. During evaluations the teams are assessed to determine how well the handler and animal interact during a skills assessment (e.g., handler gives commands to sit, stay, leave it) and how the team handles mock site simulations (e.g., how does the person and animal respond when the animal is crowded and pet by a number of different people at the same time).

Three pet partner teams consisting of a handler (the dog's owner) and a Pet Partner certified therapy dog each visited the classroom on different days of the week. The three teams including a greyhound named Batman and his owner who came on Thursdays, a golden retriever named Brutti and his owner who came on Tuesdays and Fridays, and another golden retriever named Sonny and his owner who visited the classroom on Mondays and Wednesdays. During intervention sessions, each student individually read to the dog (e.g., on Thursdays, Student 1 would read to Batman first from 8:30 to 9:00 a.m., then Student 2 would read to him from 9:00 to 9:30 a.m., and then Student 3 would read to him from 9:30 to 10:00 a.m.)

All books read during each condition were self-selected by students from the teacher's library located within the classroom which contained accelerated reader (AR) books. AR is a reading program designed to assist students in grades K-12 during independent reading activities. The traditional AR program involves students reading books at their independent reading level, reading the book one or multiple times, completing a computer based multiple-choice quiz, and receiving feedback regarding their quiz score. Prior to the start of the study and as part of the students' normal classroom requirements, they participated in

the traditional AR program. Within the library, the teacher had a variety of books categorized into several categories (e.g., holidays, sports, animals). Each book included in the library had the AR reading level of the book (e.g., 0.2, 1.3, 3.4, 5) written on the outside binding so the students could easily determine which books were at their assigned reading level.

Experimental Design

A multiple probe across student single-subject design was used to determine the impact of reading to a therapy dog on the on-task behavior. This quantitative design was chosen as it provided a means to decrease the collection of data across the multiple baselines while concurrently ensuring that no significant changes occurred before the introduction of the intervention. Additionally, the multiple probe design allowed investigators to determine if a functional relationship existed between the intervention (reading to the therapy dog) and on-task behaviors (Kennedy 2005). A multiple probe design is frequently used when academic learning is involved (Alberto and Troutman 2006) as such, this design was selected because it best controlled for possible learning or carry-over effects as a result of student exposure to reading.

Data Collection

Prior to the start of the study and as part of their daily independent reading activities, the students' daily progress monitoring reading comprehension skills were assessed using the AR program. Student's reading level was pre-determined through the AR pre-quiz called the STAR reading quiz which identifies students reading level. Following the STAR reading quiz, the students' special education teacher corroborated that the placement level provided by the STAR assessment accurately reflected the students' current instructional reading level (i.e., 2nd grade). Once their reading level was determined, students self-selected books at the upper end or slightly above their current STAR reading level to ensure they were reading near or at frustration level (i.e., challenging task) throughout all conditions of the study.

Interval recording was used to determine the percentage of intervals the students were on-task reading aloud during each phase of the study. Interval recording involves dividing an observation period into a number of short intervals and then determining the percentage of intervals that the behavior is displayed (Alberto and Troutman 2006). During each condition, students were observed during independent reading and the percentage of intervals they exhibited on-task reading aloud behavior was recorded. On-task behavior was directly observed using a modified version of the Behavioral Observation of Students in Schools (BOSS; Shapiro 1996). The BOSS code is a systematic direct observational measure used to record academic skills using interval recording and allows researchers to create a numerical recording for behaviors observed in natural settings such as a classroom (BOSS; Shapiro 1996).

Each observation period consisted of the total duration it took the student to read each book and each session was further divided into 15 s intervals (e.g., if a student took 10 min to read a book, there would be a total of 40 intervals for that session). Momentary time sampling was used to record the occurrence of on-task reading aloud behavior within a given interval. During each 15 s interval, students were observed for the first 10 s and behaviors were recorded during the last 5 s of the interval. Behaviors recorded for each interval indicated a single notation therefore, the students were either marked as on-task for

all of previous 10 s or off-task for the 10 s period based on the operational definition (e.g., if the student looked away from the book for more than 3 of the 10 s in the interval the student would be marked as off-task for that interval). Percentage of intervals of time on-task was calculated by dividing the total intervals on-task by the total intervals it took to read the book (e.g., a student who read a book in 10 min and was marked as on-task during 38 intervals and off-task during 2 intervals would be on-task for 95 % of the 10 min period)

Procedures

Prior to baseline, students participated in preliminary activities where they were introduced to the therapy dogs and the purpose of the investigation. Target students were identified based on study criteria and following receipt of informed consent/assent, students were interviewed to obtain their perspectives regarding the study. Social validity measures were also conducted with the teacher during this pre-intervention condition. Target students also completed the STAR assessment to determine the book level they should read during the study.

Baseline

During this condition, students were observed during independent reading activities for up to 2 weeks. Students self-selected AR books from the library located in their teacher's classroom. The observational period began after the students selected a book and were given instructions to read aloud to themselves. The student on-task behaviors were then recorded using the BOSS code through direct observation as they read.

Intervention

Intervention activities took place over 4 weeks during which the designated pet partner team (handler and certified therapy dog) was present in the classroom on their respective days each week (i.e., Sonny and his owner came on Mondays and Wednesdays, Brutti and his owner came on Tuesdays and Fridays, and Batman and his owner came on Thursdays). The length of time the pet partner team spent in the classroom ranged from 30 min to 1.5 h/visit. The following script was read to each student prior to each intervention session,

_____ (student name) it is time for you to go read your AR book to the dog. If you are not sure about a word you can try to sound it out or you can skip it, remember how well you read and your AR score are not counting towards your grade. While you read you can pet the dog if you want. After you are finished reading you need to take your AR test. You will be allowed to play with the dog after you are through. Do you have any questions?

During intervention, each student read his/her AR book individually to the dog while the handler was present to ensure the dog was obedient and the researcher was present to observe and record the student's on-task reading aloud behavior. No assistance was provided to the student during the reading activities. Prior to starting each session, each student self-selected a book that was at the upper instructional/lower frustration level (i.e., Student 2's STAR level was 2.2–3.2 so he selected books that were 3.0 or above) to read. Each then individually read his/her book aloud to the dog in the private corner of the classroom designated for the dog reading visitation program. Following completion of the

AR quiz, each student was allowed to play with the therapy dog for a 5–10 min period. During this time, students could take the dog for a walk, groom it, ask the dog to complete commands (e.g., ask the dog to sit), and/or pet the dog. Additionally, following each intervention session, the teacher would allow the other students in the class who were not participants in the study to spend time with the dog, however no systematic data was collected on the other students' interactions with the dog.

Maintenance

One month following intervention activities, students completed a cumulative maintenance assessment over a two-day period. During this time, the maintenance of on-task behaviors reading aloud behavior was assessed. The same procedures used during baseline (no therapy dogs were present) were used during the maintenance condition.

Social Validity

Twice during this investigation, prior to intervention and following the maintenance condition, students and their teacher were interviewed to determine the social validity of the dog reading program (Table 2). Interviews were conducted individually and responses were recorded using paper and pencil. Prior to intervention and after meeting the dogs, students indicated they liked the dogs and thought they would enjoy reading to them. In addition, each believed that reading to the dogs could help them with their reading. The teacher indicated the dogs might help students feel they were not alone and could help alleviate their anxiety during reading. She also noted the dogs might help students improve their confidence when reading but was not sure if the students might use the dog as a crutch claiming they could not read if the dogs were not present. She also was unsure if the dogs would be distracting.

Following maintenance, students and their teacher were interviewed a second time. Students confirmed their initial positive thoughts about reading to the dogs with all indicating they liked the activity, noting they were more confident during this time because the dogs listened while they read. Student 1 indicated the dogs helped when reading harder books and wanted the dogs come to help her during math. Similarly, Student 2 noted how the dog listened when he read aloud and it helped him to sound out words. Student 3 also observed that the dogs would not criticize his reading. Student 2 indicated he enjoyed reading to the dogs but did not like that it took away from him getting to complete his homework during school. The teacher indicated students expressed eagerness for one-on-one time with the dogs and observed that Student 1 and 3 built a relationship with the dogs and appeared to enjoy reading to them. She also noted that all students in the class seemed more engaged in reading activities when the dogs were present. One problem she communicated was scheduling the dogs to come at a certain time and indicated the presence of a full time therapy dog would help address this concern.

Interobserver Agreement and Treatment Integrity

Interobserver agreement data were collected by a trained second observer. The second observer recorded the student's on-task reading aloud behaviors simultaneously through direct observation with the first observer. Interobserver agreement was calculated by dividing the number of agreements by the number of agreements plus disagreements of the intervals that indicated the student was engaged in on-task reading aloud behaviors and

Table 2 Pre and post social validity questions

Student interview questions (pre intervention)	Teacher interview questions (pre intervention)
<ol style="list-style-type: none"> 1. What do you think about the dog? 2. Do you think you will like reading to the dog during independent reading? 3. What do you think you will like most about reading to the dog? 4. What do you think you will like least about reading to the dog? 5. Do you think it is important to read well? Why? 6. How do you think reading to the dog will help your overall reading skills? 7. Do you think you will be comfortable when you read to the dog? 	<ol style="list-style-type: none"> 1. What do you think about the dog? 2. Do you think the dog will assist students in reading comprehension skills? 3. Do you think the dog will help improve academic engagement behaviors? 4. What aspects of having the students read to a therapy dog do you think are useful in the learning process? 5. Do you think having the students read to the therapy dog will allow you as the teacher to be more efficient and effective in teaching? 6. What are your concerns about having your students read to the therapy dog? 7. What benefits do you foresee in having the students read to the dog? 8. Do you think a therapy dog/classroom pet is something you would use in the future with your students?
<i>Post intervention questions</i>	
<ol style="list-style-type: none"> 1. Did you like reading to the dog? 2. Did you feel more confident in your reading skills when you read to the dog? 3. Did reading to the dog help you to learn to read better? <ol style="list-style-type: none"> a. If it did, how do you think it helped? b. If it did not, why do you think it did not? 4. What did you like most about reading to the dog? 5. What was the worst thing about reading to the dog? 6. Would you want your teacher to let you keep reading to the dog during your independent reading time? 7. Would you like to have other opportunities to interact with a dog or other animals? 8. Would you like to have animals used in your other classes? 9. Did reading to the dog help you learn? 10. Did you feel comfortable with the dog? 	<ol style="list-style-type: none"> 1. Did you like having the students read to the therapy dog? 2. Do you think having the students read to the dog improved their reading skills? 3. Do you think having the students read to the dog improve their academic engagement behaviors? 4. Do you think the students were more confident in their reading after reading to the therapy dog? 5. Do you think it was better, worse, or equivalent to traditional independent reading activities? Why? 6. What did you like most and least about having the students read to the dog? 7. Would you have your students read to a therapy dog again? 8. Would you consider using a therapy dog or a classroom pet to teach or reinforce behaviors or other academic skills if they were available?

then multiplying this number by 100. For Student 1, data were recorded during 40 % of baseline and intervention sessions and 50 % of maintenance sessions. Agreement was 100 % for baseline and maintenance and 98 % for intervention. For Student 2, data were recorded during 40 % of the baseline and intervention sessions and 50 % of the maintenance sessions. Agreement was 94 % for baseline and 100 % for intervention and maintenance. For Student 3, data were recorded during 50 % of baseline and maintenance sessions and 40 % of the intervention sessions. Agreement was 83 % during baseline, 98 % during intervention, and 97 % for maintenance.

Treatment integrity involves collecting data on the implementation of the independent variables particularly for single subject research (Kennedy 2005). In order to provide quantification of the treatment condition a checklist was developed to assess treatment integrity during the intervention condition. The checklist included the following items: the student met the researcher and the dog, the student was selected a book and read aloud to

the therapy dog, and the student was allowed to play with the dog after completing the AR quiz. Treatment integrity was collected during 30 % of sessions for Student 1, 40 % of sessions for Student 2 and Student 3. Treatment integrity was 100 % for all sessions for all three students.

Results

The results indicate all three students experienced moderate to significant improvements in on-task behavior when participating in the dog reading program. All demonstrated gains in on-task behaviors between baseline and intervention and between baseline and maintenance. Figures 1, 2, 3 illustrates the percent of time on-task-reading aloud for each student during each condition.

Data Analysis

This study used a single subject methodology therefore visual data analysis was used to interpret the data. Visual analysis involves examining the data for patterns and drawing conclusions based on what the data represents (Kennedy 2005). Visual analysis is used to determine both within and between phase patterns. Level, is the first criteria used in visual analysis. Level refers to the average (mean or median). When examining level it is important to consider the overall average as well as the average of the last few data points prior to a phase change (Kennedy 2005). Trend is the second area that is examined through visual analysis. Trend is examined through slope (upward or downward slant) and magnitude (rapid or gradual increase or decrease in the data) (Kennedy 2005). Lastly, visual analysis examines the level of variability (degree to which data points deviate from the overall trend). In addition to level, trend, and variability, immediacy of effect is also used to examine the impact between phases (e.g., baseline and intervention). Immediacy of effect refers to how quickly a change in the data pattern is observed after a phase change and is typically assessed through level or trend changes.

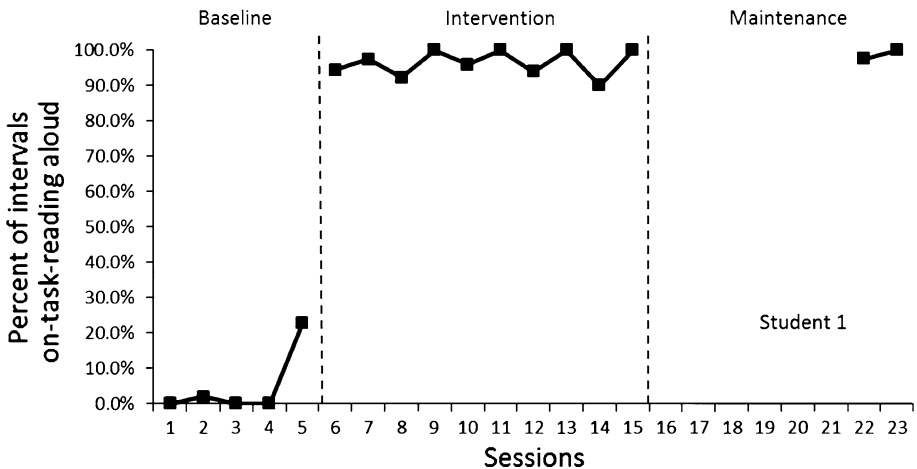


Fig. 1 Student 1's percent of intervals on-task-reading aloud

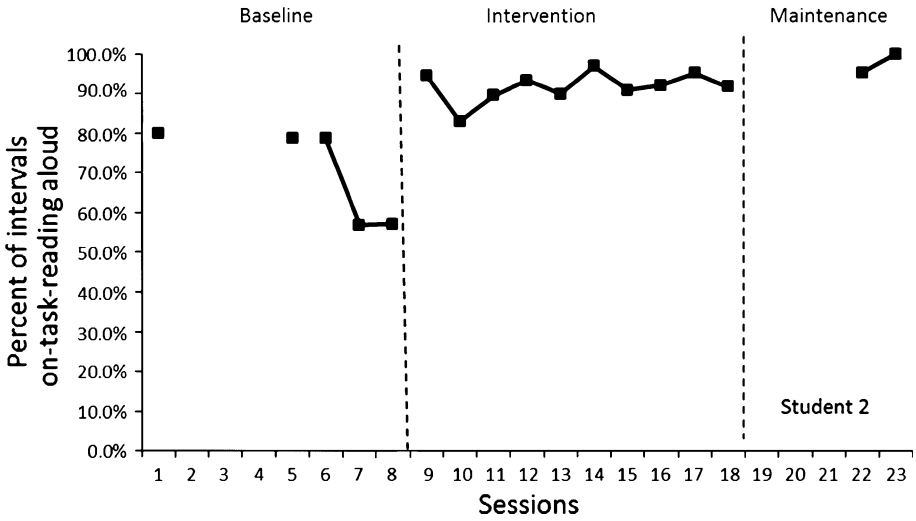


Fig. 2 Student 2's percent of intervals on-task-reading aloud

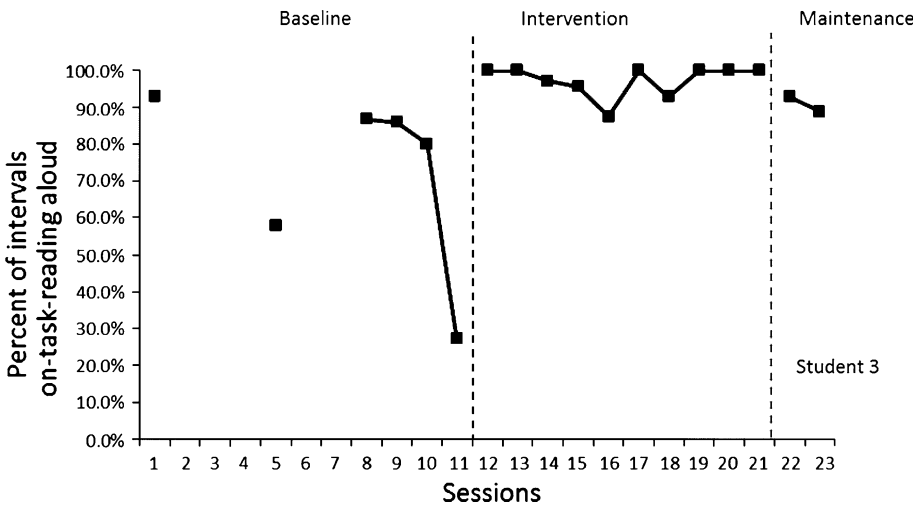


Fig. 3 Student 3's percent of intervals on-task-reading aloud

Percent of non-overlapping data (PND) is another method used to analyze data between phases. PND is determined by finding the highest (or lowest) baseline data point. This data point is then compared to the data points in another phase (e.g., intervention) that are above (or below) it. The proportion of data points not overlapping between baseline and intervention phases are then calculated to determine the PND (Scruggs et al. 1987). PND scores above 90 indicate an effective intervention; scores between 70 and 90 indicate a fairly effective intervention; scores between 50 and 70 are questionable; and interventions with scores below 50 are considered ineffective (Scruggs and Mastropieri 1998).

Student 1

Throughout the study, Student 1 read books at the upper 2nd grade and lower 3rd grade reading level. Student 1's time on-task increased during intervention and remained high during maintenance compared to baseline performance. Figure 1 illustrates the percent of intervals of on-task behavior for Student 1. During baseline, she exhibited on-task-reading aloud behaviors during an average of 5 % of intervals and this increased to an average of 96 % of the intervals during intervention. Visual analysis of the data demonstrate an immediate intervention effect was observed during the first session of intervention (on-task 94.4 % of the time) compared to the last session of baseline (22.9 % of the time on-task). Additionally, on-task behavior remained high throughout intervention with a lower level of variability (range 90–100 %) compared to 0–23 % during baseline. The percent of non-overlapping data between baseline and intervention was 100 % and was also 100 % between baseline and maintenance indicating the intervention was highly effective in increasing on-task-reading aloud behaviors.

Student 2

During the study, Student 2 read books at the 3rd and 4th grade level. Student 2's time on-task also increased during intervention and remained high during maintenance compared to baseline performance. Figure 2 illustrates the percent of intervals of on-task behavior for Student 1. He was on-task during an average of 70 % of the intervals during baseline and an average of 92 % of the intervals during intervention. There was also an immediate effect observed at the start of intervention. Specifically, during the last session of baseline he was on-task for 57 % of the time compared to the first session of intervention when he was on-task 94.5 % of the time. The percent of non-overlapping data between baseline and intervention and between baseline and maintenance was 100 %. Additionally, there was a slight increase in the maintenance average (98 %) from the intervention average of 92 % indicating the on-task reading aloud behaviors were maintained over time. Visual analysis indicates on-task behaviors were highly variable during baseline (ranging from 57 to 80 % of the time on-task) and became less variable during intervention (ranging from 83 to 97 % of the time on-task) and maintenance (95–100 % of the time on-task).

Student 3

Student 3 read books at the 1st and 2nd grade level during the study. Time on-task increased during intervention and remained high during maintenance compared to baseline levels. Figure 3 illustrates the percent of intervals of on-task behavior for Student 1. During baseline, he was on-task for an average of 72 % of the intervals and 97 % of the intervals during intervention. Similar to Students 1 and 2, an immediate increase between the last session of baseline and the first session of intervention was observed indicating the intervention had an immediate impact on Student 3's behavior. Specifically, during the last session of baseline he was on-task during 27.3 % of the time compared to the first session of intervention when he was on-task 100 % of the time. The percent of non-overlapping data between baseline and intervention was 80 %. Visual analysis indicated time on-task was highly variable during baseline (ranging from 27.3 to 86 % of the time on-task) and more stable during intervention (ranging from 87.5 to 100 %) and maintenance (ranging from 88.9 to 92.9 %).

Discussion

The purpose of this pilot study was to examine the effects of a dog visitation reading program on academic engagement (i.e., on-task reading aloud behaviors) in elementary students with emotional and behavioral disorders during a challenging reading task. Visual analyses of the data indicate on-task reading aloud behaviors increased and remained high for all three students during intervention despite the students reading challenging books. Previous anecdotal research indicated potential behavioral benefits for students who read to a therapy dog (Bueche 2003; Jalongo 2005; Jalongo et al. 2004; Hughes 2002; Newlin 2003); however, this research did not systematically examine the effects of these programs on students with emotional and behavioral disabilities. This study sought to provide preliminary evidence on the effects of this type of program on students with emotional and behavioral disabilities and provide important implications for future research.

The results demonstrate that students were more on-task when given the opportunity to read aloud to the therapy dog and the students all shared that they enjoyed reading to the dogs. This is of particular significance since students with EBD tend to lack academic engagement particularly during difficult tasks (Lane et al. 2007), often choose not to engage in academic tasks (Slate and Saudargas 1986; Teeple and Skinner 2004), and often demonstrate disruptive and off-task behaviors (Sutherland et al. 2008). Furthermore, previous studies with elementary students found that time on-task was lower when students read at instructional level or frustration levels (Cramer and Rosenfield 2008; Gickling and Armstrong 1978; Treptow et al. 2007). The present study found that although students were reading at the upper instructional/lower frustration level during the study, their task engagement improved during intervention and was maintained. This indicates students were engaged and on-task despite it being a challenging task.

All participating students experienced an initial improvement in on-task reading aloud behavior observed at the start of intervention. These results are important as they indicate that students had the potential for greater task engagement during baseline however, it was not until the dogs were present during intervention that they became engaged in the reading and more willing to read aloud. The level of connection students demonstrated with the dogs varied and this may have influenced their levels of motivation to be on-task during the reading activities. For example, Student 1 was initially reluctant to read aloud during baseline however, this quickly changed once intervention began and she started reading to the dogs.

When it was her turn to read to a dog, Student 1 would quickly find a book to read, sit down next to the dog, and begin petting/talking to the dog. She would often continue to pet the dog while she read her book and showed the dog the illustrations. After the reading activities were completed she enjoyed petting the dog and taking the dog for a walk in the school hallway. Furthermore, Student 1's relationship with the dogs expanded beyond the required interactions during the study. For example, during one session she brought in baby pictures of herself to show the dog Brutti and also drew a picture to give to him. During another session, once she completed her required reading and prior to the next student reading, she requested to read a personal book to the dog. At the beginning of the study, the teacher indicated Student 1 tended to read fast and missed information as a result. It appeared that providing the dog as a reading companion provided her with the ability to focus individually on making sure the dog heard each word she read prompting her to slow down and become more aware of what she was reading.

Similar to Student 1, Student 3 appeared to develop a close bond with the dogs and would frequently talk to the dogs at the beginning of the study before beginning to read his

book. After completing his AR quiz, he enjoyed petting the dog and liked giving basic commands for the dog to complete (e.g., shake). Student 3's on-task behavior was more stable during intervention and he also read at a higher volume and spoke more clearly than he did during baseline. He noted he enjoyed having the dogs come to visit him in the classroom and liked reading to the dogs even though the books were challenging. Student 3 indicated he enjoyed spending time with the dogs and liked taking the dogs for walks in the hallway after the reading activities. During the last session, Student 3 asked if he could read an extra book to the dog. This indicates that he was motivated to continue reading to the dog which is of particular notice since his teacher reported he was frequently reluctant to read.

Student 2 differed from the other students as he would not usually talk to the dog prior to reading his book and would typically only pat the dog at the end of the reading activities and usually declined any further interactions with the dog. When asked about his experience, Student 2 noted that he was proud of himself for reading challenging books throughout the study and he enjoyed reading to the different dogs. He indicated he would have preferred to not have the human audience which included the handler and researcher.

Limitations and Future Research

One limitation of this study is its small sample size. While three participants are appropriate for a study using single case research methodology, generalization of results is limited to larger numbers of individuals within the same population. Additionally, the intervention was short term which limited the scope of the study to behavioral changes and future studies may want to examine interventions over a longer period of time (e.g., the entire school year) as well as examine academic factors. Unlike many dog reading programs, the volunteer dog handlers during this study did not prompt or assist the students in any manner and did not attempt to teach reading skills during the sessions. Typically in these programs, volunteers are trained to assist children with reading activities, however the purpose of this study was to examine behavioral changes and therefore reading skills were not taught.

A review of the students' AR quiz scores indicate that there was an immediate increase in comprehension scores for all three students at the start of the intervention however, further analyses found high levels of variability. The initial increase may be a result of the therapy dogs providing motivation to the students to be more engaged during the reading tasks; while the variability may be a result of different procedures used in the study than in the typical AR program (e.g., during the typical AR program, students read at the instructional level and may read a book multiple times prior to taking the quiz) (Nunnery et al. 2006).

Future research should expand beyond the behavioral measures used in this study and examine academic effects of a long-term dog reading program on students with disabilities. Future studies should also seek to replicate this study using a larger sample across various classrooms/schools and perhaps use a group design to compare dependent measures (e.g., on-task behavior, reading skills) during dog reading visitation program to a traditional reading program (e.g. peer or teacher). One limitation of the current study is that it is not known if the behavioral effects observed were a result of the students reading to the dogs or if the student's behaviors were impacted by the presence of multiple adults during the intervention condition. The researcher was present during baseline however the students were instructed to read to themselves during baseline and maintenance as this was most reflective of their classroom independent reading activities. Future research should seek to

examine the impact of using a group design to compare the behavior across different groups (e.g., students who read to an adult only, compared to students who read to a dog only, compared to students who read to a dog and an adult). Furthermore, it may be of interest to examine how willing a student is to accept help when reading with a human (e.g., adult or peer) compared to when reading to a dog and volunteer particularly if the “assistance” is coming from the dog’s point of view (i.e., the handler says the dog thinks the word is...).

Previous research demonstrated that increased engagement is linked to improved academic performance (Connell et al. 1994; Marks, 2000); therefore, the improvements in task engagement observed during this study should be further examined in addition to the critical aspects of literacy including accuracy, fluency, and comprehension during animal assisted interventions. Future research should examine the impact on behavior and reading skills when incorporating animals into explicit reading instruction (e.g., direct instruction, repeated readings, systematic prompting, error correction) that is necessary to improve reading skills of individuals who struggle with decoding (Bursuck and Damer 2011). The results of this study indicate the dogs possibly served as a motivator to the students and facilitated increased engagement; however, this study did not specifically examine student motivation during reading activities. In addition to motivation, persistence when reading may be effected by allowing children to read to dogs and this may be particularly critical for children with disabilities who experienced prior failure or significant struggles with reading activities.

Previous research found that the presence of a dog can decrease blood pressure when adults were asked to complete working memory tasks (Allen et al. 1991, 2001, 2002 and when children were asked to complete a stressful tasks (i.e., read aloud to the researcher) (Friedmann et al. 1983); hence, it may be of interest to examine if students are more interested in reading and/or have more success when reading if given the opportunity to read to a dog compared to reading to a person. This pilot study begins to examine the potential impact animals may have on behavior and future research needs to be conducted to better understand the relationship and potential impact animals can have on learning in children with disabilities.

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