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Come, Follow Me! Behavioral Outcomes in Adolescents with Autism and Related Disorders After a Five Session Animal Assisted Therapy Program

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Abstract

A growing evidence base is emerging demonstrating the efficacy of Animal Assisted Therapy (AAT) in a wide range of therapeutic environments, including the treatment of dementia, symptoms of Autism Spectrum Disorder (ASD), and major depression (Nimer and Lundahl, 2007). However, recent meta-analyses of the literature to date suggests the evidence is relatively low-quality, though generally promising (Ibid). Investigators particularly pointed to perceived "methodological weaknesses" (O'Haire, 2012). This study seeks to assess the efficacy of a once-weekly, five-session longitudinal AAT program, "Come, Follow Me!", as it relates to social, cognitive, behavioral, and developmental outcomes for students with ASD and related disorders. Retrospective analysis was performed on clinical session data collected by the therapist consisting of weekly serial evaluation of 25 "positive behaviors" and 17 "negative behaviors" using a pre-validated "Psychological Session Form" for use in AAT (Chandler, 2012). Behaviors were rated on a 5-point Likert Scale (0-none; 1-very low; 2-low; 3-medium; 4-high; 5-very high). A Total Positive Behavior Score (Tpos) was calculated weekly for each participate as an average of all positive behavior scores. A Total Negative Behavior Score (Tneg) was similarly calculated. A Total Behavior Score was calculated as Tpos – Tneg. A total of 15 students were enrolled across two iterations of the "Come, Follow Me!" curriculum. Two sets of data were excluded from the analysis because the students completed less than four out of five sessions (n=13). The data was matched by week between the two applications of the AAT intervention, and overall averages were calculated. Linear mixed models were used to test for change across weeks. Overall, Tpos was found to increase by an average of 0.079 points per week (b-value), with a p-value < 0.001. Increases in average Participation (b = 0.114, p = 0.006), Teamwork (b = 0.122, p = 0.026), and Self-Esteem (b = 0.233, p = 0.005) scores appeared to be major drivers of the general trend seen in Tpos. In addition, an improvement seen in the Total Behavior Score was determined to be attributable to the observed week-to-week increases in Tpos, as opposed to a week-to-week decreased in Tneg. For these reasons, future applications of the "Come, Follow Me!" curriculum might focus more on positive behavioral interventions. Moreover, continuing to measure negative behavioral outcomes may not be as clinically useful. This retrospective analysis provides further evidence that animal-assisted interventions can measurably improve behavioral outcomes in a clinically significant way. In specific, the "Come, Follow Me!" program, was found to produce statistically significant improvements in positive behaviors overall, with notable effectiveness in participation, teamwork, and self-esteem.

Background:

Animals have a long history in therapeutic environments, and are generally recognized as beneficial in specific medical, behavioral, and mental healthcare interventions. In fact, the State of Connecticut passed a law in June 2013 following the attacks at Sandy Hook Elementary School, mandating resources for the provision of therapy animals through the Department of Children and Families as part of a crisis-response program (CT General Assembly, Public Act no. 13-114). Nevertheless, rigorous research to investigate the efficacy of Animal Assisted Therapy (AAT) is in an early stage. It is not yet fully clear how, when, or for which indications AAT may be effective as an adjunct to traditional interventions.

A growing literature exists surrounding Animal-Assisted Therapy as an effective tool in healthcare settings. To date, most research has been focused on Autism Spectrum Disorder and symptom management, interventions in behavioral problems, or interventions for emotional well-being (Nimer and Lundahl, 2007). A meta-analysis of the literature to 2007 identified 250 publications on AAT, of which 49 articles met the inclusion criteria for analysis. Many of these studies were found to lack controls, or were deemed to have other "methodological issues." The authors conclude that a "universal understanding of what AAT is and how it is used does not exist," but found AAT to be promising "as an additive to established interventions" (Ibid). In particular, studies have investigated the efficacy of AAT in Alzheimer and other dementia patients, substance abuse therapy, and psychiatric care (Filan et al, 2006; Barker and Dawson, 1998.) In a systematic review of 14 published papers on AAT and Autism Spectrum Disorder, the author found "unanimously positive outcomes" but significant "methodological weaknesses" (O'Haire, 2012). A few studies have attempted to directly investigate fluctuations in physiological stress markers, particularly cortisol levels, and in relation to AAT. In 2010, Barket et al conducted a small "convenience sample" (n=10) study, and found evidence supporting a "buffering effect on stress response" as demonstrated by modest reduction in salivary cortisol levels and blood pressures.

"Come, Follow Me!" is a five-session program focusing on social skills development in children with autism spectrum disorder and related social-cognitive impairments. Developed by Soul Friends Inc in Wallingford, CT, "Come, Follow Me!" is led by licensed clinical social workers, along with one or two certified therapy dogs. The MSW facilitates activities designed to address motor and language skills, social skills, and sensory integration, while developing a new understanding for human-animal communication. Interaction with the therapy dogs is thought to improve skill development by providing

a unique motivation to participate, as well as by allowing the participant to engage in communication skills apart from a typical human-human social environment (Nicoll et al, 2009).

Methods:

Retrospective analysis was performed on clinical session data collected by the licensed clinical social worker (LCSW) consisting of weekly serial evaluation of 25 "positive behaviors" and 17 "negative behaviors" using a pre-validated "Psychological Session Form" for use in AAT (Chandler, 2012). Chandler's Psychological Session has been shown to have high test-retest reliability (≥0.90), and has been validated for use with dog, cat, or equine assisted interventions (Chandler, 2012 p.203). Positive behaviors include conduct such as "Participation", "Teamwork", and "Eye Contact." Negative behaviors include conduct such as "Resistant", "Guarded", or "Agitated" (Ibid). Behaviors were rated on a 5-point Likert Scale (0-none; 1-very low; 2-low; 3-medium; 4-high; 5-very high). A Total Positive Behavior Score (Tpos) was calculated weekly for each participate as an average of all positive behavior scores. A Total Negative Behavior Score (Tneg) was similarly calculated. A Total Behavior Score (Ttot) was calculated as Ttot = Tpos – Tneg.

A total of 15 students were enrolled across two iterations of the "Come, Follow Me!" curriculum. Two sets of data were excluded from the analysis because the students completed less than four out of five sessions (n=13). The participants were adolescent-aged students enrolled at the same educational facility for students with special needs, where "Come, Follow Me!" is offered on a regular basis as one of the behavioral and developmental services. The program continues to be offered because staff recognize an apparent therapeutic benefit. However, clinical outcomes have previously not been systematically assessed. The LCSW recorded behavioral scores on the Psychological Session Form based on their professional clinical assessment. The LCSW of record was consistent across weeks and among participants whose clinical session data was included. The data was matched by week between the two applications of the AAT intervention, and overall averages were calculated. It was possible to pool weekly session data of the two study groups because the specific "Come, Follow Me!" protocol is consistent week-to-week with each application (Nicoll et al, 2009). Statistical methods utilized linear mixed models to test for change across weeks.

Results:

Overall, Tpos was found to increase by an average of 0.079 points per week (b-value), with a p-value < 0.001. Increases in average Participation (b = 0.114, p = 0.006), Teamwork (b = 0.122, p = 0.026), and Self-Esteem (b = 0.233, p = 0.005) scores appeared to be major drivers of the general trend seen in Tpos. In addition, an improvement seen in the Total Behavior Score was determined to be attributable to the observed week-to-week increases in Tpos, as opposed to a week-to-week decreased in Tneg.

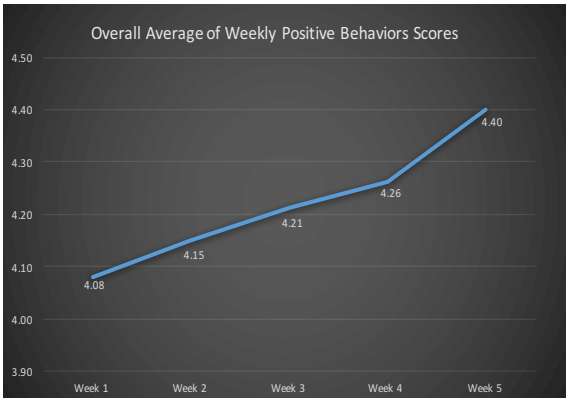

Figure 1: b-value = 0.079; p-value < 0.001

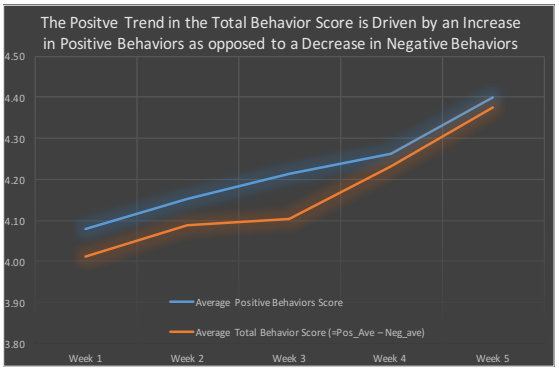

Figure 2: Comparison of the overall trend in Total Behavior Score to the Positive Behaviors Score alone reveals that clinical outcomes were driven by improvements in positive behaviors, rather than by a decline in negative behaviors.

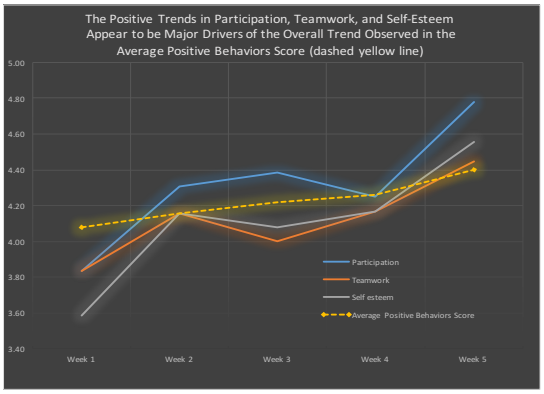

Figure 4: Participation: b-value = 0.114, p-value = 0.006; Teamwork: b-value = 0.122, p-value = 0.026;
Self-esteem: b-value = 0.233, p-value = 0.005

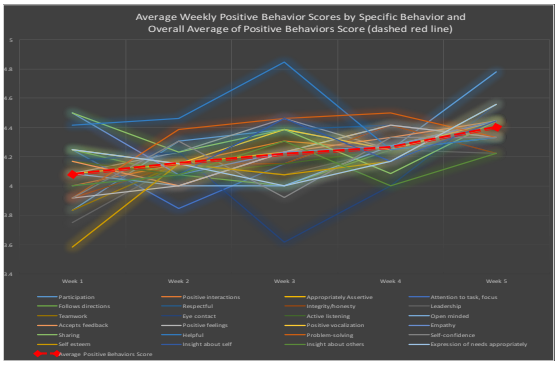

Figure 3: There is significant variability among the 25 positive behavioral outcomes (solid lines); The overall increase in positive behaviors is an average of these 25 individual trends (red dotted line)

Discussion:

The “Come, Follow Me!” program was found to produce statistically significant improvements in positive behaviors overall, with notable effectiveness in participation, teamwork, and self-esteem. Notably, a measurable decline in negative behavioral outcomes was not observed. For these reasons, future applications of the “Come, Follow Me!” curriculum might focus more on positive behavioral interventions, while continuing to measure negative behavioral outcomes may not be as clinically useful. Likewise, the positive behavioral outcomes that did show statistically significant improvement had apparently modest effects occurring mainly at the upper bound of the Likert Scale (4s and 5s). A modified Psychological Session Form could be developed to provide increased granularity at this end of the scale, allowing for improved specificity in participants’ clinical assessments. This change to clinical assessment may also aid in delineating the clinical significance of the statistical outcomes presented here.

One important limitation of this study was the relatively small sample size (n=13). A repeat analysis with a larger data set would help improve the power of the findings. Moreover, a prospective analysis of future applications of the “Come, Follow Me!” would help to corroborate the retrospective findings reported here. In addition, no control intervention was available for comparison. An appropriate control protocol in future studies would help identify specific confounding factors and further categorize the direct impact of AAT on clinical outcomes.

Despite these methodological shortcomings, the small study described here provides convincing evidence in support of animal-assisted interventions as an effective modality in achieving measurable improvements in specific positive behaviors among adolescents with ASD and related disorders.

References:

Barker, S. B., & Dawson, K. S. (1998). The effects of animal-assisted therapy on anxiety ratings of hospitalized psychiatric patients. *Psychiatric services*.

Barker, S. B., Knisely, J. S., McCain, N. L., Schubert, C. M., & Pandurangi, A. K. (2010). Exploratory study of stress-buffering response patterns from interaction with a therapy dog. *Anthrozoös*, *23*(1), 79-91.

Connecticut (State). Legislature. *An Act Concerning Animal Therapy*. House Bill no. 6465. Public Act no. 13-114. (Approved June 6, 2013). *Connecticut State Senate and House of Representatives in General Assembly.* https://www.cga.ct.gov/2013/ACT/pa/pdf/2013PA-00114-R00HB-06465-PA.pdf

Filan, S. L., & Llewellyn-Jones, R. H. (2006). Animal-assisted therapy for dementia: a review of the literature. *International Psychogeriatrics*, *18*(4), 597-612.

Nimer, J., & Lundahl, B. (2007). Animal-assisted therapy: A meta-analysis.*Anthrozoös*, *20*(3), 225-238.

O'Haire, M. E. (2013). Animal-assisted intervention for autism spectrum disorder: A systematic literature review. *Journal of autism and developmental disorders*, *43*(7), 1606-1622.

Nicoll, K. (2006; updated 2009). *Come, Follow Me!* Unpublished curricular outline. Soul Friends, Inc.

Chandler, C. K. (2012). *Animal assisted therapy in counseling*. Routledge.

Chandler, C. K. (2012). *Animal assisted therapy in counseling*. Routledge, Appendix C: "Psychological Session Form." Pg. 321-324