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Measuring the Effects of Reading Assistance Dogs on Reading Ability and Attitudes in Elementary Schoolchildren

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Abstract

Reading Education Assistance Dogs (R.E.A.D.) is a reading program that uses therapy dogs to increase a child's desire and ability to read. However, more data is needed to demonstrate the effectiveness of such programs. A five-week R.E.A.D. program was implemented to assess feasibility and effectiveness. Participants included 18 children entering the 2nd grade (9 assigned to read to dogs and 9 assigned to read without dogs present). Fifteen children completed the study (9 in the Dog Group and 6 in the Control Group; $p = 0.058$). To detect changes in reading ability and in attitudes toward reading, a Curriculum Based Measurement (CBM) for reading and an Elementary Reading Attitude Survey (ERAS) was given at week 0 and week 5. There were no significant differences over the course of the study in ERAS scores for the Dog Group, but the Control Group had significant reductions in the ERAS academic score ($p = 0.04$) and a trend for a reduction in the ERAS total score ($p = 0.06$). There was a numerically larger but not statistically different reduction in CBM in the Control Group compared to the Dog Group ($p = 0.16$). Further studies are warranted to determine if these trends represent statistically significant effects of the R.E.A.D. program.

Keywords

attitudes; motivation; early reading; educational research

Reading ability has a significant impact on all areas of academic learning. Poor reading skills at an early age can lead to an overall dislike of school and can increase the risk of drop out (Ecklund & Lamon, 2008; Hernandez, 2011). Also, low literacy levels can lead to underachievement in all academic areas (Ecklund & Lamon, 2008) and can significantly impact an individual's education and future success. Students who struggle with reading benefit from individual reading instruction and extra reading time (Duke & Block, 2012; Wilfong, 2008). However, schools often have limited time and resources to devote to students who are having difficulties.

Motivation to practice reading is integral to improving reading skills. A student's motivation to read independently is a key factor in the overall improvement they will achieve, and

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students who spend more time on independent reading tend to earn higher reading scores (Mullis, Martin, & Gonzalez, 2003). Unfortunately, students who struggle with reading often have a low motivation to practice reading, thus compounding the problem (Ecklund & Lamon, 2008). Struggling readers also tend to feel more negatively toward reading in school, which can be due to embarrassment or frustration about their reading skills (Mckenna & Kear, 1990). This can make it difficult to implement effective school reading programs for these students. Increasing students' motivation to read would not only benefit the students, but also remove some of the burden from schools by increasing the amount of time students spend reading on their own.

Students who struggle with reading often have low self-esteem and tend to withdraw from classroom activities (Ecklund & Lamon, 2008). This decrease in confidence, along with a lower motivation to practice reading, makes this population of students very difficult to reach. In addition, studies have shown that students who do not learn to read effectively in primary grades are likely to never achieve full literacy (Sloat, Beswick, & Willms, 2007). Therefore, it is imperative that reading programs be designed to engage young readers. With so many challenges facing reading educators, a reading program that addressed many of these issues, without taking time away from regular reading instruction, could serve as a supplementary aid to help students who struggle in reading. This reading program would occur outside of the normal school day, and would provide students with extra time to practice their reading skills. For this reading program to really be effective, it must creatively motivate students to read, while also providing struggling readers with the increased confidence they need to practice and improve their reading skills. Implementation of such a reading program could help schools reach more struggling readers.

One possible approach that incorporates these features is to use therapy dogs as part of a reading program. There are many health and psychological benefits of contact with animals (Barker & Wolen, 2008), particularly for children. One study found that pre-adolescents who had a pet also had higher autonomy, self-concept, and self-esteem, all qualities considered important for academic success (Van Haute & Jarvis, 1995). In addition, results from this study also suggested that pets can be considered as a source of support (Van Haute & Jarvis, 1995). These benefits from human and animal interaction are not limited to pet owners. Another study found that the presence of a friendly dog reduced blood pressure in children who were asked to read aloud (Friedmann, Katcher, Thomas, Lynch, & Messent, 1983). These benefits of the human-animal interaction could be used to make the learning process more comfortable and enjoyable for children.

Several studies related to the effects of therapy animals on children have focused on children with developmental disabilities (Martin & Farnum, 2002; Redefier & Goodman, 1989; Sams, Fortney, & Willenbring, 2006). For example, one study found that children with autism who were put in contact with an animal demonstrated increased use of language and had improved social interactions while with the animal (Sams et al., 2006). In addition, studies have shown that children in the presence of animals had improved and sustained focus and maintained a higher state of awareness, as well as improved attitudes toward school (Martin & Farnum, 2002). While these studies focused on populations of children with developmental disabilities, the benefits demonstrated could have a positive impact on

children in the general population and especially on children who have learning disabilities or who struggle with reading.

One of the benefits of therapy animals may be due to reductions in stress for human participants. One study measured the physiological stress response to a task when the participants performed the task alone, when there was a friend present, and when they were with their dog. The results showed that study participants had the highest level of stress when their friend was present, and the lowest level of stress when their dog was present (Allen, Blascovich, Tomaka, & Kelsey, 1991). One explanation for these results is that the participants considered other people, even their friends, as an evaluative presence, which induced stress (Allen et al., 1991). Dogs on the other hand, are considered a non-evaluative presence that can provide support and comfort to participants without judging them (Allen et al., 1991). This component of the human-animal bond could specifically help to address the low self-esteem commonly seen in students struggling with reading, while providing them the support and confidence they need to practice and improve.

The benefits of therapy animals have prompted some groups to incorporate animals such as dogs into reading programs. The Reading Education Assistance Dogs (R.E.A.D.) Program was created by a non-profit organization that encourages children to read through the use of therapy animals (Intermountain Therapy Animals, 2010). This program taps into the benefits associated with animal interaction to encourage and motivate children to improve their reading skills. Although the specific details vary among individual programs, they are designed to have children read to trained dogs, thus taking advantage of the non-judgmental and stress-reducing effects of a dog during reading programs for children.

Although anecdotal evidence suggests there are benefits of the R.E.A.D. Program, the effectiveness of these programs to improve reading ability need further evaluation. If a positive relationship between the use of R.E.A.D. programs and reading ability is found, it could provide an important, effective, and inexpensive method to improve reading skills in children, a skill of critical importance in children's success. Therefore, the purpose of this study was to test the feasibility of coordinating and implementing a five-week R.E.A.D. program for children using therapy dogs and to generate preliminary data assessing the effect of the R.E.A.D. program on children's attitudes toward reading and overall reading ability. The hypothesis was that both groups would see an improvement in their reading skill and attitude scores due to the extra practice time, with the children in the R.E.A.D. program seeing a greater level of improvement.

Methods

Participants and Research Design

For this study, 18 children entering the 2nd grade were recruited from the local elementary schools to participate in a five-week reading program between June and August. Recruitment was conducted through flyers at the public library and also at the two local elementary schools. Children were randomly assigned to participate in the R.E.A.D. program (Dog Group; $n = 9$) or in the non-dog reading program (Control Group; $n = 9$), which served as the control group. All child participants and parents were notified during

recruitment for the study and on the consent form that, if enrolled in the study, they would be assigned randomly to read to a human volunteer or to a pet partner and handler team. Mean baseline scores on the Curriculum Based Measurement (CBM) were compared between the two groups before the intervention began to ensure similar baseline reading abilities in the two groups. Those in the Dog Group were paired with a dog that they would read to each week (always in the presence of the dog's handler), while those in the Control Group were paired with a human volunteer. A minimum of one study investigator was present at all times (in addition to a dog handler for each dog in the dog group) and all children from the R.E.A.D. group read in a single large room over two half hour sessions (8 children per session), while all children from the control group read in a separate single large room also over two half hour sessions. Fifteen children completed the study. Three of the students in the Control Group dropped out of the study. Of the 3 children who dropped out of the Control Group, two never attended the program. One child's family decided they did not have the time to participate while the other child did not wish to attend if he could not read to a dog. The third child attended the first week of the program, but did not enjoy the program and decided not to attend any further sessions. This study was approved by the university's Clinical Studies Review Committee and Institutional Review Board. All parents signed an informed consent form.

Measures and Procedures

The CBM for reading was used to test each child's reading ability. The CBM is a commonly used test that monitors a child's progress through direct assessment of academic skills (Wright, 1992). This test was chosen over a typical standardized test because it is quicker to administer, can be given repeatedly in a short period of time, and is more sensitive to short-term gains (Wright, 1992). Thus, the CBM is likely to be able to detect significant changes in reading ability within the confines of a five-week study. Additionally, the CBM can be used to directly compare the performance of the children within the study, rather than comparing them to a national average (Wright, 1992). For this test, each child was asked to read three different passages for one minute each. Each passage was at least 150 words long and was selected from a collection of stories designed for a 2nd-grade reading level. The test administrator followed along with each passage and then calculated the number of words correct per minute (WCPM), with a higher score indicating a higher number of words correct per minute. The median score from the three reading passages was then used as the CBM score for the child.

Each child's attitude toward reading was then measured using the Elementary Reading Attitude Survey (ERAS). This survey was designed to assess the attitude of the child toward reading in both academic and recreational settings (McKenna & Kear, 1990). This survey was chosen due to its child-friendly format, as well as previous research demonstrating its reliability and validity (McKenna & Kear, 1990). This survey has 10 questions related to academic reading and 10 questions related to recreational reading. An example question in the recreational reading section is: "How do you feel when you read a book on a rainy Saturday?" An example question in the academic reading section is: "How do you feel when you read out loud in class?" Students' can identify their feelings on each question by selecting from among four cartoon graphics to select from which include four pictures of

Garfield the cat that range from very happy to very upset. The test administrator assigns points to each picture chosen by the student, on a range from 4 points for the happiest Garfield to 1 point for the least happy Garfield. Three separate scores make up the ERAS component, scores for both the academic and recreational reading sections and an overall “total” score for the entire survey; a higher score for each section indicating a better attitude.

The ERAS and CBM were administered to each child at the beginning and the end of the 5-week program. The median WCPM score from the three reading passages was then used as the CBM score to assess reading skills and the academic ERAS, recreational ERAS, and total ERAS scores were each evaluated separately to assess reading attitudes. Both the Dog Group and the Control Group met once weekly for 30 minutes for a total of five sessions at a local senior center. Where possible, the child read to the same dog or human listener each week, although this was not always possible due to rare time conflicts with a dog’s owner or a human listener.

READ Dogs

The dogs used for this program are registered therapy animals that have been extensively trained (Pet Partners, 2012). The dog handlers volunteered for the study. Dog breeds varied, with two Jack Russell terriers, one Newfoundland, two mixed breeds, one Siberian husky, one shih tzu, and one greyhound. Each dog was assigned to two children throughout the study, but they only read with one student at a time per half hour session.

All dog teams in this program had been trained and tested through the Pet Partners® Therapy Animal Program (Pet Partners, 2012). The Pet Partners® Therapy Animal Program is a non-profit organization that has developed training programs for therapy animals to ensure they are qualified and comfortable in therapy situations, and provides liability insurance for certified teams. The pet handler first learns the skills that are required to visit with an animal, such as determining if an animal is a good fit for visitation, identifying and decreasing stress, animal safety and health, interacting with special needs of different client groups, interacting with people, professionalism, and facility health and safety codes. All animals participating in the program must meet health requirements to ensure they are healthy, free of parasites and disease, not eating a raw meat diet, and in compliance with immunization requirements. The handler/animal team must then pass a skills and aptitude test to ensure the animal can be controlled and follow basic commands, and the team is tested in conditions it would likely encounter on a visit. All animals must be assessed for health and cleaned prior to every visit, and they undergo re-evaluation every three years. Handlers received additional training specifically on the R.E.A.D. program through the Intermountain Therapy Animals Program (Intermountain Therapy Animals, 2012). There currently are R.E.A.D. programs in 36 states in the United States and in six other countries.

Data Analysis

Sample size calculations performed based on changes in reading ability from other interventions showed that a large number of children would be required (>35 per group) in order to have adequate statistical power to detect a difference between the groups, given similar small changes in reading scores (Wilfong, 2008). However, as it has not yet been

shown what degree of change could be expected from interaction with therapy animals in the R.E.A.D. program, the goal of this pilot study, in addition to showing the feasibility, was to assess the changes and variability that could be expected in this type of intervention such that future studies can be conducted to more fully evaluate the program.

CBM and the academic, recreational, and total ERAS data were examined graphically to determine the distribution of the data. As many of the data were not normally distributed, data are shown in Table 1 all as the median of CBM and academic, recreational, and total ERAS scores so as to be presented in a more consistent manner. For statistical analysis of the data, independent t-tests were used to compare means of normally distributed data (CBM) between the Dog and Control groups, while Mann Whitney U tests were employed to compare medians of skewed data (academic, recreational, and total ERAS) between the two groups. For statistical analysis of changes within each group (from Week 0 to Week 5), paired t-tests were used to compare the means of normally distributed data (CBM), and the Wilcoxon Signed Rank test was used to compare the medians of skewed data (academic, recreational, and total ERAS). This statistical analysis was performed using commercial statistical software (Systat 11.0, Chicago, IL). A p value ≤ 0.05 was considered statistically significant.

Results

Baseline Results

Nine children were randomly assigned to each of the two study groups (i.e., Dog versus Control). At baseline, mean CBM and median recreational, academic, and total ERAS scores were not significantly different between the two groups.

Attrition Results

In the Dog Group, 0 of 9 children dropped out, while 3 of 9 dropped out of the Control group ($p = 0.058$).

R.E.A.D. Group Results

In the R.E.A.D. Dog Group, there were no significant differences between Week 0 and Week 5 in mean CBM or median academic, recreational, or total ERAS scores (Table 1), although there was a numerical increase in the mean CBM from 65 in Week 0 to 88 in Week 5. From Week 0 to Week 5, there was a non-significant decrease in recreational ERAS and total ERAS scores while the academic ERAS score stayed constant.

Control Group Results

In the Control Group, there was a significant reduction in the median academic ERAS score ($p = 0.04$). The median total ERAS score, recreational ERAS score, and the mean CBM scores all decreased from Week 0 to Week 5, although the decrease was not statistically significant.

Comparison of Results to Initial Hypothesis

The numerical but not statistically significant improvement in CBM from week 0 to week 5 in the R.E.A.D. Dog Group is consistent with the hypothesis that children would improve in reading scores due to the extra practice time, with the children in the R.E.A.D. program seeing a greater level of improvement (Figure 1). However, the Control Group had a decrease in CBM, so these findings were contrary to the hypothesis.

Discussion

The comparison of the dropout rates between the two groups showed a trend toward a lower dropout rate in the Dog Group (0 out of 9 students) compared to the Control (3 out of 9 students). This finding suggests that dogs may increase retention of children in reading programs. However, further studies are needed to determine whether these findings are significant in larger studies of the R.E.A.D. Program.

One of the outcomes of the study was reading ability, using the CBM score. The decrease in the CBM scores of the children in the Control Group, while not statistically significant, was surprising. The initial hypothesis for the study was that both groups would see an improvement in their scores simply due to the extra practice time, with the children in the R.E.A.D. program seeing a greater level of improvement. However, the decline in CBM scores for the children in the Control Group may have more to do with when the program took place rather than the reading program itself. A review of 39 studies assessing the effect of summer vacation on academic achievement showed that achievement test scores tend to decline over summer vacation (Cooper, Nye, Charlton, Lindsay, & Greathouse, 1996). Specifically, children tend to lose about 1 month on a grade level equivalent scale or 1/10 the standard deviation relative to Spring test scores (Cooper et al., 1996). Although further research is required, the R.E.A.D. program could be a fun, creative way to reduce the loss of reading ability in children during vacation.

As compared to the CBM score, which assesses reading ability, the ERAS scores (academic, recreational, and total) assess attitudes toward reading. None of the ERAS scores changed significantly in the Dog Group; however, the academic ERAS score decreased significantly in the Control Group with a trend for a decrease in the total ERAS score as well. This suggests less favorable attitudes toward academic reading at the end of the program in the Control Group. Previous studies have found that students who struggle with reading tend to have less favorable attitudes toward reading in school (McKenna & Kear, 1990). Therefore, the finding in the current study of reduced ERAS scores is important when considering this program as a way to specifically target and help struggling readers. Programs that address both reading skills and attitudes toward reading may be helpful in general, since attitude toward reading and reading ability have such a strong correlation (Ecklund & Lamon, 2008).

Major limitations of this study include the small sample size and the high dropout rate in the Control Group. Additional limitations include not being able to match every child with their assigned dog and handler team at every session, having only one location, and the timing of the program during the summer, all of which may have affected these preliminary results. Further research is required to better understand potential benefits and limitations of a

R.E.A.D. program and also optimal methods for their use. Nonetheless, these preliminary results are encouraging and warrant further study to determine if the trends found in this study represent statistically significant differences between the two programs. Given these parameters, the numerical trends in the data support the idea that future studies could show R.E.A.D. programs may have benefits for improving reading ability and attitudes toward reading in elementary-age children.

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Figure 1. Change in Curriculum-Based Measurement (CBM) scores between baseline and week 5 in the Dog (n = 9) versus Control (n = 6) groups

Figure 2. Change in Elementary Reading Attitude Survey (ERAS) scores between baseline and week 5 in the Dog (n = 9) versus Control (n = 6) groups.

Table 1

Median (Range) of Scores for Curriculum Based Measurement (CBM) for Reading and an Elementary Reading Attitude Survey (ERAS – Recreational, Academic, and Total) for Children in the Dog and Control Groups.

	Dog Group (n=9)					Control Group (n=6)				
	Week 0		Week 5		P value	Week 0		Week 5		P value
	Median	Range	Median	Range		Median	Range	Median	Range	
CBM	65	39–175	88	41–195	0.33	88	41–160	75	49–164	0.26
ERAS-recreational	36	13–39	31	15–39	0.83	36	34–39	34	21–40	0.11
ERAS-academic	31	16–40	31	19–40	0.44	38	26–40	35	21–40	0.04
ERAS-total	70	31–78	62	34–77	0.91	72	60–79	67	51–80	0.06