# Critical Review: The Efficacy of Animal-Assisted Therapy for Improving Communication Skills in Adults with Aphasia or Apraxia

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This critical review examines the effectiveness of using animal-assisted therapy (AAT) to improve communication skills in adults with aphasia or apraxia. Study designs include: single case experimental trial (1), crossover within group trial (1), and case study pretest/posttest (1). Overall, the examined research provides support for using AAT to improve communication in adults with aphasia or apraxia. However, the limited scope of this research and weaknesses in design indicate that further experimental research is required on the use of AAT.

## *Introduction*

Animal-assisted therapy (AAT) is a type of intervention where an animal, such as a dog, is used in the treatment process to achieve specific goals (Macauley, 2006). With specialized training, physical, occupational, counseling and speech-language therapists can deliver AAT in adjunct to their traditional therapies (Macauley, 2006). Children or adults who have a positive association with dogs and who are not allergic to them may benefit from AAT. Since the relationship between a human and an animal can be powerful, incorporating a dog into therapy can promote improvement in clients' physical, social, emotional, and/or cognitive functioning (Macauley, 2006; Lafrance, Garcia, & Labreche, 2007). In addition, AAT has been reported to have a positive effect on communication by improving the verbal and nonverbal behaviors of individuals with a variety of disorders, including dementia (Richeson, 2003), pervasive developmental disorders (Martin & Farnum, 2002), and schizophrenia (Barak, Savorai, Mavashev, Beni, 2001).

To date, there is limited published research on the role of AAT in speech-language pathology to aid in the treatment of adults with aphasia or apraxia. Individuals with communication disorders often experience a wide range of emotions, such as anxiety, depression, fear, or frustration, after being diagnosed with a speech or language disorder and these feelings may be magnified in therapy (Macauley, 2006). It is proposed that incorporating an animal into traditional speech-language therapy will provide clients with emotional support, improvement of mood, unconditional acceptance, and more enjoyable treatment which will ultimately result in an increase in the desire to communicate (Macauley, 2006). Given these potential benefits, it is important to examine the existing literature to determine whether AAT should be considered as an adjunct to traditional speech-language therapy when treating clients with aphasia or apraxia.

## *Objectives*

The primary objective of this paper was to critically evaluate the existing literature regarding the efficacy of AAT for improving communication in adults with aphasia or apraxia.

## *Methods*

### Search Strategy

Computerized databases including CINAHL, Scopus, and PyscInfo were searched using the following search strategy: ((animal-assisted therapy) OR (pet therapy)) AND ((aphasia) OR (apraxia)).
One article was obtained by contacting the author.

### Selection Criteria

Studies selected for inclusion in this critical review were required to investigate the impact of AAT on the communicative abilities of individuals with aphasia or apraxia. No limitations were set on the demographics of research participants or outcome measures.

### Data Collection

Results of the literature search generated the following types of articles congruent with the selection criteria above: single-case experimental trial (1), crossover within group trial (1), and case study pretest/posttest (1).

## *Results*

### Single-Case Experimental Design

An experiment by Lafrance, Garcia, & Labreche (2007) explores the effect of a therapy dog on the communicative abilities of a 61-year-old male with non-fluent aphasia. One month post-stroke, the participant received intensive speech-language therapy at a rehabilitation facility, one hour per day, for a 12-week period. Once per week, he received AAT in adjunct to speech-language therapy.

The goal of the study was to explore whether the presence of the therapy dog during walks back to the ward after the AAT session impacted the social communication skills of the participant. After every traditional therapy session, a porter accompanied the individual back to his ward; however, after the AAT session, the therapy dog and handler (i.e. the speech-language pathologist) accompanied the individual. Data was collected over an eleven-week period. The study employed a ABCA design. Condition A (week one and two) involved the porter returning the participant to the ward, Condition B (week three and four) involved the handler, and Condition C (weeks five to nine) involved the handler and the therapy dog. Finally, for the last two weeks of the study, the porter returned the participant to the ward (Condition A). To collect data, an observer walked behind the participant's wheelchair. All walks back to the ward occurred on the same day of the week, at the same time, and used the same route. Observations were focused on the overt social-verbal behaviors (laughing, attempts to verbalize, automatic speech, production of single words, production of utterances, and production of sentences) and social-nonverbal behaviors (smiling, gestures to communicate, head nods, eye contact, and attention directed towards the handler, staff, or other patients) of the participant. Tallies of each of the behaviors were made, plotted on graphs, and analyzed descriptively.

Results indicated that verbal and non-verbal behaviors were most prevalent when the dog was present. In addition, more conversational partners approached the participant when the dog was present.

This single-subject experiment used an ABCA design, which tested the participant's performance before treatment, during treatment, and after treatment. The withdrawal condition eliminated any effects of the intensive speech-language therapy or spontaneous recovery. Discovering that the participant's performance went back to baseline when the treatment was withdrawn provides evidence that behavioral changes were due to the treatment. Although a descriptive analysis was appropriate for this study, visual analyses do not provide the reader with a strong level of evidence. In addition, it is difficult to generalize findings from an individual participant to an entire population. The study could also be criticized for not providing readers with information on who the observer was, if she knew the purpose of the study, or if she received any training. Despite these few weaknesses, this study proves the reader with suggestive evidence that AAT is effective in improving communication in adults with aphasia.

Cross-over Within Group Trial

A paper by Macauley (2006) explores whether speech-language AAT is more effective, equally effective, or less effective than traditional speech-language therapy for adults with aphasia. In addition, the study looked at whether participants reported differences in their motivation and attitude during traditional therapy versus speech-language AAT.

Three men with non-fluent aphasia participated in the study. The men suffered from left-hemisphere strokes four to seven years prior to the study. The participants received one semester of individual traditional speech-language therapy followed by one semester of individual speech-language AAT. Both the traditional and speech-language AAT interventions were run by a graduate student clinician, supervised by a certified speech-language pathologist, and contained similar activities and targeted similar goals. The sessions were 30 minutes long, once weekly for 12 weeks.

Participants were tested using the Western Aphasia Battery (WAB) and received an Aphasia Quotient (AQ) prior to the traditional speech-language therapy (Time 1), between the two semesters (Time 2), and after the AAT (Time 3). In addition, participants were given a client-satisfaction questionnaire to complete at Time 2 and 3. The questionnaire consisted of 21 questions and participants were asked to answer each question on a scale from 1 to 10 (1 = strongly disagree, 10 = strongly agree). Scores of 1 to 3 were considered to be negative (regression of skills), scores of 4 to 7 as no improvement (maintenance of previously learned skills), and scores of 8 to 10 as positive improvement (active learning and retention of new skills). The participants' scores were averaged to determine a mean participant response for each question.

To determine whether speech-language AAT is effective for persons with aphasia, the researcher examined the WAB results to determine if the participants' AQ increased from Time 2 to 3. The participants' AQ scores did not change. To further analyze the data, the researcher evaluated the results from the questionnaire at Time 3. The overall mean for the questionnaire at Time 3 was 8.3. Based on the rating scale mentioned above, this indicated that the participants believed that that they improved during the AAT sessions. In addition, all participants met or exceeded all therapy goals set during the AAT semester.

To determine whether speech-language AAT is less effective, more effective, or equally effective as traditional speech-language therapy, the researcher compared the differences in the participants' AQ from

Time 1 to Time 2, and from Time 2 to Time 3. No significant differences were found across the measurements; however, the participants met or exceeded all therapy goals during both semesters. This suggests that both speech-language AAT and traditional therapy are equally effective for treating persons with aphasia. The researcher also determined the difference between the participants' responses for each question at Time 2 and Time 3. A difference of 4 was considered noteworthy, a difference of 2 to 3 was considered important, and a difference of less than 2 was considered negligible. Responses for questions concerning the clinician remained constant (mean difference = 0.5, negligible); however, responses for questions concerning the therapy differed greatly (mean difference = 2.2). This difference indicates that participants felt the AAT was more enjoyable than traditional therapy.

To determine which therapy type the participants were more motivated to attend, the researcher compared the mean participant responses of four specific questions from Time 2 and Time 3. The participants' mean score following traditional therapy was 5.8, while their mean score following AAT was 9.05. All three participants were more motivated to attend therapy when they knew the therapy dog would be present.

In addition, speech-language pathologists not affiliated with the study were requested to observe one AAT session. Each observer commented that the participants spoke with less effort when addressing the dog, than when speaking to the clinician. In addition, one observer reported that one participant spoke with improved prosody when speaking to the dog as compared to speaking with the clinician. Macauley (2006) also reported an increase in spontaneous verbalizations in the AAT sessions. Most of the verbalizations were directed towards the dog.

In order to evaluate the validity of the results, the data analysis needs to be evaluated. To obtain the participants' AQ scores, the WAB was administered three times over a relatively short period. Measuring the change with an alternate form of the test might yield more reliable and valid evidence. In addition, information on the statistical analysis of the data was not included. There are other limitations to this study that could have influenced the results. Firstly, the order of therapy type was not randomly assigned. Each participant received traditional therapy first, followed by AAT. By the time participants received the AAT, they were familiar with the clinician and the general format of the therapy session, which could account for the increase in communication. In addition, the therapeutic successes from the traditional therapy could have been carried over to the AAT sessions. Secondly, the two treatment types were not described clearly. The author provides the reader with the treatment goals for each participant and the treatment duration and intensity, but fails to provide adequate detail about the treatment procedures. Therefore, a clinician would not be able to apply the therapy types to their practice. Lastly, only three participants, who had strokes four to seven years prior, participated in the study. The author suggests that a larger study that included more subjects, especially those within the first six months post-stroke, could have revealed statistically significant results. Despite these limitations, the study provides the clinician with suggestive evidence that the use of a therapy dog can act as a catalyst to motivate clients with aphasia to communicate.

Case Study Pretest/Posttest

Adams (1997) presented a case report of a 72-year-old woman (referred to as WA), who suffered from two left-hemisphere strokes, resulting in apraxia. Initially, WA was tested using the Boston Diagnostic Aphasia Examination (BDAE) and received an overall Aphasia Severity Rating of 1. WA was not fluent in conversational speech, demonstrated difficulty spontaneously initiating words, and displayed faulty confrontation naming. She did not have difficulties with comprehension of speech.

WA received eight AAT sessions to enhance speech therapy, twice weekly for four weeks with the author, a speech-language pathologist, and two male sheepdogs. The goal of the therapy was to increase the number of appropriate and correct word initiations. The therapy activities, which involved the use of both dogs, were described in full detail. At the end of each treatment session, data would be collected during two probe tasks: answering one-word WH questions and identifying pictures. After each probe task, a percentage was obtained by dividing the number of correct verbal responses by the number of trials for each session. The results were plotted on a graph over the treatment sessions. Over the course of treatment, variables of social behavior (smiles, looks, leans, touches, verbalizations, and name-calling) were also measured. To measure the social behaviors, the author videotaped the AAT session and reviewed the behaviors. The percentage of each behavior was obtained by dividing the number of times each variable was observed by the total number of social variables per session.

At the end of therapy, the BDAE was re-administered. There were no changes in WA's Aphasia Severity Rating. However, results of the study stated that the percentage of correct answers to WH questions

increased from 40% to 80% over treatment. The percentage of correct identification of pictures increased from 30% to 80% over the course of treatment. The results from the analysis of the social behaviors demonstrated a shift in the percentage of nonverbal behavior to verbal behaviors. In the first session, looks were the predominant social behavior; however, by the last session, verbalizations were the most prevalent.

In order to evaluate the validity of the results, the methodological weaknesses need to be considered. Case studies provide a low level of evidence, namely because of the small sample size and the lack of a control group, which limits the ability to draw conclusions from the study and to generalize to other adults with apraxia. One major limitation of the study is that the data analysis was weak. Comparing the participant's results on the BDAE, a test of aphasia, before and after treatment, is not the appropriate test to determine whether AAT is an effective treatment for apraxia. A test specifically designed to assess apraxia would have yielded more scientifically sound results. In addition, the statistical analysis of the progress throughout the therapy block was extremely limited. Since a baseline was not obtained, a proper statistical analysis could not be conducted. The reader was only provided with descriptive statistics, which weakens the validity of the evidence. In addition, the author was the only person responsible for providing the therapy and collecting the data. This could have caused results to be biased due to prior knowledge of the hypotheses. Another major limitation of the study is that the design does not allow the effects of AAT to be isolated from speech therapy. It is possible that WA could have seen improvements with traditional speech therapy alone. Therefore, the degree to which the patient's improved performances can be confidently ascribed to the effects of enhancing speech therapy with AAT is questioned. A final limitation is subject selection. During the study period, WA received daily treatment to learn American Indian Gestural Code. This leaves readers uncertain if the reported changes were due to the experimental treatment or the other treatment. In addition, the subject suffered from dementia, which could have impacted the results. Overall, this study provides some equivocal evidence that AAT is effective for increasing communication in adults with apraxia.

### *Conclusions & Recommendations*

Although there is little evidence to support the benefit of using AAT with clients with aphasia or apraxia, there is agreement that incorporating animals into speech-language sessions does not have a negative effect on clients and may motivate them to achieve their therapy goals. In each study reviewed, all participants exhibited improvement in communication while participating in AAT in adjunct to traditional speech therapy. Participants were also more enthusiastic about therapy when they knew the dog would be present. Overall, the research provides some weak evidence that AAT may increase communication in adults with aphasia or apraxia. Therefore, this evidence should be considered preliminary and further research is recommended. Future research should use larger sample sizes and experimentally sound procedures. Randomly assigning a larger number of participants into an AAT group and a control group (i.e. traditional speech-language) will help to increase the reliability and validity of these studies. This will help to isolate the effects of AAT from traditional speech therapy. Despite the limited evidence, speech-language pathologists should consider incorporating AAT into their practice when working with adults with aphasia or apraxia.

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