

### **Critical Review:**

## **Is animal-assisted therapy (AAT) associated with improved communication outcomes for individuals with communication disorders?**

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This study reports a critical review of the literature on the outcomes of animal assisted therapy (AAT) for individuals with communication disorders. Five articles, including one randomized controlled trial, two single-subject designs, and two systematic reviews, were included for review. Overall, the results of this review provide evidence ranging from slightly to highly suggestive that AAT leads to positive outcomes for those with communication disorders. Implications for clinical practice and recommendations for future research are discussed.

### ***Introduction***

Animal-assisted therapy (AAT) is therapy that involves interaction with a certified therapy animal as a form of treatment. Current evidence suggests that AAT may be effective in improving overall mental health, eliminating a sense of isolation, and improving quality of life in disorders such as depression, schizophrenia, and addiction (Kamioka et al., 2014). The negative health outcomes associated with these disorders that may be ameliorated by AAT may also apply to communication disorders. Decreases in mental health and quality of life, as well as social isolation are all factors that may be present in individuals with communication disorders. For example, social isolation has been demonstrated after the onset of aphasia, where shrinkage in social networks and decreased contact with communication partners has been reported (Vickers, 2010). Teenagers with high-functioning autism spectrum disorder report having a low quality of communication life (Burgess & Turkstra, 2010), and receptive language difficulties have been associated with psychosocial problems in children with hearing impairment (Hogan, Shipley, Strazdins, Purcell, & Baker, 2011).

Increasing quality of life and mental health, and decreasing social isolation may have direct benefits on things like social communication, or indirect benefits on meeting speech or language goals due to the reduction of interference of these negative factors on performance in therapy. This question has potential clinical implications as clients may be reluctant to communicate with a speech-language pathologist or other skilled communication partner because of low self-efficacy or anxiety surrounding making an error. Using animals in speech and language therapy may provide a living being to interact with that doesn't

present the same communication pressure as another person does, possibly motivating the client to interact more without fear of failure.

### ***Objectives***

The primary objective of this paper was to outline and critically evaluate studies that examined AAT as an intervention method for various types of communication disorders.

### ***Methods***

#### Search Strategy

Online databases including Scopus, CINAHL, PsychINFO, and Western University's library search engine were searched using the following search strategy: (aphasia OR dementia OR language disorders OR communication disorders OR communication OR autism) AND (animal assisted therapy). There were no limitations placed on this search.

#### Selection Criteria

Articles identified for inclusion included those that focused on the communication outcomes of AAT when administered to participants with a diagnosis of any of the communication disorders listed above. Articles excluded from review included those that did not provide adequate description of their analysis for critical appraisal.

#### Data Collection

The articles reviewed for this paper consisted of studies that involved participants with various diagnoses. These include: autism spectrum disorder (ASD), aphasia, language impairment, dementia, Down's syndrome, and other non-specified mental or physical disabilities that are associated with communication difficulties. The

study designs consisted of one quasi-randomised control trial, various single-subject designs, and two systematic reviews.

### **Results**

**Breitenback, Stumpf, Fersen, & Ebert (2009)** examined whether dolphin assisted therapy (DAT) improved the communicative ability, social-emotional behaviour, and parent-child interactions among children with severe disabilities. Their secondary objective was to compare the effects of their DAT program which included a recreational/vacation atmosphere, counseling, and interaction with dolphins to other intervention programs included outpatient DAT, and a program consisting of the same components of the intervention program that uses farm animals as opposed to dolphins. The design used was a quasi-randomised control trial, as assignment to all groups with the exception of the farm animal group were randomized. Participants were not randomly assigned to that condition; instead, the farm animal group took place at a separate facility with their own recruitment process. Participants (n=118) with various disabilities affecting communication including, autism spectrum disorder, Down's syndrome, and mental and physical disabilities were recruited. Only children with "strongly limited" communication abilities were recruited, though the authors failed to provide an operational definition for this term. Groups were similar regarding important indicators including age, disability type, sex, and parental education for most groups.

A questionnaire created by the authors and demonstrated to have adequate reliability (each subscale had a Chronbach's alpha between .71 and .90) was administered to parents and staff to record change in communicative ability and social-emotional behaviour, though no standardized measures of language ability were employed. Parent-child interactions were analyzed with commonly-used communication analysis techniques.

Appropriate descriptive statistics were reported. Parametric tests including MANOVA and ANCOVA were used to evaluate the results of the parent-questionnaire, as the data revealed a normal distribution. For the remaining data, appropriate non-parametric tests were administered.

Significant therapy effects were found for some measures of communicative ability for both the experimental and outpatient groups. Parent-questionnaire results of comprehension and use of verbal speech for both the experimental group and the outpatient DAT group significantly improved, though

the effect for the outpatient group disappeared 6 months post-therapy. Both the experimental group and the outpatient DAT group saw significant improvements in non-verbal reactivity (e.g. smiling). Significant therapy effects were found for some measures of social-emotional behaviour for all three treatment groups. Parent-questionnaire results of social-emotional competence significantly improved in both the experimental and outpatient groups, though the effect was not maintained long-term in the outpatient group. The results for self-confidence revealed a significant treatment effect for both the experimental and farm animal group, though the effect was not maintained long term for the latter group. It is worth noting, that the outpatient group's parent-reported self-confidence ratings were higher than the other two groups at the beginning of the study, which may contribute to the lack of therapy effect for this group. None of these therapeutic effects were found in the analysis of the staff questionnaires. No therapy effects were found in terms of observation of parent-child interaction. The authors clearly outline the limitations of the study including the disadvantages of the subjective nature of their data collection tools.

This study employs an appropriate design, as well as appropriate measures and analysis. It provides highly suggestive evidence that a comprehensive DAT program has effects on some measures of communicative ability and social-emotional behaviour that outlast the effects seen by outpatient DAT or comprehensive therapy involving farm animals.

**O'Haire (2012)** conducted a systematic review of AAT for ASD. 14 studies were included in this review. They all met the following criteria: 1) were published in English in a peer-reviewed journal, 2) consisted of empirical studies using AAT, and 3) reported results specifically for participants with a diagnosis of ASD. The review was completed according to the preferred reporting items for systematic reviews and meta-analyses (PRISMA) (Liberati et al. 2009). Appropriate inclusion criteria and search strategies were employed.

Strengths of this systematic review are as follows. First, the author denoted appropriate eligibility criteria and used an appropriate search strategy, searching several online databases as well as specialized databases relating to the field of human-animal interaction. Secondly, the author listed and described all included studies in a table so that the reader was able to understand the specifics of each study included for review. Additionally, the author did provide an evaluation of important parameters of the studies' methodologies including sample size, study design, and assessment type. However, one of several weaknesses

of the review consists of the fact that the studies were not given any sort of individual quality rating based on the internal validity of the study. Other weaknesses of the review include the fact that the data extraction and quality appraisal were only performed by one researcher. Additionally, the author made no mention of potential publication bias of the pool of literature, nor did they report about any potential conflicts of interest of the authors of the included studies.

The reported outcomes in the studies included increased social interaction, and increased use of language. Despite the methodological flaws stated above, the systematic review adequately evaluated the statistical analyses used in the studies as appropriate, and found that the researchers reported on important differences such as social interaction with the animal versus social interaction with other people. O'Haire found that more studies were able to report a significant increase in social motivation than actual behaviourally observed increases in social interaction. Many studies reported significant increases in use of language. However, O'Haire did not operationally define of what an increase in use of language consisted.

Several limitations of the literature were brought to light. These include the inconsistent use of terminology to describe AAT, variation in both the type of animal used in therapy and the qualifications of the therapists conducting AAT, as well as a lack of RCTs and a lack of standardized protocol being employed in the interventions. Though the author failed to meet some of the criteria necessary for a high quality systematic review, the evaluation of the methodology of the included studies was well described and reasonable. Therefore, the findings that AAT for ASD is currently in the proof of concept stage of research and that positive outcomes from the current body of evidence should be interpreted with caution are compelling. Due to the lack of rigor in the systematic review, it is possible that findings of the included studies are even less suggestive than the author has suggested.

**Filan & Llewellyn-Jones (2006)** conducted a systematic review of AAT for persons with dementia. 13 controlled studies were included in this review.

Strengths of this systematic review are as follows. First, the authors denoted appropriate eligibility criteria and used an appropriate search strategy, searching several online databases as a manual search of bibliographies of relevant publication. Secondly, the authors listed and described all included studies in a table so that the reader was able to understand the specifics of each study included for review. Additionally, two researchers independently performed the literature

search and performed the data extraction. The authors did provide an evaluation of each study's methodological strengths and weaknesses. However, the author failed to give any sort of individual quality rating based on the internal validity of the study. The weaknesses of the review include the fact that the authors made no mention of potential publication bias of the literature, nor did they report about any potential conflicts of interest of the authors of the included studies.

Despite some methodological weaknesses with the systematic review, the important strengths listed above combined with the fact that the included studies in this review consist entirely of controlled studies indicate that the findings of the review are suggestive and clinically important. Several limitations of the literature were brought to light. These include the following. First, it is unclear as to what percentage of the population with dementia would benefit from AAT, as those who are chosen as study participants tend to have previous successful interactions with animals. The second limitation has to do with caregiver bias. Due to the nature of the disease, much of the outcome measures used in the included studies were caregiver report. The authors suggest that caregivers may themselves have had positive interactions with the animals, and may be projecting these benefits onto their loved ones with dementia. Other limitations include lack of evidence for long term effect, small sample sizes, and lack of randomization. Clinically important findings from this review include that AAT sessions as seldom as one time per week may be as beneficial as more frequent sessions, and that AAT for persons with dementia is a promising intervention for reducing agitation and promoting social behaviour.

**Boyer & Mundschenk (2014)** examined whether AAT with a cat resulted in more verbal continuations (exchanges that go beyond initiation and response) with children with a diagnosis of language impairment (LI) and age-matched peers over time and in comparison to activities with a toy cat and a preferred activity. They conducted 3 "n-of-1" studies using an alternating treatment design. No baseline data was collected to compare frequency of continuations at the onset AAT to the completion of the therapy. Treatment order was randomized, but the duration of each treatment session was only fifteen-minutes.

Only visual analysis was conducted in order to interpret the results. No statistical analysis or manipulations were performed. Based on visual analysis, the authors concluded that 2 of the dyads exhibited an increase in continuations in the AAT sessions over the course of therapy, and 1 of the dyads frequently exhibited more

continuations during the AAT sessions than during the other two treatment conditions. Due to the inappropriate analysis applied to the results of this study, as well as the lack of baseline data gathered, and the nature of “n-of-1” studies relative to more rigorous study designs, these results only slightly suggest that AAT may result in increased social interaction among children with LI and a peer.

**Macauley (2006)** compared the effects of AAT to traditional aphasia therapy for adults with non-fluent aphasia. The author used baseline-treatment design with pre, mid, and post testing (n=3). Treatment order was not randomized, as each participant received one block of traditional therapy followed by one block of AAT. The same clinician administered both types of therapy, to control for the potential of the clinician’s style affecting the results. Commonly used standardized language tests for aphasia, the meeting of individual therapy targets, and a client-satisfaction questionnaire were used to measure outcomes. The questionnaire has been used in previous AAT studies, but no data on the validity or reliability was reported.

No difference in standardized test scores was found between the traditional therapy term and the AAT term, though each participant met their individual therapy goals in both treatment conditions. Based on the questionnaire results, participants reported increased enjoyment, increased motivation, increased interest, and increased overall satisfaction with AAT compared to traditional therapy. However, the author did not report statistical significance and instead considered an increase of 2-4 points “important” and an increase of more than 4 points “noteworthy”.

This study employs an appropriate design, though would have benefitted from randomizing the treatment conditions. Some of the outcome measures used were appropriate, though the positive results reported are based exclusively off of a questionnaire of which reliability and validity have not been established. Additionally, the author failed to adequately analyze the data derived from the questionnaire results. Thus, while clinically compelling, the reported results are only slightly suggestive.

### *Discussion*

Overall, the findings from the reviewed studies suggest evidence ranging from slightly to highly suggestive that AAT is associated with improved communication outcomes for those with communication disorders. The range in quality of evidence is due to several factors. First, the study designs used in the included studies

were variable. The results from a well-conducted randomized controlled trial are inherently more highly valued than single-subject designs. Secondly, the methods with which the data of each study was treated were inconsistent, with many of the researchers failing to provide sufficient statistical treatment of their results in order to report statistical significance.

There also exist several limitations within the entire body of literature that make it difficult to both conduct and adequately appraise research in this area. First is the issue of inconsistent terminology. Though AAT is the most commonly accepted term, many researchers use different terminology depending on the animals that they are working with (e.g. dolphin-assisted therapy, hippotherapy). This inconsistency in terminology makes it difficult to establish a solid base of literature that researchers can draw from in order to build rationales for their own research and drive the literature-base forward. This limitation was apparent in the current paper, as AAT was the only search term employed in order to gather research, possibly leaving some gaps in this appraisal. The second issue that plagues this area of research is the variability of activities that AAT encompasses. Few of the studies reviewed describe their therapy activities in adequate detail for replication, and each AAT program may consist of vastly different activities. Similarly, there is wide variability in types of animals used for AAT. This variability makes it difficult to decide whether AAT is effective as a whole, as one type of activity or one type of animal may yield better results than another. Finally, the main positive results reported in the studies reviewed consisted of positive outcomes in social communication as well as motivation to complete and enjoyment of therapy. These outcomes are particularly difficult to quantify, as is reflected in the variability of types and quality of outcome measures used. Many of the studies used surveys or questionnaires (Breitenbach et al, 2009; Boyer & Mundschenk, 2014; Macauley, 2006). However, only one of these studies reported on the reliability and validity of their measures (Breitenbach et al, 2009). Researchers in this area would benefit from using standardized, well-validated questionnaires or surveys that measure aspects of social communication as well as client satisfaction with therapy.

### *Clinical Implications and Directions for Future research*

Animal-assisted therapy shows clinical relevance for many disorder areas related to Speech-Language Pathology (SLP) as increased social interactions were reported. Additionally, the finding that clients may be

more motivated and satisfied by AAT than traditional therapy should be further explored. These findings are clinically important due to the ongoing challenge of finding interventions that clients are motivated by, are satisfied with, and yield positive results, especially when it comes to social communication.

Due to its clinical implications and suggestively positive results, future research on AAT is warranted. Future research in this field should focus on conducting more rigorous statistical analysis of its findings, in order to ensure the reliability of the results. Additional RCTs should be conducted that compare AAT to traditional language therapy. Finally, research should be conducted that establishes the most effective means of implementation of AAT for SLP practice, with the aim of establishing standard protocols for AAT implementation for communication disorders.

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