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The Impact of Canine Companion Service Animal (CSA) Use on Social Behaviors Between Individuals with Autism Spectrum Disorders Who Use CSA and Those Who Do Not

Melanie D. Hoffman
Walden University

Walden University

COLLEGE OF SOCIAL AND BEHAVIORAL SCIENCES

This is to certify that the doctoral dissertation by

Melanie Hoffman

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Dr. Stephen Lifrak, Committee Member, Psychology Faculty
Dr. Pat Carmoney, University Reviewer, Psychology Faculty

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Eric Riedel, Ph.D.

Walden University
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MS, Walden Univerity, 2009

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Dissertation Submitted in Partial Fulfillment

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Abstract

According to theory of the mind, individuals with autism spectrum disorders (ASD) are unable to interpret the social cues of others, which results in anxiety and social behavior deficits . Individuals with ASD are currently using canine Companion Service Animals (CSAs) in order to practice developing attachment bonds ; however, no known quantitative studies have demonstrated the efficacy of CSA in improving social behaviors in ASD populations. The purpose of this quantitative study was to examine the extent to which exposure to CSA impacts social skills and social interaction in children and adolescents with ASD as measured by the parent self-reports on the Social Skills Improvement System (SSIS) and the Social Responsiveness Scale (SRS), respectively. MANOVA results of a matched-paticipant, equivalent, posttest-only design (n = 122) showed that CSA users had fewer deficits in social skills and social interaction. There were no differences in age, IQ, or comorbidity CSA scores for social interaction or social skills based on MANOVA analysis. Results suggest that attachment bonds between the CSA user and an associated CSA provide an opportunity to engage in social interactions despite social skill deficits. This study contributes to social change by increasing awareness of the impact of CSA on the daily social functioning of children and adolescents with ASD.

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ProQuest LLC.
789 East Eisenhower Parkway
P.O. Box 1346
Ann Arbor, MI 48106 - 1346

Dedication

This study is dedicated to Thomas and Lady, whose friendship and love for each other can be described as nothing short of magic. This study is also dedicated to my parents who recognized the importance of pets in a child's life. And for Jeremy, who never doubted I could accomplish this research study. I love you all!

Acknowledgments

I would like to thank my husband, Jeremy, whose enduring patience has been a gift, and for my son, Thomas, who thought that this study was a great idea for giving animals and individuals with autism a way to improve their lives.

I would also like to thank all of the canine training facilities, ABA centers, and school districts that helped to recruit my sample, forming partnerships with the community is the best way to educate the public on this new service and intervention.

I would like to thank Dr. Cox who made the dissertation process painless and almost fun. Dr. Cox challenged my abilities and my thought processes so that the best possible final product could be achieved. Dr. Lifrak, thank-you for taking the chance on a topic that you had reservations about. We learned about the use of CAT with CSAs together, and your help with the statistical analysis helped achieve my educational goals.

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Chapter 1: Introduction to the Study

Background

Autism spectrum disorder (ASD) is a neurodevelopmental condition characterized by deficits in social interaction, expressive and receptive communication disability, and stereotypical and repetitive motor behaviors and interests (American Psychiatric Association, *DSM-TR-IV*, 2000). Individuals with ASD have a wide variety of physical, cognitive, and psychological deficits (*DSM-TR-IV*, 2000). The symptom severity and comorbidity with other conditions is also diverse. Thus, the use of the term "autism spectrum disorder" is significant in that no two individuals are the same along the continuum of language deficits, social skills deficits, emotional and behavioral dysregulation, IQ, or comorbidity (*DSM-TR-IV*, 2000). The ASD continuum also refers to how individuals are able to function in academic, social, or work-relatedsettings. It is estimated that 1 out of every 88 children in the United States has a form of ASD, and that the number of diagnosed children is rapidly increasing (Baio, 2012). Thus, studies focusing on the alternative treatments may help educators, physicians, other professionals in the medical community, such as mental health professionals, to develop interventions to improve overall function and prognosis. Many educational, medical, and psychological interventions have been studied; however, not all have demonstrated efficacy for all individuals diagnosed with ASD. Thus, adjunct and alternative therapies to augment current evidence-based interventions need to be explored for this population. Many interventions have been shown to be efficacious in treating social skills deficits, such as applied behavioral analysis (ABA), social skills training via cognitive behavioral training

(White, Ollendick, Scahill, Oswald, & Albano, 2009), and psychotropic medications (Woodard, Groden, Goodwin, Shanower, & Bianco, 2005). However, no studies have been done to determine if the use of CSA therapies could improve quality of life and social behaviors.

Companion animal therapy (CAT) is the process by which animals are used as cotherapists. Clients simply care for the animal, talk to the animal, ride the animal, or stroke the animal to extract therapeutic benefits (Levinson, 1984). Most studies using CAT, animal aassisted therapy (AAT), or pet therapy have been conducted with elderly populations in assisted-care facilities. For instance, Kongable, Buckwalter, and Stolley (1989) found that pet therapy increased social interactions in Alzheimer patients. Studies to identify CAT use to reduce anxiety are limited yet encouraging. For example, the use of CAT has been shown to reduce blood pressure and anxiety levels in perioperative patients, as well as comfort families in the waiting room (Miller & Ingram, 2000). The literature on the use of CAT as a means of increasing social interactions is more developed. For instance, Adamle, Riley, and Carlson (2009) concluded that pet therapy with college freshmen provided a social support system for establishing new relationships. Studies using CAT with individuals diagnosed with autism are scarce. In an occupational therapy-pet therapy study of individuals diagnosed with ASD results suggested that pet therapy improved therapeutic outcomes by increasing social interactions and language use (Sams, Fortney, & Willenbring, 2006). Very few quantitative studies exist exploring the use CAT with individuals diagnosed with ASD, and an exhaustive literature review found no known studies that used quantitative

methods to explore the use of exposure to a CSA with individuals diagnosed with ASD. The use of CSAs for individuals with physical disabilities has demonstrated efficacy in helping to improve daily function, but for individuals with invisible ASD disability deficits, such as deficient social skills leading to decreased social interaction or increased generalized and social anxiety, there have not been sufficient studies to quantify the extent to which exposure to a CSA helps this population improve social behaviors. To substantiate the necessity of the current study, a detailed analysis of the use of animals as a treatment modality to improve social interactions and social skills in individuals with ASD is included in Chapter 2.

Statement of the Problem

An adjunct intervention that has yet to be explored in individuals with ASD is the use of exposure to CSAs as a form of CAT. This study was an attempt to fill a gap in the literature and examine the extent to which exposure to a CSA impacted social skills and social interaction in children and adolescents with ASD. The independent variable of the study was the use of CSA and the dependent variables important to the study were the total and subscale scores of the SSIS and SRS. Further, the covariates were age, gender, IQ, and comorbidty of the CSA or non-CSA user.

Nature of the Study

This quantitative study examined parents' self-reports of their child's or adolescent's ability to perform in social situations and use social skills after exposure to a CSA. Parents of CSA users who met inclusion criteria, as described in Chapter 3, completed a Participant Information Sheet, the SSIS (Gresham & Elliot, 2008), and the

SRS (Constantino & Gruber, 2005). Participants in this group (Group A) were recruited following Institutional Review Board approval of the study and the cooperation of CSA trainers. The trainers sent recruitment e-mails to their clients. The trainers' clients were then able to choose whether or not to contact me via e-mail or telephone. After collecting data for Group A, parents of children or adolescents with an ASD diagnosis who did not use a CSA were recruited (Group B). In addition to meeting criteria outlined in a following section, the parent participants were chosen in cooperation with specialty ASD schools based on the parent's child or adolescent's gender, IQ, comorbidity, and age. In other words, while the parent participant completed the research materials and measures, parents in Group B were chosen based on their child being matched to a child in Group A. Results were analyzed by group, dependent variable, and covariate.

Several self-report measures were considered for this study; however, the SSIS and SRS were chosen based on their extensive clinical and research use (Constantino & Gruber, 2005; Gresham & Elliot, 2008). A second rationale for choosing to use these two measures was the ease of completion by respondents as well as the reliability and validity of each measure.

Research Questions and Hypotheses

The following three research questions and hypotheses guided the study:

Research Question 1

After controlling for child or adolescent demographics (gender, age, IQ, and comorbidity), is there a significant difference in parents' self-report about their child's or adolescent's social skills and social interactions between parents of children or

adolescents with autism who participated in exposure to a CSA and parents of children or adolescents with autism who did not participate in exposure to a CSA?

$H1_0$. After controlling for child or adolescent demographics (gender, age, IQ, and comorbidity), there is no difference in parents' self-report of their child's or adolescent's social skills and social interactions as measured by the parents' subscale and total scores on the SSIS and the SRS between parents of children or adolescents with autism who participated in exposure to a CSA and parents of children or adolescents with autism who did not participate in exposure to a CSA.

$H1_a$. After controlling for child or adolescent demographics (gender, age, IQ, and comorbidity), there is a difference in parents' self-report of their child's or adolescent's social skills and social interactions as measured by the parents' subscale and total scores on the SSIS and SRS between parents of children or adolescents with autism who participated in exposure to a CSA and parents of children or adolescents with autism who did not participate in exposure to a CSA.

Research Question 2

For the parents of children or adolescents with autism who use a CSA, is there a significant relationship between parents' self-report of their child's or adolescent's social skills and social interactions as measured by the parents' total scores of the SSIS and SRS, respectively?

$H2_0$. For the parents of children or adolescents with autism who use a CSA, there is no significant relationship between parents' self-report of their child's or adolescent's

social skills and social interactions as measured by the parents' total scores of the SSIS and SRS, respectively.

$H2_a$. For the parents of children or adolescents with autism who use a CSA, there is a significant relationship between parents' self-report of their child's or adolescent's social skills and social interactions as measured by the parents' total scores of the SSIS and SRS, respectively.

Research Question 3

For the parents of children or adolescents with autism who use a CSA, is there a significant difference in parents' self-report of their child's or adolescent's social skills and social interactions by gender, age, IQ, and comorbidity, as measured by the parents' total and subscale scores of the SSIS and SRS, respectively?

$H3_0$. For the parents of children or adolescents with autism who use a CSA there is no significant difference in parents' self-report of their child's or adolescent's social skills and social interactions by gender, age, IQ and comorbidity as measured by the parents' total and subscale scores on the SSIS and SRS, respectively.

$H3_a$. For the parents of children or adolescents with autism who use a CSA there is a significant difference in parents' self-report of their child's or adolescent's social skills and social interactions by gender, age, IQ and comorbidity as measured by the parents' total and subscale scores on the SSIS and SRS, respectively.

Purpose of the Study

The purpose of this study was to determine if CSAs have efficacy as a therapeutic modality to improve social skills and social interaction. Covariates important to this study

were gender, age, IQ, and comorbidity.The independent variable was the use of exposure to a CSA and the dependent variables were (a) social skills and social interactions subscales and (b) total scores of the SSIS and SRS, respectively.

Theoretical Base

The theory of the mind model (Baron-Cohen, Leslie, & Frith, 1985) and attachment theory (Bowlby, 1973, 1980) served as the theoretical base for this study. Theory of the mind suggests that individuals with ASD have an inability to accurately perceive social interactions (Hamilton, 2008), which contributes to their inability to understand others' feelings or to empathize (Colle, Baron-Cohen, & Hill, 2007). As applied to this study, TOM would suggest that anxiety and social deficits are elevated due to an inability to perceive and predict behaviors in others (Hiller & Allinson, 2002). Through the use of exposure to a CSA, individuals with autism may be able to practice perceiving social cues as they interact with their CSA, and then use their CSA as a transitional object that would help reduce the social anxiety in human-human interactions. The human-animal attachment bond has a long history of contributing to overall health, improving empathy, promoting self-esteem, and bolstering social support (Karol, 2007). Bowlby (1973, 1980) proposed that individuals form attachments with others and that these relationships and attachment experiences provide the foundation or the representational model to guide future interactions and perceptions of others and their behaviors. Individuals who have high levels of attachment anxiety and attachment avoidance are prone to increased emotional distress and nervousness (Collins, 1996). In this study,the CSA may act as a social support system which decreases attachment

anxiety and attachment avoidance, which, in turn, decreases emotional distress by providing the individual with ASD coping skills in a social situation. Therefore, attachment theory was used in this study to explain the extent to which exposure to a CSA improved social interactions and social skills in children and adolescents with an ASD diagnosis based on parent self-report.

Definition of Terms

Animal Assisted Activities (AAA): The Delta Society (2010) delineates that AAA is used to: (a) increase motivation to complete academic interventions, mental health therapies, or physical therapies; (b) does not use standardized durations of treatment; (c) most often is used as a group intervention; and (d) is very similar to pet-visitation therapy. Animal assisted activities are less manualized than AAT in that no therapeutic goal is assigned, and AAA can be conducted by trained professionals operating under the guise of a therapeutic intervention or can be conducted by a trained volunteer.

Animal Assisted Therapy (AAT): Animal assisted therapy is goal oriented and is a manualized treatment used to improve physical or psychosocial function (Berget, Skarsaune, Ekeberg, & Braastad, 2007). Further, AAT is used by professionals who have been certified to use animals in a therapeutic manner either in a group or individual setting, and all portions of the services are goal-directed, and progress towards therapy goals is recorded (Delta Society, 2010). The visits and time allotted for sessions are scheduled as part of the treatment plan. Specific goals listed on the Delta Society Website (2010) include uses for: (a) improving motor skills, (b) improving wheelchair skills, (c) implementing rehabilitation strength training, (d) increasing social interactions in a group

setting, (e) increasing self-esteem, (f) decreasing anxiety, (g) improving recreation skills, (h) reducing loneliness, (i) improving attention skills, (j) increasing exercise, (k) meeting educational goals, (l) improving therapeutic motivation, and (m) improving short-term and long-term memory skills.

Autism Spectrum Disorder (ASD): ASD is a neurodevelopmental disorder first diagnosed in childhood, characterized by qualitative deficits in social interaction, motor function, and language (*DSM-TR-IV*, 2000). For the purposes of this study, ASD refers to individuals with low-functioning autism, high-functioning autism, Asperger's, and Pervasive Developmental Disorder-Not Otherwise Specified (PDD-NOS).

Comorbidity: Psychiatric or medical conditions that co-occur with other conditions.

CSA: CSAs are trained for a specific client, usually for prolonged exposure to aid in the acquisition of some therapeutic goal or improvement in some area of cognitive, social, emotional, or physical function (American's with Disabilities Act [ADA], 1990). Hence, as a definitive mechanism, animals serve to improve wellness. CSAs have access to all public domains when accompanied by their handler; however, if the CSA's recipient is not present, the animal does not have access to public domains. The Delta Society (2010) asserts that CSAs are appropriate for visible as well as invisible disabilities especially for those disabilities that reduce: (a) performing manual tasks, (b) walking, (c) seeing, (d) hearing, (e) speaking, (f) breathing, (h) learning, (i) working, as well as (k) some disabilities that may not be visible, such as epilepsy or psychiatric conditions.

Human-Animal Bond/Attachment: A relationship between an animal and human characterized by friendship, companionship, and reciprocity of interaction (Keil, 1990). Animals and humans enter into a social contract where both members benefit socially, emotionally, and neurologically.

Pet: An animal in which humans have strong attachments to such that they view the animal as a member of their family (Keil, 1990).

Pet Therapy: Pet therapy is a generic term used to describe an adjunct therapy to help improve the treatment outcome of academic, medical, or psychological interventions. For the purpose of this study, pet therapy includes animal assisted therapies (AAT), animal assisted activities (AAA), pet visitation therapy (PVT), and the use of CSAs. The general benefits associated with pet therapy, AAA, PVT, or AAT are: (a) to teach empathy because of the nonjudgmental nature of animals and the ease of reading an animal's body language, (b) to increase self-esteem because the individual changes his or her focus from self to others as he or she interacts with the animal, (c) to teach individuals nurturing and self-care skills, (d) to improve therapeutic rapport with a therapist because animals give the client a sense of emotional safety, (e) to give individuals a sense of acceptance, (f) to provide entertainment from watching animals perform tricks, (g) to increase socialization with the animal and others via more nonverbal and verbal responses, (h) to increase mental stimulation and communication, (i) to increase physical contact and touch, and (j) to activate the physiological relaxation response to reduce stress and anxiety (Delta Society, 2010).

Pet Visitation Therapy (PVT): In PVT the use of a CSA or therapy animal is aimed at improving social interaction and communication in individuals who are hospitalized or institutionalized (Jorgenson, 1997). Interactions are spontaneous and based on the initiation of the human who comes into contact with the therapy animal.

Prolonged Exposure Pet Therapy: Any contact with a therapy animal for over 20-minutes per therapy session, or for over 16-weekly sessions with the animal and therapist.

Prolonged Exposure to a CSA: Any individual who uses a CSA to mitigate the influence of psychological health symptoms to improve quality of life. Individuals must have contact with their CSA all day, every day. Prolonged exposure refers to 24hour contact for at least 1day prior to assessment of changes in social skills or social interaction.

Social Anxiety: A persistent fear of social interaction where the individual fears that they will embarrass themselves and the resulting social interaction increases anxiety symptoms (*DSM-TR-IV*, 2000). Individuals who experience social anxiety may avoid social interaction and may experience impairment in social, academic, or occupational functioning (*DSM-TR-IV*, 2000). The avoidance of social interaction as a means to reduce social anxiety may result in deficient social skills.

Social Skills: Social skills are "the skills necessary for interacting successfully with peers and adults in home, school, and community settings" (Reynolds and Kamphaus, 2004, p.60). To have adequate social skills individuals must have sufficient functional communication skills, leadership skills, and adaptive behavior skills to engage in activities of daily living. Functional Communication refers to "The ability to express

ideas and communicate in a way others can easily understand" (Reynolds & Kamphaus, 2004, p. 60); leadership refers to "The skills associated with accomplishing academic, social, or community goals, including the ability to work with others"(Reynolds & Kamphaus, 2004, p. 60); and activities of daily living refers to "The skills associated with performing basic, everyday tasks in an acceptable and safe manner" (Reynolds & Kamphaus, 2004, p. 60).

Theory of the Mind (TOM): A theoretical construct that proposes that individuals with ASD preclude them from perceiving other individuals' social and communicative interactions resulting in anxiety and social awkwardness (Colle et al., 2007).

Assumptions

The following assumptions were made in this study:

- All participants responded to self-report survey instrument questions and the Participant Information Sheet accurately and honestly.
- All participants had adequate reading comprehension skills to accurately answer the self-report measures, as well as enough insight to assess on their child's levels social skills behaviors.
- All participants' children had been accurately diagnosed with a form of ASD. No attempt was made to clinically assess the diagnosis nor confirm it from medical records.

Limitations

The following limitations or weaknesses are acknowledged in this study:

- The results of this study were not intended to be generalized to other populations who use CSAs due to the purposeful sampling techniques used during recruitment.
- A second limitation to the study was internal validity. There may have been inherent differences between children with ASD whose parents participated and children with ASD whose parents did not consent to participate.
- It is important to note that length of time of exposure to a CSA may have posed a significant threat to validity.
- Thhe purposeful sampling of parents of children or adolescents with CSAs did not reflect the normative socioeconomic standing of most families with a child diagnosed with autism because CSAs are generally not a covered medical treatment by insurance companies. The average cost of a service animal is about $20,000 (Delta Society, 2010). Thus, this treatment is not a realistic option for most families. The matched participants (based on the child or adolescent's age, gender, IQ, comorbidity) in the non-non-CSA group were not matched based on socioeconomic status. The population under study did not accurately reflect ethnic or gender diversity based on the statistical information listed in the *DSM-TR-IV* (2000).
- Another limitation was the lack of control using expanded population parameters, such as expanded age ranges, differences in IQ, and limited demographic diversity. This dramatically impacted recruitment and the ability to match children or adolescents for comparison.

- Confounding variables such as (a) comorbidity with other diagnosable medical or psychological disorders, (b) child or adolescent maturation, or (c) psychological interventions may have resulted in false positives in terms of therapeutic outcome.
- The methodology did not reflect an experimental design. Instead, limitations due to accessing a large enough sample size as well as privacy issues did not readily reflect changes in children or adolescents before and after prolonged exposure to a CSA.
- The novice status of CSAs as a treatment modality precluded exploration of the problem via a longitudinal, repeated-measures, research design. As a means to generate pretest and posttest scores, parent scores from a matched participant group based on age, gender, comorbidity, and IQ of the child or adolescent were compared to parent scores from children or adolescents who used CSAs for therapeutic benefit.
- This study did not make use of random assignment of children or adolescents represented by parent participant's data, which would have improved the rigor and thus the findings.
- There are multiple ways to define social skills and social interactions. The SRS and SSIS are not comprehensive in their measurement of the variables under study.
- Social skills and social interaction were measured by self-report measures completed by parents or guardians. The perceived levels of social behavior

deficits were limited to the items on the self-report measures. Other important variables that could have enhanced interpretation of the phenomenon under study were not considered.

Scope and Delimitations of the Study

Exclusion and inclusion criteria of the variables under study, population under study, research questions and hypotheses, and the theoretical perspectives all were chosen based on the need to fill the gap in the existing literature; however, alternatives could have been explored. To this end, the scope of the study refers to what was included and excluded from the study. There have been many studies that address the use of short exposure CAT with a variety of populations which are addressed in great length in the following chapter; however, there are only a few known studies that address the use of CSAs as a therapeutic modality with individuals with a primary diagnosis of ASD. Further, these studies were anecdotal, and as such it was determined that the use of quantitative data collection and analysis methods could significantly add to the literature. The exploration of social skills acquisition/deficits and social interaction as variables was undertaken in this study for the following reasons: (a) it is well established that social interactions and social skills represent deficits attributed to individuals with ASD diagnoses (*DSM-TR-IV*, 2000), (b) these variables have been explored and supported in the literature (Bardill & Hutchinson, 1997; Barker, Knisely, McCain, Schubert, & Pandurangi, 2010; Trotter, Chandler, Goodwin-Bond, & Casey, 2008), and (c) the theoretical perspectives included in this study have been previously linked to the study's variables (Bowlby, 1980; Mikulincer & Shaver, 2007). A second delimitation associated

with this study was that it sampled parents of children or adolescents ages 8-18 from across the United States who have ASD and also use a CSAfor physical safety, as a social aid, and as a means to reduce social and generalized anxiety. An equal sized control group of parents of children or adolescents with ASD who do not participate in exposure to a CSAwas used to determine the extent to which the animal improved social skills and social interaction. Thus, the self-reports of parents with children under 8 years of age or over 18 years of age, who had children without ASD diagnoses, were non verbal, or had IQ scores below 79 were excluded.

Significance of the Study

The results of this study increased awareness of the potential therapeutic benefits of exposure to CSAs. Further, a major limitation of any therapeutic use of animals is the lack of scientific data to support efficacy. This study represents the first known quantitative study that provides data to support for the use of CSAs to improve social behaviors for people diagnosed with ASD. This evidence helps to establish the validity of the intervention and thus convince third-party payers to offset the financial burden associated with it.

This study has social change implications for how disabilities are viewed as well as how CSAs are used for a variety of physical as well as invisible disabilities such as intellectual disabilities, emotional disabilities, psychological disabilities, or developmental disabilities, and may guide social change as a means to increase understanding of how CSAs improve daily function and social behaviors..The results of this study could be a catalyst for exploring adjunct treatments for a host of medical or

psychological disabilities. If so, the use of CSAs could be extended and how public organizations, such as schools, view the use of CSAs for disabilities (other than those impacting physical function), could prompt policy changes.

Summary and Transition

Pet therapy encompasses many terms such as CAT, AAA, AAT, or PVT. Further, there is a sufficient amount of anecdotal, qualitative, and case study accounts pertaining to its benefits to wellness. However, it has been argued that there is a need for more randomized quantitative studies that use diverse and large sample sizes (Nimer & Lundahl, 2007). Unfortunately, methodological limitations such as lack of standardized procedures, differences in rates and duration of exposure, limitations on exact procedures used during the experimental phase of studies all have contributed to difficulties in conducting meta-analyses to exact efficacy of the use of animals as therapeutic agents (Nimer & Lundahl, 2007). To complicate CAT studies further is the notion that CAT uses therapy animals, as opposed to service animals, or CSAs. In short, therapy animals are not afforded the same access to public areas (Delta Society, 2010). The animal is allowed in a public space only when an organization permits the animal and its handler (Delta Society, 2010). A service animal or CSA is allowed in any public location by law.

The most commonly cited theories associated with CAT studies are suggestive of the benefits of CAT as a social aid, and the use of attachment theory through the establishment of the human-animal bond. Theory of the mind suggests that individuals diagnosed with ASD have difficulties perceiving the intentions of others (nonverbal or verbal behaviors). Thus, anxiety and social deficits result. A CSA can be part of a therapy

treatment modality where the human and animal form an attachment. Through the development of an attachment bond, the individual with ASD may focus on the animal to reduce anxiety and practice social skills. Thus, the aim of this study was to determine if CSAs have efficacy as a therapeutic modality to improve social skills and social interactions. It was proposed that exposure to CSAs improved the social behaviors of the child or adolescent with ASD and that significant differences between the two participant groups was to be expected.

Chapter 2 will (a) review the literature on the diagnosis of ASD and the treatments used currently; (b) explore how the attachment theory associated with the human-animal bond is associated to wellness in terms of physiological health, mental health, and social interaction; and (c) justify the need for the current study since no relevant literature about the use of exposure to a CSA with children or adolescents with ASD was reviewed or located for review. In Chapter 3, the methodologies, procedures, sampling and recruitment techniques, and instrumentation will be discussed. Chapter 4 will present the data and statistical analysis for each hypothesis. Descriptive statistics of the sample will be described using tables. Chapter 5 will discuss the results in relation to previously conducted studies, the limitations of the study, the recommendations for future research and practice, alon with the significance of the findings and their implications for social change.

Chapter 2: Literature Review

Introduction

Pet therapy and CAT are an adjunct therapy conducted by trained professionals to bring about a particular therapeutic goal. Pet therapy has been used with a variety of populations to produce physical, emotional, social, and psychological benefits. The aim of the study was to determine if exposure to CSAs has efficacy as a therapeutic modality to improve social skills and social interactions in children or adolescents with ASD based on the self-reports of their parents' scores on the SSIS and SRS, respectively. This chapter reviewed literature on the human-animal bond with respect to (a) the historical importance of animals and their relationships with humans, (b) the use of animals for therapeutic means, including a definition of pet therapy and CAT, (c) the common ethical concerns associated with the use of animals in a therapeutic capacity, (d) attachment theory, (e) improvements in overall wellness, (f) improvements in psychosocial wellness in elderly and cancer populations, (g) improvements in cardiovascular patients with regard to physiological health correlates, (h) improvements in psychosocial wellness in children, (i) improvements in psychosocial wellness in mental healthcare, (j) improvements in anxiety, and (k) improvements in social skills and social interactions, . This chapter concludes with an overview of the population under study;specifically it looked at (a) diagnostic criteria, (b) prevalence rates and deficits; (c) theoretical framework to explain social deficits and anxiety in individuals diagnosed with ASD, (d) common treatments, (e) a review of the limited studies using pet therapy and CAT with individuals diagnosed with ASD,(f) a review of the methods employed in pet therapy and

CAT studies, whose function is to justify the need for the current study and to highlight the methodological limitations of previous studies.

While the review was limited to English-only materials, no limitation was placed on the date.The multiple searches used the following electronic databases: PsycINFO, SocINDEX with Full Text, PsycARTICLES, and PsycBOOKS. The following keywords were used in the searches: *pet, pet therapy, companion animal, CAT, animal, animal therapy, AAT, PVT, service animals, CSAs, animal activities, AAA, autism, human-animal, human-animal bond, attachment, TOM,* and *attachment theory*. There was

Historical Importance of Animals and Their Relationship with Humans

Animals have an important function and relationship with humans. The domestication of animals has led to higher agricultural yields, which in turn has led to a better quality of life (Walsh, 2009). Further, humans have had a long history of entering into relationships with animals for companionship. The companionship and services that animals provide to humans have demonstrated positive therapeutic benefits. One of the first documented uses of animals in a therapeutic manner occurred in York, England in the 1700's where institutionalized individuals tended to and cared for gardens and animals to improve functional and therapeutic outcomes (Ormerod, 2005). The staff hypothesized that the animals had healing qualities capable of reducing stress, reducing loneliness, and mitigating physical disabilities (Ormerod, 2005). In more recent history, the Red Cross started to use companion animals to treat battle fatigue in World War II (Burch, 1996). These uses of animals in a therapeutic context did not reflect established practices to treat any mental health related problem. There was no such practice known as

pet therapy or CAT, nor were there many mental health professionals who would have considered using animals a mode of therapeutic intervention. Pet therapy as an adjunct intervention and field of study in psychology happened by accident. Boris Levinson, a child psychologist and the Father of Pet Therapy, brought his dog, Jingles, into a psychotherapy session and noticed that the introduction of the dog into the session helped the client relax, establish rapport, and be motivated to share (Levinson, 1969). The field of pet therapy and CAT is now used by a variety of medical practitioners, mental healthcare practitioners, and educators in a variety of contexts. In addition to the use of pets in psychotherapy, pets have been used (a) in long-term care to study social interactions and behavioral outcomes (Kawamura et al., 2009), (b) in prisons to improve behavior (Laun, 2003), (c) in hospice centers to distract patients from pain as well as to provide comfort to family members (Conner & Miller, 2000), (d) in hospitals to distract patients from invasive procedures and to reduce perioperative anxiety (Johnson, Meadows, Haubner, and Sevedge, 2008), (e) as adjuncts to pain management (Sobo et al., 2006), (f) as a form of improving function due to physical disability (Conner & Miller, 2000), and (g) as mediums to improve cognitive function (Conner & Miller, 2000). Companion service animals represent a therapeutic extension of the important role animals play in the improvement of physical, social, and emotional function of humans (Delta Society, 2010).

Pet Therapy Defined

Pet therapy, also called PVT, is used as an adjunct therapy to help improve the treatment outcome of academic, medical, or psychological interventions. Pet therapy is

different from AAT in that AAT is goal-oriented and is a manualized treatment used to improve physical or psychosocial function (Berget et al., 2007). According to Jorgenson (1997), PVT has the goal of trying to increase socialization, communication skills, and therapeutic levels of interaction and is based on the participant's choice to initiate contact. Oftentimes, the literature does not differentiate between these terms such that the generic term, pet therapy, has been employed. Pet therapy encompasses many different terms and processes to include: CAT, PVT, AAT, animal therapy, AAA, and the human-animal bond. Miller and Ingram (2000) asserted that pet therapy has many different modalities for use and definitions. Pet therapy can be brief or can involve individuals adopting an animal for use in structured activities (Miller & Ingram, 2000). The use of animals for a therapeutic outcome can be accomplished using exposure where the service animal becomes a companion at home to increase function, or to promote overall well-being (Delta Society, 2010). Therapeutic outcome can also be accomplished using brief exposure and delivered in a variety of locations (Delta Society, 2010). Common domains where pet therapies are employed include hospitals, long-term care facilities, in psychotherapy sessions, and in academic settings, with the goal to increase motivation to improve physical health or to increase participation in psychotherapy, to aid in academic remediation, or to aid in recreational exercise which impacts cardiac health (Kawamura et al., 2009).

The Use of Service Animals

The use of animals in a therapeutic manner comes from the use of registered service animals or via the use of trained CSAs. Service animals are trained for a specific

client, usually for prolonged exposure to aid in the acquisition of some therapeutic goal or improvement in some area of cognitive, social, emotional, or physical function (Delta Society, 2010). Hence, animals serve as definitive mechanisms to improve wellness. Prior to animals being taken into any setting to be used as a therapy service animal, the handler should receive training on appropriate dog-handling techniques, the policies of the facility, and appropriate ways to interact with the participants (Khan, & Farrag, 2000). Further, in order to be a therapy animal, the animal should be screened for disease, should be vaccinated, should be screened for temperament and behavioral problems, and should be given obedience training (Khan, & Farrag, 2000). It is important to note a difference between service animals, CSAs, and therapy-animals in terms of the rights of individuals who use these therapeutic modalities. Therapy animals may be brought into a particular domain with advanced permission to enhance goal directives (McDowell, 2005) while service animals and CSAs generally accompany individuals in any situation and are allowed by law as they aid individuals to increase function (Ryan & Straub, 2005).

Concerns About Using Animals as Part of Therapy

As with any potential treatment for physical and mental health, there are always potential risks associated with a particular modality. As such, the potential to harm a patient or client must be considered prior to using a treatment. Some of the common concerns associated with the use of pet therapy have produced a barrier for its use with certain populations and in certain treatment locations. The following discussion highlights concerns associated with pet therapy.

A common concern associated with wellness as it relates to pet therapy use in any clinical setting is the potential for the transmission of disease from the animal to the human or from the human to the animal (Brodie, Biley, & Shewring, 2002). The parasitic, fungal, or bacterial diseases which can be transmitted by animals are known as zoonoses. In this way, individuals with health-related problems could develop new medical concerns such as meticillian-resistant Staphylococcus aureus (MRSA), which in turn could rapidly spread throughout a facility (Brodie et al., 2002). Haas (1987) asserts that there are certain populations who are more at risk to zoonoses-related diseases, such as the young, the very old, those receiving cancer treatments, and those with HIV or other immune-suppressed conditions. Equally concerning is the health of the animal being used. Animals take on the anxiety of the individuals they come into contact with thus putting undue stress on the animal. Additionally, individuals can transmit disease to animals via direct contact, so contact can turn the animal into a vector to spread disease (Lefebvre & Weese, 2009). The risks and negative concerns of zoonoses are largely unwarranted and can be easily avoided by having participants wash their hands prior to and after the intervention and by having the animal groomed prior to being taken to the intervention site (Guay, 2001).

Another concern with the use of pet therapy as a therapeutic modality is animal bites. Guay (2001) asserts that this particular risk is largely unfounded because of the temperament-screening process and medical screenings that therapy animal candidates undergo prior to their training and use. Further, pet therapy is not appropriate for every population such that it would be unethical to place an animal in a situation in which it

could be abused and as a result, bite someone (Guay, 2001). For example, clients or patients who demonstrate violent tendencies could potentially be too aggressive and injure the therapy animal. Under this particular circumstance, the likelihood that the animal would respond by biting is highly probable.

A final concern associated with the use of therapy-animals as modalities of therapeutic intervention is allergies and phobias. Pet therapy or CSAs may not be an option for use with individuals who have allergies related to pet dander or who have animal-related phobias. Both of these concerns would constitute harm that outweighs the benefits of treatment. In terms of individuals not participating in pet therapy but within close proximity to the animals, pet therapy is also a health concern due to allergies, phobias, or zoonoses. One way to mitigate this concern is to have the pet therapy take place at a site away from the general population and to make announcements within the facility that there will be therapy-animals on particular dates and times.

Human-Animal Bond, Attachment Theory, and Anxiety

Several versions of attachment theory have been developed. Early versions focused on the formation of attachment as a means to ensure infant survivability (Bowlby, 1973). That is, infants formed attachments to their parents because of the learned association of the parent with food. Likewise, parents formed attachments to their children as an evolutionary determinant to ensure the survival of their genetic make-up (Bowlby, 1973). Attachment theory as it relates to social interaction and social anxiety can perhaps be best explained by Bowlby (1973, 1980) who proposed that individuals form attachments with others and that these relationships and attachment experiences

provide the foundation or the representational model to guide future interactions and perceptions of others and their behaviors. In this way, individuals learn to behave and interact with others, based on their interactions and attachment to early caretakers. In later revisions attachment theory, Bowlby (1980) argued that individuals generally like to maintain secure attachments to their parents for biological reasons to include acquisition of food, but that quality of the relationship impacts the future expectation of behaviors which in turn impacts the security of the attachment style and system. Thus, secure attachment relationships can then be transmitted to other relationships because the expectation is that these relationships will also result in secure attachments. Additionally, secure attachments decrease emotional stress because of the secure feelings associated with the other member of the relationship so that the individual then chooses to remain in close proximity with that person or to seek out that person on a different occasion (Slater, 2007). This may be one plausible explanation as to why individuals are able to transfer attachments to new people and seek out new relationships.

Unfortunately, individuals with autism have deficits with establishing human-human attachments due to an inability to comprehend the behavioral intent of others and due to their own language, motor, and social deficits (Baron-Cohen et al., 1985). Thus, it is important to note that Bowlby's (1973) initial assertions about the relationship between the mother and child directly impacting the development of future pathology is not necessarily true as research has demonstrated that ASD has genetic underpinnings (Horwitz, Rumsey, Grady, & Rapoport, 1988; Zilbovicius et al., 1995). Individuals who have high levels of attachment anxiety and attachment avoidance are prone to increased

emotional distress and nervousness (Collins, 1996). Individuals with autism generally do not seek out social support or interactions which is indicative of low attachment security, high attachment avoidance, and high attachment anxiety. Mikulincer and Shaver (2007) asserted that in non-autistic adults who seek social support, their attachment style is more secure and that their attachment anxiety is low such that overall emotional distress is low due to increased coping skills. This assertion is particularly important in consideration of the current study because the CSA may act as a social support system which decreases attachment anxiety and attachment avoidance which in turn decreases emotional distress by providing the individual with ASD coping skills in a social situation.

Keil (1990) reviewed the findings of her 1986 thesis in which she conducted a qualitative study with elderly populations to develop a theoretical framework depicting the human-animal bond as it relates to attachment. In short, individuals can have varying levels of attachment to animals. Keil asserted that proximity does not necessarily generate any attachment to an animal; however, this assertion is solely based on the context of proximity as well as the attachment style of the individual. Overall, attachment style is based on how the brain of an individual codes experiences for storage within short-term and long-term memory as either episodic or semantic memories (Slater, 2007). In this way, initially parent-child relationship patterns form the working models of social interaction with all individuals. As development continues, individuals are able to distinguish between the context of the episode and the relational working model formulated in early childhood. The ability to form and maintain attachments to others through social interaction is based on attachment style. Ainsworth (1989) identified three

types of attachment response styles by studying infants and small children involved in a stranger/ parent-child separation experiment and they are: secure, avoidant, and anxious attachment styles and responses. Erozkan (2009) described individuals who are able to develop secure attachments as individuals who can feel positive self-worth, and can establish and maintain healthy, intimate relationships with others because they are able to trust the individual. In other words, the person's internal model matches their current and expected experiences with their peer. For individuals who are deemed insecure they often perceive themselves as unworthy of close relationships due to their internal model of what should be experienced during an episode not being synchronized with their past experiences in trying to achieve and maintain secure relationships (Slater, 2007). Insecure attachment styles have been linked to the development of anxiety disorders while secure attachment styles are protective against developing social anxiety symptoms (Muris & Meesters, 2002). Social anxiety produces feelings and thoughts of being negatively evaluated by peer interaction such that individuals may choose to avoid people and situations that could be embarrassing (Erozkan, 2009). Thus, individuals use avoidance to control anxiety and to avoid rejection, and avoid feelings that could lead to social blunders (Erozkan, 2009). Furthermore, anxious attachment styles involve individuals fearing the absence of an attachment figure due to their inabilities to match their internal models of appropriate interaction with their perceptions of past encounters, and avoidant attachment styles result from individuals not engaging in social interaction as a means to disable their internal models of attachment out of fear of rejection (Herbert, McCormack, & Callahan, 2010).

The attachment bond between an animal and human may be easier to establish and maintain because human-animal relationships are less complicated than human-human relationships (Rynearson, 1978). There are some antecedents that can produce a stronger attachment bond with an animal, and they include (a) the frequency to which the individual has contact with the animal, (b) the physical appearance of the animal, and (c) the reciprocal interaction and communication with the animal (Klaus & Kennell, 1982). The human-pet dynamic represents a stronger attachment than just the proximity paradigm (Keil, 1990). A large percentage of households (>50 %) have at least one pet (Jorgenson, 1997), and it is very common for people to form attachments to their pets and see them as members of their family (Voith, 1985). In fact, many individuals report that they have a stronger attachment to their pet than their significant others (Walsh, 2009). Related to this attachment is the fact that pet owners assign human characteristics to their pets and engage the animal in conversation (Walsh, 2009). As many as 70% of all children talk to their pets and confide in them (Serpell, 2000). From the perspective of the human-animal bond vis-à-vis attachment theory, children confide in their pets due to the nonjudgmental and supportive nature of an animal.

Attachment to animals may occur more naturally and readily due to unconditional love and acceptance that animals offer to humans (Beck & Madresh, 2008), thus resulting in individuals who may be more forthcoming in a therapy session in terms of the establishment of a positive therapeutic relationship (Velde, Cipriani, & Fisher, 2005). According to Bryant (1985) and Melson, Peet, and Sparks (1992), individuals who demonstrate attachment to their pets use more empathy skills and express more empathy

than individuals who do not own pets or do not have secure attachments with their pets. Human interactions with animals have demonstrative advantages to decrease anxiety, improve physiological measures of anxiety, and increase socialization (Barker & Dawson, 1998; Fick, 1993; Schuelke et al., 1991). Further, the human-animal interaction has shown to have profound impact on the brain. When humans and animals (dogs) interact, dopamine, cortisol, oxytocin, prolactin, endorphin, and phenylalanine levels in both humans and dogs increase (Odendaal, 1999). By simply interacting with animals, endorphins are released, which increase the feelings of well-being and comfort, and endorphin release suppresses the parasympathetic nervous system, generating a state of relaxation (Livnat, Felton, Carlson, Bellinger, & Felton, 1985). The physical act of touching may play a significant role in the attachment related to the human-animal bond. Touching establishes trust for both participants and also is pleasurable for both participants and has been shown to have physiological health benefits as well as psychosocial benefits (Netting, Wilson, & New, 1987). The final type of attachment bond described by Keil (1990) with regard to theoretical framework is the notion that individuals who use CSAs have the highest level of attachment to their animal. The CSA generates friendship and trust as the animal helps to facilitate improvements in differing areas of physical, emotional, psychological, or social function (Keil, 1990).

Human-Animal Bond and Wellness

In a literature review by Brodie et al. (2002), the authors concluded that the use of animals for therapeutic conditions has a wide variety of links to wellness including increased social interactions in differing populations as well as improvement in physical

health in terms of reductions in blood pressure, death from cardiac conditions, increased relaxation, and reductions in depression. In a training manual linked to wellness using equine therapy, Kersten and Thomas (2004) asserted that the use of horses has been to shown to improve communication skills, improve a child's and adult's sense of self-confidence, improve problem-solving skills such that conflict resolution is possible, and help individuals develop relationships with others. The following review of literature focused on various populations who have used pet therapies with positive physical and psychosocial therapeutic outcomes.

Human-Animal Bond and Psychosocial Wellness in Elderly Populations

Older individuals often become socially and physically isolated due to being institutionalized, retirement status, loss of mobility, financial constraints, and the loss of friends and family (Horowitz, 2008). Attachment to others is a psychological need for overall well-being and function and can be accomplished through contact with companion-animals (pets), friends, family, religious affiliation, or employment (Prosser, Townsend, & Staiger, 2008). There are numerous studies using older populations that suggest the social benefits to well-being when pet therapy-related activities were used as an adjunct treatment (Banks & Banks, 2002; Fick, 1993). For example, in a 2-year longitudinal study of eight Japanese women living in a long-term care facility, qualitative analysis suggested six pertinent themes associated with the use of twice monthly pet therapy sessions: Participants were more likely to develop and take an interest in other residents in the facility, they developed more self-interest as reflected in interactive relationships, and they showed more interest in their environments due to the ease of

establishing relationships via the use of therapy-animals (Kawamura et al., 2009). Thus, pet therapy motivated individuals to interact with others.

Other studies suggested similar positive benefits for elderly populations with regard to improvement in social interactions, decreases in negative verbalizations and behaviors, decreases in loneliness and depression, as well as improvements in physiological measures of health such as decreases in blood pressure via the use of pet therapy activities. For instance, Churchill, Safaoui, McCabe, and Baun (1999) used a within-subject randomized repeated-measures design where participants were videotaped in either a dog condition or a no dog condition to delineate if individuals with a diagnosis of Alzheimer's disease and "sundown behaviors" would benefit in terms of socialization and agitation through the use of pet therapy. Individuals demonstrating Sundown Syndrome in connection with an Alzheimer's diagnosis often wander aimlessly, become verbally and physically combative, and demonstrate agitation and aggression (Churchill et al., 1999). Thus, the authors proposed that therapy animals would help decrease Sundown symptoms by stimulating the elderly participants' relaxation response such that blood pressure would decrease (this variable was not reported in the study), could serve as a distraction such that undesirable behaviors would decrease, and could help stimulate memories there by serving as a cognitive therapy (Churchill et al., 1999).

At the outset and conclusion of the study, 28 European American participants from three nursing homes were given the Burke Dementia Behavioral Rating Scale (Haycox, 1984) to assess language, social interaction, attention, spatial orientation, bladder/bowel control, motor control, and eating/grooming habits. Additionally the

participants were given a demographics questionnaire; the Agitation Behavior Mapping Instrument (Cohen-Mansfield, 1986) to measure physical and verbal aggressive behaviors; as well as the Daubenmire's Data Coding Protocol (Daubenmire, White, Heizerling, Ashton, & Searles, 1977) to measure social behavior frequency and duration. The participants were videotaped every 5 minutes for 15 seconds from 5:00 to 5:30 to observe social behaviors such as smiling, verbalization, and tactile contact over the course of 2-sessions with or without a therapy dog present. Repeated measure- analysis of variance (ANOVA-RM) of differences in agitation behaviors was significant indicating that the presence of the therapy dog resulted in lower rates and durations of agitation; however, the amount of time the dog spent with the participants was not significant (Churchill et al., 1999). This finding is interesting when placed into context with the current study because the authors hypothesized that the prolonged nature of exposure would produce significant changes in behaviors than in typical pet therapy studies. Dependent *t* test changes in socialization produced significant differences for smiling, verbalization, and looking forward and tactile contact; however, there was no significant difference in scores based on the severity of dementia (Churchill et al., 1999). Again, this finding is important because many therapeutic interventions intended for individuals with ASD have significant differences in overall efficacy based on the individual's diagnosis within the autistic spectrum. It may be that pet therapies have the similar therapeutic benefits as suggested by the results of Churchill et al. (1999) regardless of severity of deficits.

Human-Animal Bond and Psychosocial Wellness in Cancer Patients

Perception of pain due to invasive medical procedures is often a concern to individuals with cancer and to their family members. Pet therapies may serve as a stress-reducing adjunct, a measure of comfort, or a distraction. In a study using a randomized pre- and posttest design, Johnson et al. (2008) attempted to identify the extent to which AAA affected anxiety, depression, fatigue, tension, self-perceived health, and sense of coherence among patients with cancer undergoing radiation therapy. Thirty adult patients receiving radiation treatments were randomly placed via computer selection into three groups: a pet visitation group in which a therapy dog and its handler were present and the cancer patient simply combed, stroked, or talked to the dog (n = 10), a friendly human visitation group where a student nurse made "small talk" with the participants (n = 10), or a quiet magazine reading group (n = 10). The participants completed a demographic questionnaire (pretest only), the Profile of Mood States (McNair, Lorr, & Droppleman, 1981), the Self-perceived Health Questionnaire (Kaplan & Camacho, 1983), the Orientation to Life Questionnaire (Antonovsky, 1988), and an exit questionnaire to determine if sessions were helpful and how they were helpful (posttest only). All other measures were given both pretest and posttest as indicated in the research design. Regardless of the experimental group all activities occurred 3-times per week for 4-weeks for 15-minutes per session. The authors were unable to find any significant differences between the three experimental conditions; however, the individuals in the dog visitation group did report that they felt their health had improved due to dog visits. Overall, the dog visits gave individuals a measure of comfort and served as a distraction

during the radiation process. More research is needed to delineate measurable benefits associated with anxiety reduction and pet therapy (Johnson et al., 2008).

Human-Animal Bond and Physical Wellness in the Reduction of Vital Signs

Overall, pet therapy and companion animals (pets) have long-term benefits for cardiovascular patients (Somervill, Swanson, Robertson, Arnett, & MacLin, 2009). It is suggested that the establishment of the human-animal bond through proximity or simple contact stimulates the parasympathetic nervous system which controls an individual's ability to relax via the control of an individual's blood pressure and heart rate (Luptak & Nuzzo, 2004). Luptak and Nuzzo (2004) conducted a study on 15 elderly women to determine if pet therapy had physiological benefits if the participant had not previously formed an attachment to the canine. The researchers measured oxygen saturation, blood pressure, and pulse rates and placed the participants randomly into 3 groups of 5. Luptak and Nuzzo (2004) used a pretest, posttest experimental design where first vital signs were taken followed by a 10- minute introduction to the experimental dog condition. During the experimental condition, participants simply stroked and held the canine. Vital signs were immediately recorded after the 10- minute interaction and again after 5 minutes of sitting quietly. Paired *t* test analysis of pretest and posttest data revealed significant reductions in all three groups for blood pressure and pulse rate; however, no differences were detected for oxygen saturation levels (Luptak & Nuzzo, 2004). More importantly, the researchers attempted to determine if pet therapy has long lasting impacts on physiological health and physiological measures of anxiety and the results suggested that blood pressure reductions significantly dropped between the first reading and the second

reading, but that there was not a significant reduction between the second and third reading. This finding initially suggested that reductions in blood pressure are beneficial to the reduction of anxiety for an extended period of time even if the animal is no longer present. Pulse rate, however, did not remain at lower levels from the second reading to the third reading. Thus, these mixed findings do not substantiate the prolonged benefits to physiological health or reduction in anxiety via short-term exposure to therapy animals such that the current proposed study may help to substantiate the necessity of using prolonged exposure to a CSA to exact lasting benefits to health and anxiety.

Human-Animal Bond and Psychosocial Wellness in Children

The use of children in pet therapy research represents an area which is in need of more studies. For the most part, studies have focused on improving social interactions, use of animals as cotherapists, use of animals to improve academic achievement (Trotter et al., 2008), and use of animals to treat pain associated with medical procedures and hospitalization (Braun, Stangler, Narveson, & Pettingell, 2009). In a quasiexperimental study by Braun et al. (2009), which used the psychoneuroendrocrine response to pain theoretical paradigm to examine how animals may modulate pain in children ages 3 to 17, the authors found that, when compared to a control group, participants in the experimental group reported reductions in pain levels but no reductions in blood pressure or pulse. Respiration rates increased in the animal experimental condition. This study employed unequal sample sizes (n = 39 in the control group and n = 18 in the animal therapy group), and as such results should be viewed with caution. Individuals in the animal experimental group underwent 15-20 minutes of dog interaction where the level

of interaction varied based on the desire of the participant. The researchers attempted to control for the handler as a confounding variable by having them sit quietly in the room and minimally interact with the participant or therapy dog. Participants in the control group simply sat quietly in their rooms without human interaction for 15- minutes. Before and after the session, the participants in both groups had their pain level rated via the FACES pain scale as well as their blood pressure, pulse, and respiration rate assessed. While this study did encounter some methodological challenges such as a failure to recruit a sample size sufficient in statistical power and a change in therapy dog used due to the death of the original therapy dog, the results of the paired *t* test indicated that individuals in the therapy dog group had pain reduction rates four times greater than those in the control group.

The results of the Braun et al. (2009) study were similar to the mixed methods' results of Sobo et al. (2006) who concluded that, even after a singular pet visitation, hospitalized children reported less pain. Sobo et al. (2006) used a convenience sample of 25 children who had undergone surgery and who were then experiencing postoperative pain. The participants' physical and emotional pain was measured pre-exposure and post-exposure using a pain scale from 1 to 10 with happy and sad faces on it. Post-intervention the participants and their parents were asked to participate in a 5- minute semi-structured interview to determine what they liked about the canine visit. While no time limit was discussed in the procedures section of the study, the researchers did discuss the therapy dog used as well as the nature of the canine visitation therapy. Simply, the therapeutic intervention was passive meaning that the animal simply lay next to the child or allowed

the child to stroke it. The level of interaction was determined by the participant. Of particular interest was that the animal did not necessarily have to be actively used to produce changes in participants' perception of pain. Paired *t* test suggested that both physical and emotional pain decreased as a result of having contact with the therapy animal. Interview data were qualitatively analyzed producing eight themes: the dog provided a distraction from pain, the dog brings pleasure, the dog is entertaining, I enjoy snuggling with the dog, the dog reminds me of my pet at home, the dog is comfort, the dog calms me down, and the dog eases my pain (Sobo et al., 2006). In short, the main conclusion was that pet therapy can serve as an adjunct to create cognitive changes in perception of pain and provide comfort, and that due to the small sample size that the study should be replicated using larger sample sizes.

Human-Animal Bond and Psychosocial Wellness in Mental Healthcare

Pet visitation therapies have been studied to delineate potential uses and efficacy for treating individuals with severe mental disorders such as schizophrenia, for treating anxiety and depression in outpatient and inpatient situations, and for the improvement of social skills.

Studies using psychiatric populations measuring changes in social interaction have produced positive results. For instance, Hall and Malpus (2000) used a quasiexperimental design with 10 psychiatric patients engaged in twice weekly, 90-minute pet therapy sessions and concluded that the intervention did produce improvements in prosocial behaviors and verbalizations. This study was an attempt to control for the novelty of having a dog as a mode of treatment and the effects of a dog

handler within the treatment itself because these are two confounding variables that are often cited as limitations associated with pet therapy studies and create uncertainty about findings associated with the benefits of pet therapy. In short, pet therapy studies have been criticized because it is unclear if positive changes in social interactions are due to the animal's interaction with the participant or due to the handler being present. Further, it is unclear if the novelty of an animal being present has definitive benefits for participants or if social interactions merely increase due to the excitement of a novel experience. Thus, this repeated-measure quasi-experimental design utilized an A-B-C-A reversal design where baseline observations were made for 2- weeks with no dog or handler present (Condition A), then 2- weeks of observation with only the dog handler present (Condition B), 14- weeks of observation with the dog handler and dog present (Condition C), and the return of Condition A for the final 2- weeks (Hall & Malpus, 2000). The phasing in of each experimental condition increased confidence that results were due to real experimental change and not due to novelty. This study has implications for the current study due to the prolonged exposure of the CSA. In short, these findings lend credence to the hypothesis that improvements in social skills are not be due to the novelty of using the CSA since exposure occurs over long periods of time. In this way, two common confounding (handler and canine novelty) variables are irrelevant to the current study.

Human-Animal Bond and Anxiety

Many studies have concluded that stroking a dog has calming effects such that physiological measures of anxiety such as blood pressure and heart rate decline, but

talking to a pet has an excitatory effect which increases blood pressure (Somervill et al., 2009). In an exploratory pre- posttest within-subjects study using a convenience, nonclinical sample of dog-owners (n = 10) interacting with pets who participants did not own as their own pet therapy dog or pet, Barker, Knisely, McCain, Schubert, and Pandurangi (2010) examined the human-animal attachment bond to determine if the past research literature demonstrating the physiological benefits of interaction with therapy-animals or pets applied to human-animal interactions when the human had not formulated a bond with the animal. The sample was comprised of 5- therapy-dog owners and 5- non-therapy-dog owners. The participants first engaged in a stress task (The Stroop Color Word Test; Stroop, 1935) 30- minutes prior to interacting with the animals to purposefully increase stress and anxiety levels followed by 30 minutes of interacting with an animal (Barker et al., 2010). Therapy dog owners interacted with their therapy dog while the other participants interacted with animals they had never interacted with prior to the intervention; following the dog interaction both groups watched a neutral video (Barker et al., 2010). Physiological measures of anxiety and stress such as blood pressure, heart rate, salivary cortisol, and salivary alpha amylase were taken before and after the intervention. Further, in an attempt to determine the extent to which the covariate trait anxiety attitudes about pets could have impacted the reliability and validity of the results, the STAI (Spielberger, 1983), subjective visual analog scales of stress and anxiety, and the Pet Attitude Scale (Templer, Salter, Dickey, Baldwin, & Veleber, 1981) were used. Paired t test were conducted to determine if there were differences in anxiety from the post-stressor activity to 1- minute post intervention and the results were modestly

significant for the physiological measures of anxiety and the subjective measures of stress and anxiety meaning that there were slight increases in physiological measures of anxiety due to the stressor activity and that interaction with the animal produced decreases in the measures. Overall, anxiety was slightly less for individuals who were in contact with their own animal; however, both groups experienced decreases in anxiety. Barker et al. (2010) concluded that contact with pets provides a buffering impact to stressors, and that the benefits of contact with a therapy-animal or pet is extended to all individuals even when a definitive human-animal bond is not established. While this study is limited by the small sample size, it is an important in context of the current proposed study. Specifically, the more attached an individual is to their pet, therapy-animal, service animal, or CSA the more likely they have an ability to cope with outside stressors. In this way, individuals have a coping mechanism which is protective in buffering stressors.

Not all pet therapy studies have demonstrated a positive effect on participants. For instance, S.E. Barker and Dawson (1998) studied STAI (Spielberger, 1983) rating scale changes in 230 psychiatric patients and found that a singular session of pet therapy versus a singular session of recreational group activities does not produce any significant reductions in anxiety when the two conditions are compared. It is important to note that ANOVA analysis demonstrated significant reductions in anxiety for individuals with mood disorders and psychotic disorders after just a single pet therapy session and significant reductions in anxiety for participants with mood disorders after a single recreational group activity. The authors suggest that the lack of differences between the two interventions may be due to the presence of the researcher interacting with the

participants versus the interaction between the dog and participants. Another methodological possibility was the use of only a singular pet therapy session. Many limitations discussed throughout the literature suggest that the novelty of the intervention could produce initial anxiety, fear, or excitement such that no immediate reductions in anxiety were apparent. A follow up study extending data collection in both experimental conditions could control for this extraneous variable and detect a change.

Human-Animal Bond and Social Interactions

The therapeutic relationship has been shown to be one of the most important aspects of psychological intervention in terms of improving the outcome of services. To this end, there has been research into the use of horses, dogs, and other animal interventions to improve therapy outcome in terms of improving motivation, disclosure, client relaxation and trust, as well as improving skills related to social interaction, self-confidence, and self-esteem. For instance, Chandler (2005) proposed that the use of equine therapy improves motivation and cooperation in therapy clients and a horse is not just a therapy modality but that the animal serves as a cotherapist. Animals as cotherapists are nonjudgmental such that clients more readily open up (O'Connor, 2006).

In a quantitative study addressing serious behavioral problems, social adjustments, and learning difficulties in 164- at-risk third-through-eighth grade students, Trotter et al. (2008) found that the use of equine assisted therapy was more effective than classroom therapy in improving adaptive skills, leadership skills, and social skills in this population. Participants in both the equine group and the classroom counseling group were assessed before intervention and after 12- weeks of intervention using the

Behavioral Assessment System for Children ([BASC]; Reynolds & Kamphaus, 2002) and the Psychosocial Session Form (Chandler, 2005). Regardless of treatment modality, the purpose of the intervention was to enhance self-awareness, have participants recognize patterns of behavior which had proven dysfunctional in the past, and learn to foster healthy relationships (Trotter et al., 2008). This study used a large sample size compared to many pet therapy studies ($N = 205$ with a final $n = 164$); however, 40 participants dropped out prior to the end of the study. One major limitation associated with this study as well most other studies was the use of nonrandom experimental group assignment based on the fact that some participants had fear of horses or allergies. Further, analysis used multiple *t* tests as opposed to multivariate analysis of data, and the two comparison groups: equine therapy group ($n = 126$) versus classroom therapy group ($n = 38$) had unequal numbers which could have had implications for the validity of and reliability of results. Participants' and parent scores on the BASC-SRS/BASC-PRS in the equine group demonstrated significant decreases in negative behaviors. Parent ratings of improvement highlighted 12- areas of improvement while participant self-reports indicated five areas of behavior improvement. Individuals in the classroom counseling group reported only one area of improvement which was statistically significant. The researchers made no attempt to control for confounding variables related to emotional maturation. Thus, results should be viewed with caution since the significant improvement in social skills could have been due to other school- or therapy-related interventions.

Other studies have also found that the use of pets as interventions or as adjunct interventions produces positive changes in social interactions (Fick, 1993; Richeson, 2003). In a qualitative study using 30 adolescents, aged 11-18, in a psychiatric inpatient setting, the participants trained dogs to perform entertaining tricks and engaged in pet care such as feeding and grooming tasks (Bardill & Hutchinson, 1997). The participants had a wide range of diagnosis and symptom severity (depression, conduct disorder, PTSD, adjustment disorder due to lack of ineffective coping skills, schizophrenia, eating disorders, bipolar disorder, and ADHD; Bardill & Hutchinson, 1997). Participants were instructed to write about their experiences with the therapy dog, and journals were collected after 1- month. The therapy dog was given free range of the facility and as such participants had prolonged exposure to the treatment modality. Other forms of data collection included observations from the researcher, clinical nursing notes, and a formal, 15–30-minute, tape-recorded interview with participants about their feelings about the dog (Bardill & Hutchinson, 1997). Ethnographic analysis of patients' journals indicated that the animals served as social enhancements to increase social interaction as participants showed others how their pets preformed tricks or how participants engaged in conversations as they completed pet-grooming tasks. Further, analysis revealed the following themes: The dog made the facility homelike, the dog reduced fear and anxiety about being hospitalized in a psychiatric facility, the dog helped the patients form a strong therapeutic alliance with the staff and other patients, the patients viewed the dog as a friend and someone they could confide in without being judged or criticized, the dog helped the patient to calm down when upset, the dog made insecure patients feel safe

given their past victimization, the dog served as a distracter from problems, and the dog helped in learning self-care skills, behavioral skills, and socialization skills (Bardill & Hutchinson, 1997). This study lends credence to the hypotheses tested in the current study that prolonged exposure to a CSA improved overall mental health and that a CSA helped in the development of prosocial behaviors.

Just as individuals with a definitive mental illness may have difficulties engaging in social situations, individuals with mental and physical disabilities can have reduced social interaction with their social environments due to discrimination or lack of social skills. In a study to assess the notion that service animals can serve as social aid to increase peer interaction in physically disabled populations, Mader, Hart, and Bergin (1989) observed the social interactions of 5- children aged 10-15 with service animals in school and public settings. The researchers also employed a matched control group (n = 5) that did not use a service animal based on age, gender, and severity of disability. Observations were made by the researchers without the knowledge of the participant; however, the school lunch and recess observations as well as the shopping mall observations varied in duration which could represent a threat to the validity and reliability of the results. Recorded observations of the experimental group revealed significant differences in social interaction. Specifically, in the school setting the participants who used service animals received more looks from passersby's, engaged in more conversations either directed solely at the child or at both the child and dog, and more physical contact was made with the child-dog team than with participants from the control group who had physical disabilities but no service animal (Mader et al., 1989). Of

particular interest to the use of service animals which serve as companions to aid in daily function, these animals also have a therapeutic effect often associated with therapy-animals. Specifically, these animals act as social enhancements by encouraging others to engage in conversations with the disabled person. The increased social interaction and the ease of social interaction occurred regardless of whether or not the participant was in proximity of individuals they knew or strangers. Given that individuals with autism have difficulties forming attachments to others, the increased socialization resulting from the use of a CSA may aid in the development of representational models that can be applied to novel relationships. In other words, individuals could learn to make and maintain friendships more readily.

Friedmann, Thomas, and Eddy (2000) assert that animals have a modulating effect on children's stress responses when used in conjunction with therapeutic intervention or when used in a companion capacity; however, overall stress levels are influenced by the situation, familiarity of location and persons within the locations proximity, fear of animals, and the child's relationship or familiarity to the animal being used. Further, the modulation of stress via the use of animals can occur from simply gazing at pictures of animals, from being in the presence of an animal but not interacting with the animal, or by physically interacting with the animal (Friedmann et al., 2000, p.137). This may be one explanation as to the wide variety of methods employed in research in terms of type of interaction employed as well as the duration of the interaction.

Autism

Autism spectrum disorders (ASD) are the result of neurodevelopmental disease processes where there are decreased functional connections within the cerebral cortex and between the cortex and subcortical regions as a result of delayed neurological maturation of the frontal lobe (Horwitz et al., 1988; Zilbovicius, 1995). These delays and deficits within the neural network result in deficits related to an inability to process neural information necessary to interpret or exact particular behaviors and cognitions (Belmonte et al., 2004). Some researchers have proposed that the neural networks function to excess, resulting in selective attention problems while other researchers hypothesize that there is over conductivity within the neural network, resulting in 'noise and cross talk' between neurons (Belmonte & Yurgelun-Todd, 2003). As a result, individuals with ASD have difficulty filtering out unimportant stimuli, which in turn leads to deficits in social skills, communication, and anxiety. Stereotypical behaviors may result due to a need to self-sooth or from motor deficits (Belmonte & Yurgelun-Todd, 2003).

Diagnostic Criteria

The diagnosis of autism can be a challenge for medical and mental-health practitioners due the wide variability in the presentation of symptoms. As such, autism has different subsets of diagnosis based on symptoms experienced. The fourth edition of the *DSM-IV-TR*(2000) requires that individuals meet the following criteria for an autism diagnosis: (a) impairment in social interactions, (b) impairment in communicative skills, and (c) restrictive repetitive and stereotyped behaviors, interests, and activities. Specifically, individuals must demonstrate at least two deficits in social interactions such

as: (a) lack of social or emotional reciprocity, (b) a lack of spontaneous sharing of interests with others, (c) a failure to develop peer relationships of appropriate developmental level, or (d) impairment of nonverbal abilities such as appropriate use of eye-to-eye gaze, use of body posture, use of gestures, or use or understanding of facial expressions (*DSM-TR-IV*, 2000). Likewise, individuals must demonstrate impairment in at least one communicative skill such as: (a) delay or total lack of spoken language, (b) impairment to initiate or sustain conversations if the individual has language capacity, (c) utilizes stereotyped, repetitive, or idiosyncratic speech patterns, or (d) deficits in ability to use social imaginative play at the appropriate developmental level (*DSM-TR-IV*, 2000). Individuals must also manifest at least one of the following behavioral patterns for diagnosis: (a) preoccupation with objects, (b) stereotyped and repetitive movements, (c) cognitive inflexibility, or (d) inflexibility due to ritualistic routines (*DSM-TR-IV*, 2000). Further, most practitioners agree that ASD symptoms are present by age 3; however, delay of diagnosis is a common problem due to symptom awareness and diagnostic tool limitations (*DSM-TR-IV*, 2000).

Prevalence

Depending on the source and how ASD is classified in terms of what forms of the disorder are included (low-functioning versus high-functioning autism, Asperger's, PPD-NOS), there is wide variability in reported estimated prevalence rates. In a book chapter highlighting changes in diagnostic rates of all forms of ASD from the 1960s to the 2000s, Coleman (2005) ascertained that the rate is 0.6%-1.1% of all school-aged children in the United States. This constitutes a rate 20-100 times higher than suggested by earlier

studies and may be due to increased prevalence or more likely due to improvements in screening and diagnosis (Coleman, 2005). This assertion is echoed by Baio (2012), and the author added that this is an approximate rate of 1 in 88 children affected. Additionally, the *DSM-IV-TR* (2000) indicates that autism in males occurs at four times the rate of females; however, females are more likely to have severe intellectual disabilities comorbid with their ASD diagnosis.

Deficits

According to Martin and Farnum (2002), poor communication skills, stereotypical behaviors, and other social skills difficulties result in a lack of interest to the social environment and are core-deficits related to pervasive developmental disorders (PDD) such as Rett's Syndrome, Asperger's, ASD, and PDD-NOS. Individuals diagnosed with ASD commonly have other neurological, physical, mental health, and educable problems relating to their condition. For example, seizure disorders co-occur with approximately 30% of all cases (Tuchman & Rapin, 2002), 50% of individuals are nonverbal, and 70% of individuals are intellectually disabled (Hertz-Picciotto, Croen, Hansen, Jones, & Pessah, 2006).

Theory of the Mind: A Theory of Social Skills Deficits and Anxiety

One of the proposed explanations for social deficits and increased social anxiety in individuals with ASD is associated with theory of the mind (Baron-Cohen et al., 1985). According to this theory, individuals have deficits in empathizing with others, difficulties in determining the mental states of others, and have difficulties generating appropriate emotions based on the mental states of others (Baron-Cohen et al., 1985). Social deficits

in communication arise from an inability to empathize because information about appropriate social interactions is not properly scaffolded to processing schema (Baron-Cohen, 2004); and as such, individuals are unable to predict other people's behaviors or the appropriate manner to respond. In this way, social exchange can result in confusion and increased anxiety (Groden, Cantela, Prince, & Berryman, 1994) because individuals with ASD have difficulties in understanding emotions expressed by others. As a result, some of the stereotypical behaviors such as arm-flapping or rocking exhibited by individuals who fall within the autistic spectrum may be a maladaptive way of self-soothing to reduce anxiety (Thomas, Barratt, Clewley, Joy, Potter, & Whitaker, 1998). It is important to note that another explanation for arm-flapping may be excitement as proposed by findings associated with a quantitative study by Martin and Farnum (2002). In short, physical behaviors increased in the pet therapy condition even though the participants were more engaged with the animals verbally and via eye gaze such that it is unlikely that the arm-flapping was a result of increased anxiety. As part of the human-animal bond which is theorized to produce the physiological and psychological benefits associated with pet therapy, O'Connor (2006) infers that interactions with horses or pets in general create a situation of unconditional love and acceptance where the individual is able to feel safe in interacting while not being judged harshly. The horse or other type of animal which serves as the therapist does not have expectations of particular behaviors or cognitions such that the individual is able to form an attachment and the animal then serves as a transitional object. Focusing on the transitional object decreases anxiety and serves to give the individual the opportunity to engage socially. After the individual

becomes more confident in social interactions with the transitional object (CSA), the individual can then transfer these skills to other humans.

Common Treatments

Autism Spectrum Disorders have many comorbid physical and mental health conditions for which there are a diverse number of treatments. Many of these comorbid conditions and treatments are beyond the scope of this discussion. As such, an abbreviated review of the most common, popular, and well-established efficacious treatments for social skills deficits and social anxiety is reviewed. Overall, the majority of treatments used to treat autism are targeted for early intervention. Early intervention is the suggested modality as the educable and psychosocial interventions are designed to enhance the neuroplascity of the brain.

Applied behavioral analysis (ABA). Applied behavioral analysis is an intensive intervention which involves a multidisciplinary approach to influence critical behaviors to improve social skills and interactions while decreasing social anxiety associated with interacting with the individual's environment (Keenan, 2006). While there is some variability in specific interventions, many programs have been designed to address specific behavioral objectives through discrete learning trials such as (a) attending skills in terms of gestures, eye gaze, and simple conversational responses; (b) imitation skills to improve gross and fine-motor coordination, improve language use and skills, and to teach appropriate social interaction through imaginative play; (c) receptive language where the child learns to follow directions and identify emotions from speech inflections; (d) expressive language where the child learns to categorize objects and concepts as well as

to retell a story; and (e) the child learns self-care skills necessary for independence (Keenan, 2006). In an article comparing the efficacy of ABA to cognitive therapies (CT), Emerson (2006) contested the argument that ABA is superior to CT. Applied behavioral analysis may only have short-term impact on behavioral change such that improvement in social skills and social interaction will continue to be a problem associated with ASD. The use of pet therapies via the use of prolonged exposure from CSAs may be a useful adjunct to improve therapeutic outcome; and as such, this may a represent a needed future area of research via the use of quantitative analysis of comparing ABA and PT to ABA alone.

Social-skills training. Due to the social deficits associated with ASD, many academic settings as well as clinical settings use social-skills training programs. In a literature review of social-skills training as an intervention with individuals with high-functioning autism or Asperger's, Rao, Beidel, and Murray (2008) concluded that, while this intervention is widely used, the diverse practices lack scientific evidence to establish efficacy. In short, this particular intervention may not benefit all individuals such that an adjunct therapy such as CAT, pet therapy, or the use of CSAs as a treatment modality may increase efficacy. Thus, one area for future research may seek to study differences between experimental groups who use pet therapy or CSAs and social-skills training versus individuals who use only social-skills training.

Cognitive behavioral therapy (CBT). Individuals who have an ASD diagnosis have a wide array of symptoms and IQs. To this end, CBTs may represent a potential viable treatment to reduce social anxiety and improve overall quality of life. Cognitive

behavioral therapies are generally successful with individuals who have the potential for insight and the ability to acquire new behaviors while reducing and eliminating undesirable behaviors (Bauminger, 2007). Thus, CBTs to enhance appropriate social interactions could reduce social anxiety which accounts for social awkwardness and isolation in individuals diagnosed with ASD. In a randomized wait-list controlled experimental design, Wood et al. (2009) used an enhanced standard CBT program with 40 individuals with high-functioning autism, ages 7-11 to reduce social and generalized anxiety associated with poorly developed social skills. The results suggested that CBT interventions significantly reduced social anxiety as measured by anxiety symptom checklists but not the participants' Multidimensional Anxiety Scale for Children (March, 1999) self-report. Since CBTs require an ability to use insight, it is quite possible that individuals with lower-functioning ASD may not benefit from this particular modality.

Medication. Regardless of age or diagnosis, social anxiety disorders are often treated using medication such as mood stabilizers, antipsychotics, or antidepressants. Wachtel, Hartshorne, and Dailor (2007) reviewed common comorbid disorders which are associated with autism and found that anxiety disorders are the most reported by parents, and that the most common treatment modality for anxiety comorbid with ASD is the use of psychopharmacological interventions. Unfortunately, few medications have been approved for use with children. Another concern is the comorbid status that autism has with seizure disorders. Some psychopharmacological interventions lower the seizure threshold such that this treatment option is not advisable. Third, some parents are unwilling to risk the possible side effects associated with many antidepressants such that

they prefer other treatment options. In this way, it may be possible to use pet therapies or prolonged exposure to CSAs to reduce anxiety in lieu of medications to treat social and generalized anxiety disorders that are comorbid with ASD.

Limited Studies Using Pet Therapy and Autistic Populations

George (1988) asserted that the use of animal therapies may be a potential advantageous adjunct treatment of comorbid disorders or symptoms associated with pervasive developmental disorders as these individuals may be able to more readily interact with their social environments because they are able to form attachments to animals. In short, the animals serve as a transitional object where the individual first establishes an attachment bond to the animal and then extends that relationship to others (Winnicott, 1986). With regard to individuals within the autistic spectrum, social deficits are a core concern where the establishment or maintenance of attachment bonds is often difficult to achieve, so the use of CSAs may be beneficial as a form of social aid (Katcher, 2000). While not directly using participants diagnosed with autism, Somervill et al. (2009) used individuals with a diagnosis of ADHD and found that blood pressure and heart rates actually increased after holding a dog. This finding seemingly contradicts studies using other populations and is an important finding related to the use of pet therapy with individuals diagnosed with ASD due to the comorbidity status of ADHD and ASD. Thus, future studies involving individuals diagnosed with ASD should consider the potential excitatory effect and delineate if physiological measures such as blood pressure rates drop after prolonged exposure or if pet therapy as an adjunct therapeutic intervention is potentially harmful for this population.

In a study comparing the use of standardized occupational therapy techniques (OT) and OT techniques and pet therapy (OT and PT) on 22 children ages 3-17 diagnosed with autism, Sams et al. (2006) conducted a pilot study to generate support for the use of human-animal bonds to improve sensory integration as well as improve social interaction and language use. The authors hypothesized that the participants would demonstrate more language usages and demonstrate more social interactions during the OT and PT condition than the OT condition alone. The study was conducted over 15-weeks in which the participants engaged in 1- session of standard OT practices (M = 26.3 minutes long) and 1- session of OT and PT (M = 28.5 minutes long) per week. The researchers did not control for participant absences from school, as such the number of sessions each participant engaged in was between 2 and 12- sessions of each type of intervention. Sams et al. (2006) found that participants in the OT and PT group had significantly greater numbers of social interactions and uses of language when animals were present than when therapy animals were not part of the OT. The research methods employed in this study were rich in description such that replication of results is possible with a larger sample size.

In another study using a within-subject repeated-measures design with 10 children, all diagnosed with PDD-NOS, Asperger's, or autism, each child acted as his or her own control when exposed to three experimental conditions, 15-minute-pet therapy-sessions, a stuffed-toy-animal therapy condition, or the use of a ball. In the presence of a therapist, prosocial verbal and nonverbal behaviors were measured via observation. Results of the ANOVA-RM indicated that, when in the live-animal therapeutic condition,

the participants were more verbal, aware of social cues within the environment, playful, and focused (Martin & Farnum, 2002). In short, the children maintained their gaze on the dog and were not easily distracted as well as initiated conversations with the dog, thus demonstrating more social interaction and verbalization in this experimental condition. An important argument Martin and Farnum (2002) make in the discussion of the results is that, in addition to the number of verbal exchanges and initiations made by the participants, the participants also made appropriate exchanges, meaning that they were less likely in this experimental condition to speak about topics unrelated to topics associated with the therapy or the current therapist-participant conversation. Thus, while the participants were less likely to maintain eye contact with the therapist because they were focused on the dog, they engaged in more two-sided conversations than in the other two experimental conditions but spent more time discussing animal-related topics and not personal topics. This study is of particular importance because the authors attempted to control for some confounding variables such as the use of the same animal per session and the use of inner rater reliability; however, the major limitation which is common in all animal therapy research studies regardless of population studied is sample size. These findings are similar to studies using other populations and substantiate that pet therapy may be a useful adjunct therapy to promote the development of conversation skills with individuals diagnosed with developmental disorders and disabilities.

In a qualitative exploration using two case studies of children diagnosed with ASD that used CSAs, Solomon (2010) examined videotaped sessions of child-canine interactions to determine the benefits of the human-animal bond. Analysis of videos and

transcripts yielded important evidence to support the assertion that pets serve as transitional objects from which the human is able to form a comfortable attachment by which social interactions can be practiced and then transferred to others. As such, the researcher analyzed the data in context of the historical importance of canines and human relationships and concluded that the interactions between the CSAs and participants in fact, improved the lives of individuals diagnosed with autism. The canine-human interactions enabled attachment bonds to form easier than human-human bonds thus increasing emotions and emotional responses by the participants (Solomon, 2010). It was concluded that the emotional responses and social interactions between the canine and the participants served to mediate social interactions between the child with autism and their parents (Solomon, 2010). This qualitative research project is important as it illustrates the potential for a CSAs to improve social interaction, and was added to this literature review as it justified the current research study. The conclusions of the Solomon (2010) study used only two representative cases, but did not examine cases which could potentially dispute the notion that CSAs mediate social interactions between children diagnosed with autism and their parents. Further, a quantitative research endeavor was needed to support the Solomon (2010) findings, and to quantify the extent to which CSAs mediate social interactions.

A qualitative study by Burrows, Adams, and Millman (2008) was conducted using CSAs with individuals diagnosed with ASD. The authors were most interested in determining the physical stressors for the canines and less interested in determining the efficacy of the CSAs as a form of prolonged exposure CAT. The analysis of the

structured interviews and observation data yielded that indeed the canine did aid in improving children's physical safety, but the companion service dog was more likely to bond to the child's parent as they are often the primary caregiver and animal handler (Burrows et al., 2008). In other words, the CSA had the most benefits for reducing stress and providing attachment comfort to the families of the child diagnosed with ASD and not the child for whom the CSA had been purchased. One interesting caveat of this study was the descriptions of attachment bonding and social companionship of the dog to the child diagnosed with ASD. If the parents were strict in not having any other family members interact with the companion service dog, the dog would seek out companionship and attach to the child thereby fulfilling another one of the CSA's purposes (Burrows et al., 2008).

In another qualitative study by Burrows, Adams, and Spiers (2008), the authors explored the use of CSAs with a sample of 10 children diagnosed with ASD. The primary goal was to examine the important behavioral patterns between companion service dogs and children diagnosed with ASD (Burrows, Adams, & Spiers, 2008). After 12- months of data collection, including interviews and videotaped observations, important themes emerged from content analysis. First, the companion service dog's most important function was to provide sentinel safety and security for the child both in the home and while in public. The second theme which emerged from analysis was that the CSA made it easier for families with children diagnosed with ASD to engage in social activities and outings outside the home. Third, the CSA served as a distraction during daily living tasks which often upset the child (the dog had a calming effect). Fourth, the companion service

dog improved many aspects of the child's mental health function as exampled by decreases in frequency and duration of tantrums, improvements in attention, decreases in anger outbursts, and decreases in anxiety. Finally, the companion service dog served as a transitional object for which the child could practice affectionate displays of affection (Burrows, Adams, & Spiers, 2008).

Equine therapy is a type of pet therapy where a client either rides or cares for a horse. While the current study does not use horses as a form of CSA treatment, it is important to include these reviews of the literature as the studies purport benefits to individuals with autism. In a pre-posttest, 12- week design using 34 individuals with ASD, Bass, Duchowny, and Llabre (2009) examined the effects of therapeutic horseback riding on social functioning. The participants, aged 4-10, were placed randomly into an experimental group (n = 19) or a wait-list control group (n = 15) and were administered the Social Responsiveness Scale (Constantino, 2002) and the Sensory Profile (Dunn, 1999). In addition to the pre-test administration of the measurement tools, the participants in the experimental group received 12-1 hour sessions of therapeutic horseback riding where the participants played games with the horses, and learned and performed basic horse care tasks (Bass et al., 2009). A 2 x 2 ANOVA analysis and follow-up paired t tests were performed to examine if there were significant changes in social functioning between the experimental and control groups. Overall, the use of therapeutic horseback riding did significantly improve social functioning with individuals diagnosed with ASD. Specifically, individuals in the experimental group showed improvement in sensory seeking (sensory integration) and sensory sensitivity, attention and distractibility

(sustained attention), sedentary routine (rigidity in daily routine), and social motivation (Bass et al., 2009). One of the major limitations to this study was access to the horses. The current study examined the use of canines as a therapeutic modality because of their practicality for use in everyday life as well as their legal status to be used as CSAs. A second limitation of the Bass et al. (2009) study was that no data was reported about the use of other concurrent therapies, medications, or interventions. The current study gathered data in reference to medication use, but did not attempt to control for these potential confounding variables. In other words, a weakness of the Bass et al. (2009) as well as the current study was the inability to state with surety that the benefits exacted in the study were from the effects of the independent variable on the dependent variable(s). A recommendation of Bass et al. (2009) for future research was to expand the same size of participants, use more comprehensive measures, and to expand the length of the study (exposure rate). The current study was an attempt to use larger sample sizes, and to study prolonged exposure. There are several other studies which have shown support for the use of animals with pervasive developmental disorders (Law& Scott, 1995; Nathanson, de Castro, Friend, &McMahon, 1997; Redefer & Goodman, 1989).

Review of Literature on Methods

Formal research using pet therapy as a treatment modality began as a response to the 1961 APA address made by Boris Levinson. Levinson described how his dog, Jingles, became a cotherapist by accident when a patient came for services at his residence several hours before his appointment time (Schaefer, 2002). Levinson stated that the dog greeted the withdrawn child and that the child first formed an attachment and relationship

with the dog. It was only after several appointments that Levinson was able to solidify the therapeutic relationship with the client such that therapy progress occurred (Schaefer, 2002). Thus, Levinson proposed that animals could be used to enhance psychotherapy with unmotivated or withdrawn clients (Schaefer, 2002). While some attendees appreciated Levinson's address, other attendees did not believe that animals could make a serious impact on therapy outcome such that they were not a worthy therapeutic intervention; however, this did not deter Levinson and others from continuing to research the use of animals as a therapeutic intervention (Schaefer, 2002). Research has had periods of interest and periods of disinterest as evidenced by this literature review. While the vast majority of studies have suggested a variety of physical or psychosocial benefits to well-being, many of the early studies were dismissed due to their anecdotal accounts. Overall, the majority of studies examined the following dependent variables (a) social skills interaction, (b) physiological correlates to anxiety, (c) self-esteem, (d) psychological manifestations of anxiety, (e) academic success, (f) the therapeutic alliance, and (g) improvement in physical function. Further, in a literature review of the use of therapy dogs as a mode of intervention, Modlin (2000) determined that of all the pet therapy studies published between 1988 and 1993, only 15% of 52 studies were direct intervention studies and the rest were nonexperimental in nature. Additionally, Modlin (2000) asserted that the studies were generally limited by a lack of theoretical framework and limited by a lack of diversity within the samples; however, the most cited theoretical frameworks discussed the physical benefits of pet therapy, attachment theory, or the use of CSAs as a social aid. Many of the methods used for collecting data included the use of

observation, open-ended questions, surveys, questionnaires, physiological measurements, behavioral checklists, and self-report measures.

Qualitative Methods Used in Pet Therapy Studies

Many of the first research studies conducted on the efficacy of pet therapy were qualitative in nature. The majority of all pet therapy and CSA studies are descriptive in nature, some of which use simplistic methods while others are well designed and use a control group. Overall, qualitative studies exploring the use of CSAs with individuals diagnosed with ASD has provided a better understanding of how this alternative treatment modality is being used (Burrows et al., 2008; Burrows, Adams, & Spiers, 2008; Solomon, 2010).

Quantitative Methods Used in Pet Therapy Studies

Recently there has been an attempt to use quantitative methods to explore the efficacy of pet therapies to mitigate a variety of physical, social, emotional, academic, or psychological problems. The most frequently used quantitative research methods in the majority of pet therapy studies are questionnaires and surveys (Barba, 1995). More recently, as a means to determine the extent to which CSA therapies have therapeutic benefit, the use of self-reports has become more prevalent. Due to limitations associated with sampling (see discussion which follows), attempts to use more sophisticated methods employ quasiexperimental designs; however, there have been some randomized controlled studies. Most studies use simpler applied pretest and posttest designs. In a meta-analysis by Nimer and Lundahl (2007), the authors suggested that quantitative methods better reflect efficacy of pet therapy as an adjunct treatment and that there is not

a difference in effect size of treatment outcome when a control group versus a simpler pre-post single-group method is employed. As such, even studies that have not employed more rigorous methods have value and support the suggestion that pet therapy has benefits for use as an adjunct medical, social, and psychological intervention. Other conclusions made about quantitative studies analyzed in the meta-analysis by Nimer and Lundahl (2007) included the notation that (a) the use of pet therapy dogs may be more beneficial for younger children as opposed to adolescents, (b) the effect size for individual delivery versus group delivery of services was higher on measures pertaining to well-being, and (c) disabled individuals may benefit more from services than others, especially with regard to medical outcome ($d = 0.96$).

Measures Used in Pet Therapy Studies

Pet therapy studies have measured physiological correlates associated with anxiety via measuring heart rate and blood pressure. Using blood pressure cuffs may be contraindicated with individuals diagnosed with ASD due to the fact that many individuals in this population have sensory integration dysfunction. Sensory issues may preclude individuals from consenting to participate or could increase anxiety. In this way, this could be a confounding variable which could skew results. For this reason, physiological correlates such as blood pressure and pulse rate measurements for anxiety were not appropriate for this study.

In addition to physiological measures, self-report assessment tools have also been employed and are generally the most used assessment tool. Social skills and social interactions have been studied via clinical observation (frequency tallies) and via self-

report measures such as the BASC-2 (Reynolds & Kamphaus, 2002). Reaven (2009) further asserts that there are positive and negative attributes associated with the use of self-report measures. Reaven (2009) cited King, Muris, and Ollendick (2005) and argued that self-report measures often use several sources such as parents, the minor child or adolescent's self-report, and the teacher report from which to draw conclusions such that validity increases.

Commonly Cited Limitations Associated with Pet Therapy Studies

The efficacy of pet therapies has not been well established for a variety of reasons. Confounding variables represent a limitation of previous studies employing pet therapy.

Perhaps the methods' most cited limitation in the literature is the use of small sample sizes due to the exclusionary criteria necessary to conduct research, such as phobias to animals, expense associated with the use of animals, immune-compromised status, or allergies to animals. Exclusionary criteria often limit the ability to recruit sample sizes, which could generate enough statistical power for generalization of results. Based on a review of the literature, most sample sizes are based on convenience-sampling methods; however, some researchers have attempted to overcome this limitation by having matched comparison control groups or standard control groups. There is a need for future research using random sampling methods or at a minimum stratified sampling to ensure diversity within a research sample.

Another criticism of pet therapies is that there are no well-established goals or mechanisms for measurement of therapeutic gains associated with the interventions

(Beck, 2000). Methodological differences across the spectrum of populations and uses of pet therapy have resulted in a diverse way of studying this adjunct intervention, but many studies have proven difficult to replicate because of (a) a failure to adequately describe the intervention, (b) researchers did not consider how the role of the CSA or therapy-animal could be a confounding variable, and (c) most studies lack a theoretical framework to guide interpretation of results. Further, methodological limitations extend to long-term consequences associated with the use of brief or long-term exposure to CSAs. Is improvement in social skills permanent? This facet of the human-animal interaction has not been adequately explored.

Quantitative Methods Used in the Current Study

In a meta-analysis which compared four studies using children with ASD and brief-exposure, pet therapy, Nimer and Lundahl (2007) concluded that pet therapy resulted in high-effect sizes ($d = 0.72$) for behavioral changes in individuals with ASD. These meta-analysis findings are encouraging; however, none used randomization during the sampling procedures, and none of these studies used a control group. Further, sample sizes ranged from 5-12 participants such that it is questionable as to whether the results can be generalized. It remains unclear as to whether animals as an intervention is beneficial for individuals diagnosed with ASD. The current study attempted to use larger sample sizes and a matched-pair control group to improve generalizability.

The purpose of the current research was to study the efficacy of using exposure to CSAs with children and adolescents with ASD based on their parent's self-report. Exploration of the literature suggested that this is an area much in need of research

because to date few studies exist researching the effect of exposure to a CSA on social skills and social interactions. While there are a host of potential quantitative methodologies to explore this topic, time constraints, research expenses, and access to adequate sample sizes, precluded a true experimental design. To this end, a matched-pair non-CSA group was compared to children and adolescents which already use a CSA to exact benefits. A complete analysis of this methodology including its limitations is included in chapter 3.

Summary

Relevant literature relating to pet therapies and ASD was reviewed to support the problem statement that, through the development of adjunct treatment options such as exposure to a CSA, social skills and social interactions may improve for individuals with ASD. This chapter reviewed studies related to (a) the historical importance of animals in relation to humans, (b) the definition and concerns associated with the use of pet therapy and CAT, service animals, and CSAs, (c) development of attachment to an animal via the human-animal bond as part of the theoretical framework guiding the current study, (d) studies using pet therapies with the elderly, cancer patients, cardiac patients, children and adolescents, and individuals with mental health concerns to improve both psychosocial and physical health; (e) diagnostic criteria, and social deficits associated with ASD; (f) literature associated with the use of pet therapy and CAT with individuals diagnosed with ASD, and (g) reviewed past methodologies used in pet therapy and CAT studies.

Many studies using CAT and pet therapy focused on its use with elderly populations to decrease anxiety and improve social interactions (Fick, 1993), individuals

diagnosed with cancer to reduce hopelessness and anxiety (Gagnon et al., 2004; Muschel, 1994), and to treat anxiety (Allen, Blascovich, & Mendes, 2002), stress, and reduce blood pressure (Baun, Oetting, & Bergstrom, 1991). However, the use of animal therapy with individuals diagnosed with ASD has not been adequately explored. Further, the literature on CSA use as a whole, regardless of population studied, is mostly anecdotal evidence due to methodological limitations or the use of qualitative research methodologies (Miller & Ingram, 2000). Overall, most animal-human studies have used short-intervention durations. Thus, this study sought to study children and adolescents with ASD using CSAs as adjunct treatments via exposure to a CSA through examination of parent self-reports of their child's social behaviors.

Chapter 3 explains the methodological approach to gathering quantitative data to answer the research questions. Additionally, a review of the data-gathering tools, setting and sample, procedures, recruitment techniques, sample size, and inclusionary and exclusionary criteria is discussed.

Chapter 3: Research Method

Introduction

The aim of the study was to determine if exposure to CSAs has efficacy as a therapeutic modality to improve social skills and social interactions in children or adolescents with ASD based on the self-reports of their parents' scores on the SSIS and SRS, respectively. This study used attachment theory as it relates to the use of exposure to CSAs to develop and practice social behaviors in children and adolescents diagnosed with ASD. This chapter describes the research design, population, sampling method, justification of the sample size, the sampling method, procedures for recruitment and data collection, instrumentation, data analysis, procedures used to protect participants from harm, and how the data were secured.

Research Design and Approach

This quantitative study used a matched-participant, equivalent, posttest-only design with nonrandomized sample selection. The sampling was clustered and multistaged in an attempt to match participants' children or adolescents in the non-CSA group to participants' children or adolescents who used a CSA based on child/adolescent criteria and rated by parent self-report. A quantitative method was preferred over a qualitative or mixed methods approach in order to quantify the extent to which a CSA improves social skills and social interaction among children or adolescents diagnosed on the autism spectrum. A quantitative method was preferred as well for the research questions. In quantitative studies, numerical data from observations, experimentation, surveys, or measurement tools (self-report; structured interviews) is statistically analyzed

to examine the relationship among variables (Creswell, 2009). In this research study, the research questions specifically were addressing changes in social behaviors and a comparison between CSA users and non-CSA users. To this end, quantitative methods were preferred. Thus, this study used a modified between-group, repeated-measures design where the non-CSA parent group represent pre-intervention levels of social skills behaviors and the CSA parent group scores represent data for children or adolescents after prolonged exposure to a CSA. The study used a static group comparison or posttest-only group with equivalent groups design.

Social skills were quantified based on the subscales and total SSIS scores. This measurement tool uses a Likert scale to describe social skills deficits and strengths. The parent version of the SSIS was used in the statistical analysis. Multivariate analysis of covariance (MANCOVA) analysis of both parent groups, and between parent groups was conducted on the subscale scores to determine if there were mean differences. If the MANCOVA analyses were significant, individual ANCOVA analyses were examined. The dependent variables in the ANCOVA analyses were the total scores of the SSIS.

Social interaction was measured and numerically represented by examining the parent subscales and total scores of the SRS. The SRS uses a Likert scale to examine the extent to which children or adolescents can successfully interact with others and can use social skills. The parent participant subscale scores from both groups were analyzed using MANCOVA. If the MANCOVA analyses were significant, individual ANCOVA analyses were examined. The dependent variables in the ANCOVA analyses were the total scores of the SRS.

Justification of Design and Statistical Analysis

As discussed in Chapters 1 and 2 as well as the introduction of the current chapter, the use of CSAs as a therapeutic modality is new (Delta Society, 2010). Further, there is a very small population of children or adolescents with a primary diagnosis of ASD using CSAs to exact psychosocial benefit. Thus, in order to examine this phenomenum using quantitative methods, a sample size of consequence was recruited and assessed. Otherwise, statistical analyses would not have had sufficient power to generate valid and reliable findings which could be replicated by other researchers. To this end, it was not possible to use a true experimental design that employed repeated measurements over time on both a non-CSA group and a CSA group. Thus, a matched-participant equivalent posttest only design was undertaken in the current study to determine if a true experimental study is warranted in the future. A repeated-measures design is time-consuming, expensive, and not practical given the small size of the total population of children or adolescents with ASD that use CSAs as a therapeutic modality. When participants are matched on multiple dimensions, the groups can be considered equivalent such that multiple measurements over time are not necessary (Creswell, 2009).

The research design and statistical analysis described in the current chapter can be justified because of the status of the current literature. There is a need to determine and describe the relationship between CSAs use with children or adolescents diagnosed with ASD and social skills and social interaction. Because of the lack of literature which measured these variables, a descriptive design such as the one proposed in this chapter was appropriate due to the preliminary nature of the current study. This study did not

attempt to demonstrate causation but rather description and quantification of relationships between variables.

MANOVA

According to Tabachnick and Fidell (2006), multivariate analysis of variance (MANOVA) is used to determine whether there are differences among dependent variables, or if detected mean differences are due to chance. In this way, MANOVA is similar to ANOVA analysis but more than one dependent variable can be examined at a time (George & Mallery, 2007). Hence, MANOVA is often a preferable analysis over ANOVA or separate *t* test because of the reduction of the potential error of finding differences due to chance. In MANOVA analysis the effects of covariates are removed prior to analysis, and the *F* statistic generated denotes the significant differences among groups in terms of interactions or main effects. MANOVA uses univariate *F* tests or post-hoc comparisons to examine the pattern of changes in dependent variables. One of the assumptions of MANOVA analysis is that scores are normally distributed about a mean to form a bell curve when graphed. Thus, a nonparametric Kolmogorov Smirnov one-sample test was used to determine whether the distribution of scores in one group differed from a normal distribution (George & Mallery, 2007). As part of the analysis, the assumptions' of variance was assessed using Levene's Test of equality of error variances. MANOVA tests are also predicated on the assumption that variances of the dependent variables are the same as in other dependent variables (George & Mallery, 2007). Likewise, the homogeneity of covariance matrices was assessed using Box's M. Box's M

is a measure of multivariate homogeneity based on similarities of determinants (Leech, Barrett, & Morgan, 2008).

MANCOVA

Simply put, a multivariate analysis of covariance (MANCOVA) is a MANOVA which analyzes one or more covariates. Covariates are included in the analysis because they are highly correlated to the dependent variables under study (Tabachnick & Fidell, 2006). In a MANCOVA test, covariates are controlled so that their effect is not included in determining if there are mean differences among groups. Urdan (2005) asserted that MANCOVA tests control covariates as a way to determine if main effects are due to the influence of the covariate on the dependent variable, or if the effects are independent of the covariate.

Pearson Product Moment Correlation

Pearson product moment correlations are used to determine if relationships exist among variables, and measure strength and direction of the association (Pagano, 2010). The Pearson correlation was the appropriate bivariate statistic to use in the current study given that all of the variables were continuous (interval/ratio data) and the hypotheses sought to assess how two scores varied (Pagano, 2010). When there is no relationship among variables the correlation coefficient is zero, and as *r* approaches +1 the relationship can be represented as a positively sloped line indicating that as one variable increases the other variable also increases. When correlation coefficients approach -1 or a perfect negative linear relationship, the negative correlation coefficient denotes an inverse relationship where one variable increases as the other variable decreases.

Correlation coefficients can be expressed as *r* or by Cohen's standard (*d*) which was used in the current study.

All statistical tests are premised on assumptions. Pearson correlations assume linearity and homoscedasticity (Stevens, 2009). The assumption of linearity is simply the idea that there is a straight line relationship between independent and dependent variables, and the assumption of homoscedasticity refers to the presumption that scores are normally distributed about a regression line (Stevens, 2009).

Procedures

I contacted the CSA trainers, ABA centers, and autism schools and obtained their cooperation to participate prior to recruitment of parent participants and data collection. Copies of the the letters of cooperation and e-mail correspondence are available in Appendix A. The canine CSA trainers, ABA centers, and schools sent cover letters to prospective participants via e-mail or postal mail to aid in recruitment of the sample (Appendix B). The prospective participants then responded directly to a link within the e-mail or via postal mail to contact me. This was done to protect the privacy of the prospective participants, and so that the prospective participants did not feel coerced. Upon direct e-mail or postal mail contact, I then mailed participants a packet containing:

- Consent forms
- A description of the study and a review of the informed consent procedures (Appendix B).
- Directions for completing the SRS, SSIS, and participant information sheet as well as copies of the instruments (Appendix C).

- A participant information sheet to ascertain demographics information (Appendix D).
- An addressed envelope to return the completed instruments, participant information sheet, and consent forms to me. Inducements were sent upon receipt of the completed measurement tools.
- Individuals were given a national crisis hotline to call which was listed on the consent form in case the participant developed any psychological symptoms from participating.

Setting and Sample

Population

The number of children or adolescents with ASD who use a CSA is very small due to the fact that this alternative therapeutic modality is new and CSAs are very expensive (Delta Society, 2010). Thus, an attempt was made to estimate the total population size by contacting canine CSA trainers listed in the Service Animal Registry of American Trainers (SARA, 2011). While the contacted organizations do not constitute all of the possible canine CSA trainers in the United States , they served as a general estimate to calculate the number of children and adolescents diagnosed with ASD (ages 8-18) who currently use CSAs. Thus, the population size was estimated to be 950 children or adolescents with ASD who currently use CSAs. Telephone conversations (personal communication, September 8, 2010) provided the information that 500 canine CSAs have been provided to individuals with ASD under the age of 19. While this is not

a definitive population size it does reflect an approximation of the number of children or adolescents with ASD who have received certified and trained CSAs.

Sample Characteristics, Sample Size, and Sampling Method

The parent sample recruited and therefore the children and adolescents with ASD examined for this study may not reflect the current demographic variables consistent with the U.S. population or the vital statistics associated with children or adolescents with ASD (more males than females) because of the use of convenience sampling. For the most part, it was expected that the parents, children, and adolescents from the CSA group would be from middle to upper socioeconomic households due to the fact that CSAs cost on average $20,000 (Delta Society, 2010). Further, because efficacy of CSA use with children or adolescents with ASD has not been established, major insurance companies do not cover this alternative treatment therapy. Therefore, it was reasonable to hypothesize those children or adolescents from disadvantaged backgrounds would not have the means to pay for a CSA. Another inclusion characteristic of the sample was children and adolescents with high-functioning autism, Asperger's disorder, or PPD-NOS. Children or adolescents who have a diagnosis of low-functioning autism, are non-verbal, or have other intellectual disabilities were excluded. The most significant difference between the two matched-participant groups may be socioeconomic status (SES). Children or adolescents who do not use CSAs were recruited from ABA centers and schools which specialize in educating children or adolescents with an ASD diagnosis. For this reason, school districts and insurance companies are often required to pay for these services, so it is likely that the comparison group (non-CSA users) varied more in

SES and ethnic diversity. There was no attempt to match children or adolescents of parent participants based on socioeconomic status, nor were children or adolescents of parent participants excluded due to their socioeconomic status. The final sample characteristic important to the current study was the age of the participants' children. The use of children or adolescents with an ASD diagnosis between the ages of 8-18 was based the information collected on the Delta Society Website (Delta Society, 2010) as well as personal communication with CSA trainers (personal communication, September 8, 2010). Consensus from the CSA trainers (personal communication, September 8, 2010) seemingly indicated that children or adolescents less than eight-years of age may not have the maturity or sense of responsibility to care for their CSA. This could lead to the maltreatment of the CSA, or could lead to increased anxiety for the children or adolescents with ASD. Thus, none of the contacted CSA trainers place animals with children or adolescents less than eight-years of age. Parent and guardian participant inclusion to the study was based on their ability to read and comprehend the self-report measures, ability to give consent, and that they needed to be native English speakers. The data collection of this study was an attempt to rate social skills and social interaction levels prior to and after CSA exposure through measurement of parents' perceptions of children with ASD.

According to Nimmer and Lundahl (2007), the average effect size for behavioral changes for children or adolescents with ASD in pet therapy studies was large ($d = 0.72$). Nimmer and Lundahl (2007) made these determinations by examining four studies which met inclusion criteria. This study involved a number of different analyses, including

MANCOVA, MANOVA, ANCOVA, ANOVA, and Pearson correlations. The analyses which include covariates (age, gender, IQ, comorbidity) require the most stringent sample size, particularly the analysis which includes two dependent variables (social interactions and social skills). G*Power 3.1.2 was used to calculate sample size for an ANCOVA with two groups, four covariates and two numerator degrees of freedom. Considering the large effect size (f = .40), a generally accepted power of .80 and a significance level of .05, the desired sample size to achieve empirical validity was a total of 64 participants (Faul, Erdfelder, Buchner, & Lang, 2008). Increasing the sample size to 100 would increase the power to .95. Therefore, I sought between 64 and 100 parent participants per group.

Noninvasive methods were used to recruit the sample. I contacted CSA trainers, ABA centers, and autism schools to gain information about their programs, to assess how many prospective parent participants each site had, and to receive permission and enlist their assistance in recruiting a sample. A list of e-mail communications are listed in Appendix A. After the Walden University Institutional Review Board (IRB) approved the proposed study (09-20-11-0059717), I had canine CSA-trainers, ABA centers, and autism schools help recruit the sample and send follow-up e-mails and postal letters to prospective participants (Appendix B). It is important to note that sampling was sequential meaning that first parent participants in the CSA group were recruited followed by parents in the non-CSA group. In this way, I was able to match participants in each group based on the child/adolescents' age, gender, IQ, and comorbidity. In the event that parent participants did not respond to the initial e-mail or postal letter that the

organization sent to the prospective parent participants, the organization resent the initial letter via e-mail (Appendix B) after 2- weeks of initial recruitment. The information contained in the initial and follow-up letters told prospective participants about the researcher, the purpose of the study, about the rights of the participants (voluntary nature of the study and confidentiality), potential risks and benefits associated with participation, the procedures, compensation, and provided contact information for the IRB and me. The parent participants were asked to directly e-mail me, respond by postal letter, or by telephone if they were interested in participating in the study. This constituted initial consent; however, participants then were asked to submit the informed consent along with the completed instruments and participant information sheet (Appendix D) upon completion of participation. This study used nonprobability sampling procedures to generate a convenience sample, followed by purposeful sampling to match children or adolescents of parent participants in the non-CSA group to children or adolescents of parent participants in the CSA group.

Eligibility Criteria

To control for confounding and intervening variables, eligibility criteria were established.

Inclusion criteria. This section describes the inclusionary criteria.

- Parents of children or adolescents aged 8-18 with ASD who used a CSA and matched-participants (based on the child's or adolescents' age, gender, IQ, and comorbidity) who did not use a CSA. The parents in the matched-participant group were based on the sample characteristics of the

children/adolescents in the CSA group. For example, if a parent of a child in the CSA group was 8 years-old, had an IQ of 100, had no comorbid condition, and was male, a participating parent in the non-CSA group was recruited if their child matched the characteristics of the child in the CSA group.

- Parents of children or adolescents with ASD with an at least low-average IQ (IQ > 79).
- English-only speakers. This included the parent of the child and the child him or herself.
- An ability of the parent to read and comprehend at or above an eighth grade reading level.
- An ability for parents to give consent for their participation to complete self-reports.

Exclusionary criteria. This section describes the inclusionary criteria.

- Non-English native speaking parents of children or adolescents with ASD.
- Parents with children who had a comorbid intellectual disability diagnosis.
- Parents of children or adolescents with non-verbal ASD children.
- Parents of children or adolescents with ASD under 8 years of age or over 18 years of age.
- Parents of children or adolescents with ASD who were unable to read or comprehend the self-report measures.

Final sample size was based on recruitment which began after IRB approval of the study (09-20-11-0059717). The finalized parent sample size per group as well as

demographic characteristics of the children or adolescents with ASD is presented in Chapter 4.

Instrumentation and Materials

A participant information demographic sheet was used to collect data from the parents or guardians who chose to participate in the study. The demographic information was used to fully describe the children or adolescents with ASD and to enhance the data analysis to explore if there were gender differences, age differences, IQ differences, and the role comorbidity played in the efficacy of exposure to CSAs. All of the self-report instruments chosen for this study quantified levels of social skills and interaction deficits. In this way, differences between the two groups (children of the participants) began to provide evidence of improvement in areas of social behaviors through prolonged exposure to CSAs. To measure social skills deficits the SSIS was used. The SSIS (Gresham & Elliott, 2008) is a self-report instrument which measures social skills deficits and problem behaviors which produce difficulties in social interaction. To measure social interaction deficits the SRS was used. The SRS (Constantino & Gruber, 2005) is a self-report measure used to quantify the degree of social impairment across the autistic spectrum. Appendix E includes the letters of permission from PAR, the Western Psychological Service, and Pearson Testing Services to use the SSIS and SRS self-report measures.

SSIS

The SSIS (Gresham & Elliott, 2008) formerly referred to in the literature as the Social Skills Rating System uses a multi-rater approach (parents, teachers, children) to

aid in the identification of social skills and behavioral deficits in individuals, ages 3–18, on the Parent Form. A major advantage of the self-report measure is the administrative time of 15-20 minutes and the readability (fifth-grade reading level for the Parent Form). The self-report measure documents frequency of behaviors which directly impact a child's ability to acquire and correctly use social skills as well as skills that can be perceived as strengths (Gresham & Elliott, 2008). Further, the SSIS has three subscales to address social skills, problem behaviors, and academic competence (Gresham & Elliott, 2008); however, only the social skills subscales were considered as part of this dissertation study. The Teacher Form which addresses the academic competence subscale measurements was not used during data collection nor was the Student Forms.

The social skills subscale of the measure consists of seven domains that measure communication, cooperation, assertion, responsibility, empathy, engagement, and self-control and the domains are measured on all three rater forms, Parent, Teacher, and Student. The communication domain addresses "taking turns and making eye contact during a conversation, using appropriate tone of voice and gestures, and being polite by saying 'thank-you' and 'please'" (Gresham & Elliott, 2008; p. 1). The Cooperation domain addresses "helping others, sharing materials, and complying with rules and directions" (Gresham & Elliott, 2008; p. 1). The Assertion domain addresses "initiating behaviors, such as asking others for information, introducing oneself, and responding to the actions of others" (Gresham & Elliott, 2008; p. 1). The Responsibility domain addresses "showing regard for property or work and demonstrating the ability to communicate with adults" (Gresham & Elliott, 2008; p. 1). The Empathy domain

addresses “showing concern and respect for others’ feelings and viewpoints” (Gresham & Elliott, 2008; p. 2). The Engagement domain addresses “joining activities in progress and inviting others to join, initiating conversations, making friends, and interacting well with others” (Gresham & Elliott, 2008; p. 2). The Self-Control domain addresses “responding appropriately in conflict (e.g., disagreeing, teasing) and nonconflict situations (taking turns and compromising)” (Gresham & Elliott, 2008; p. 2).

The SSIS uses Parent ratings which “indicate the frequency of the exhibited social skill and problem behavior using a 4-point scale of *Never*, *Seldom*, *Often*, and *Almost Always*” (Gresham & Elliott, 2008; p. 2). Parents also rate the perceived importance of each social skill and problem behavior on a 3-point scale of *Not Important*, *Important*, and *Critical* (Gresham & Elliott, 2008). While having the parent’s perspective generates a diverse picture of the social and behavioral functioning of children or adolescents with ASD, there is the possibility that an individual may not have understood a particular question, may have inconsistently answered similar questions or questions that measure the same construct, may have faked bad or good, or may have been careless in responding to items. To reduce potential respondent bias or error the SSIS uses the F Index, the Response Pattern Index, and the Response Consistency Index to address these threats to validity.

The revision of the SSRS to the SSIS was an attempt to improve psychometric properties. The SSIS was standardized using 4700 children aged 3-18 from across the United States from 2006 to 2007 to represent the U.S. population according to gender, ethnicity, SES, and geographical region based on 2006 Census data (Gresham & Elliott,

2008). Additionally, 2800 parents from three different aged norm groups (ages 3–5, ages 5–12, and ages 13–18) participated in the standardization process, as did individuals from special-populations such as individuals with intellectual disabilities or ASD. The revision and development of the SSIS resulted in 67% of the items which relate to Social Skills subscales on the Parent Form sharing items with the Student Form (Gresham & Elliott, 2008). This resulted in high internal consistency scores which suggest that scale scores most likely are free from the influence of random error, that items are well written, and that items reflect the construct they were designed to measure. The internal consistency coefficient alphas can be broken down by normative age group and gender as follows based on the Parent Form for ages 3-5: Social Skills Scale (.95 female, .97 male, .96 combined); Social Skills Scale (.95 female, .95 male, .95 combined) for children ages 5-12; Social Skills Scale (.95 female, .96 male, .96 combined) for adolescents ages 13-18 (Gresham & Elliott, 2008). Further, the median subscale reliabilities for all three normative age groups and genders combined is .84.

Test-retest reliability refers to the consistency between scores by the same rater after brief periods of time. The SSIS used a sample size of 115 from the Parent Form group with a mean of 61 days between retest (Gresham & Elliott, 2008). The median test-retest reliability correlation on the Parent Form for ages 3-18 was $r = .87$ with a median subscale correlation of $r = .83$.

Validity of an assessment tool refers to the extent to which the items accurately reflect what the tool purports to measure. In other words, the items within each scale should be correlated, and the subscales across the tool's domain should share a

relationship. The Social Skills scales and the Problem Behaviors scales have a moderate and negative intercorrelation from -.42- -.65 across all of the self-report forms and normative age ranges (Gresham & Elliott, 2008). This was expected because behaviors measured on the Problem Behaviors scale directly interfere with positive social interactions which are measured on the Social Skills scale (Gresham & Elliott, 2008). Further, the intercorrelationof the subscales in the Social Skills Scale is moderate and positive with all correlation coefficients exceeding .50 on the Parent Forms (Gresham & Elliott, 2008). The intercorrelationof the subscales on the Problem Behaviors Scale has a range of .53- .92 across the Parent Forms for all age ranges. Of special importance to the proposed study is the Autism Spectrum subscale of the Problem Behaviors scale which has a correlation of -.70- -.80 for all of the forms and age ranges with the Social Skills scale, subscales on the Problem Behaviors subscales, and the Communications and Engagement Social Skills subscales. These intercorrelations suggest that the SSIS was composed with solid internal structure and that the self-report measure is a good report of social skills strengths and weaknesses especially in the population under study in this dissertation study: individuals with a primary ASD diagnosis. The SSIS has demonstrated adequate correlation with other measures that purport to measure similar constructs. This is considered important validation evidence. For instance, the parent SSRS and the revised version, the SSIS, demonstrate a correlation of .75 for ages 3-5; .73 for ages 5-12; .69 for ages 13-18 for the Social Skills scale, and moderate to high correlations for the respective normative age groups of .65, .70, and .77 (Gresham & Elliott, 2008). Similarly, the SSIS is highly correlated to the BASC-2 (Reynolds & Kamphaus, 2004).

For the Social Skills scale, adjusted correlation coefficients are .80, .57, and .74 while the adjusted coefficients for the Problem Behaviors scale were in the .80s (Gresham & Elliott, 2008).

A final justification for the SSIS being included in the current study was the ability of the measure to differentiate between children or adolescents who have an ASD diagnosis and those who do not. A hallmark of a diagnosis of ASD is social skills deficits. When a sample of 50 parents and nine children with an ASD diagnosis were administered the SSIS, the results of the parents' Social Skills scale scores were 1.5 standard deviations (*SD*) lower than a nonclinical reference group, and the results of the parents' Problem Behaviors scale scores were 1 *SD* higher than the nonclinical reference group (Gresham & Elliott, 2008). Further, the scores for the Autism Spectrum subscale were 2 *SD* higher than a nonclinical reference group (Gresham & Elliott, 2008).

SRS

Constantino and Gruber (2005) assert that the SRS which is completed by parents to assess children between the ages of 4 and 18 has advantages over other self-reports that assess ASD. Further, the items require an eighth grade reading ability to answer the items and produce reliable responses (Constantino & Gruber, 2005). Specifically, the SRS quantifies the degree of social impairment across the autistic spectrum. The SRS administration takes approximately 15- minutes to complete 65 items that use a 4-point Likert scale of 1 (*Not True*), 2 (*Sometimes True)* , 3 (*Often True*), or 4 (*Almost Always True*) (Constantino & Gruber, 2005). The items on the questionnaire measure "dimensions of interpersonal behavior, communication, and repetitive/stereotypic

behavior which are characteristic of autistic spectrum disorders" (Constantino & Gruber, 2005, p. 3).

Interpretation of the SRS produces a total score which delineates the severity of social skills deficits within the autistic spectrum as well as five treatment subscales: Social Awareness, Social Cognition, Social Communication, Social Motivation, and Autistic Mannerisms (Constantino & Gruber, 2005). Transformed, *T*-scores between 60 and 75 suggest that there are deficiencies in reciprocal social behavior which results in mild to moderate difficulties with social interactions; *T*-scores > 76 are considered very severe meaning that social interactions are very impaired to nonexistent (Constantino & Gruber, 2005). The Social Awareness Treatment subscale measures the "ability to pick up on social cues; items in this category represent the sensory aspects of reciprocal social behavior" (Constantino & Gruber, 2005, p. 17). The Social Cognition Treatment subscale measures the "ability to interpret social cues once they are picked up; this category represents the cognitive-interpretive aspects of reciprocal social behavior" (Constantino & Gruber, 2005, p. 17). The third Treatment subscale, Social Communication, "includes expressive social communication; this category represents the 'motoric' aspects of reciprocal social behavior" (Constantino & Gruber, 2005, p. 17). The Social Motivation Treatment subscale measures "the extent to which a respondent is generally motivated to engage in social-interpersonal behavior; elements of social anxiety, inhibition, and empathetic orientation" (Constantino & Gruber, 2005, p. 17). The final Treatment subscale, Autistic Mannerisms, measures "stereotypical behaviors or highly resisted interests" (Constantino & Gruber, 2005, p. 17).

The composition of the SRS lends itself well to assessing ASD by measuring the frequency of behavior covering all of the criteria listed in the *DSM-IV-TR* (2000). Five different studies using a sample size of 1639 participated in the standardization process, and the sample was demographically equivalent to the US population described in the 2004 Census data (Constantino & Gruber, 2005).

Internal consistency refers to the extent of correlation between items on a measure or the first half of the measure with the second half of a measure. The alpha coefficients for the normative parent group (n = 1081) was .93 for females and .94 for males; the combined clinical parent and teacher ratings (n = 281) was .97 (Constantino & Gruber, 2005). Since the alpha coefficients were above .80, the SRS is considered to be a good and reliable measure of reciprocal social behavior deficits, and is a justification for use in the current study.

In a test of temporal stability of scores, 379 individuals were administered the instrument via maternal reporting after 17- months of delay. The correlation of the test-retest administration was .85 for males and .77 for females (Constantino & Gruber, 2005).

The Revised Autism Diagnostic Interview (ADI-R; Rutter, Le Couteur, & Lord, 2003) is the most used instrument for diagnosis of ASD; however, the main disadvantage of this structured interview is that it takes approximately 2 hours to complete (Constantino & Gruber, 2005). Thus, having a brief tool such as the SRS may be an advantage and may be preferred in some clinical or research situations. The ADI-R and the SRS were given 1- month apart (n = 61), and have been compared to determine the

correlation between the two constructs. When the scores of both measures were plotted on a graph, all participants' scores were 2 *SD* above the mean of 100 for both measures (Constantino & Gruber, 2005). The data also suggested a strong agreement between raters (mothers, fathers, and teachers). The inter-rater reliability correlation between fathers and mothers was .91(Constantino & Gruber, 2005).

Data Collection and Analysis

Data Collection

Recruitment occurred nationwide via contact with organizations who train and provide CSAs to children or adolescents with ASD, and to ABA or schools who service children or adolescents with ASD. Recruitment information, information about the study, consent forms, and instruments (SSIS, SRS, and the participant information sheet) were sent to 690 families as an attempt to recruit 64-100 families per participation group. I had information about the total number of animals placed with individuals and how many recruitment e-mails or postal letters were sent to prospective parent participants; however, I did not have a list of names that represented prospective parent participants from which to draw the sample. This was purposefully done as to attempt to avoid coercion and respect the privacy of the children or adolescents who use CSAs or attend the ABA or autism schools. The organizations who train and provide CSAs directly e-mailed or mailed recruitment materials associated with the study to prospective participants. The same procedures were used by the ABA centers and schools to recruit the non-CSA group. The prospective parent participants were then free to contact me directly via e-mail, telephone, or via mail. I then mailed participants packets containing

the instruments, directions to complete the self-report measures and participant information sheet, consent forms, two envelopes, a cover letter, and a list of local mental health providers specific to the geographic location of each participant. Each participating family was assigned a research number as a means to protect participant identity. The disbursement of inducements ($5 gift card) was undertaken by me upon return of the completed instruments. While large inducements may constitute coercion, a small inducement as a thank-you for donating time to research endeavors is generally acceptable to the American Psychological Association (APA, 2010). A second way I encouraged participation was via the use of follow-up letters e-mailed by the CSA trainers, ABA centers, or schools at 2- weeks after initial recruitment. Participants were asked to complete and return all of the questionnaires within 1- week of receiving the research materials.

All of the measures were self-administered and required little to no outside assistance; however, written instructions were provided (Appendix C). All instruments were be hand-tallied, and after all data for the CSA group was collected, recruitment and data collection for the parent participants in the matched child or adolescent non-CSA group began. Local autism schools and ABA centers were asked to recruit families based on the age, gender, comorbidity, and IQ of the child or adolescent criteria of the CSA group. Upon collection of all the data from both participant groups, data analysis began. The raw data is available to other researchers for 5- years after the completion of the current study. Further, the data is stored in a locked file cabinet that is only assessable to me.

Data Analysis

Data was entered into SPSS version 18.0 for Windows. Descriptive statistics were calculated for the sample demographics (age, gender, IQ, comorbidity) and the research variable composite scores to provide a description of the data. This included frequency and percentages for nominal (categorical/dichotomous) data and means/standard deviations for continuous (interval/ratio) data (Howell, 2010).

Data Analysis by Research Question

Research question 1. After controlling for child or adolescent demographics (gender, age, IQ, and comorbidity), is there a significant difference in parents' self-report about their child's or adolescent's social skills and social interactions between parents of children or adolescents with autism who participated in exposure to a CSA and parents of children or adolescents with autism who did not participate in exposure to a CSA?

$H1_0$. After controlling for child or adolescent demographics (gender, age, IQ, and comorbidity), there is was no difference in parents' self-report of their child's or adolescent's social skills and social interactions as measured by the parents' subscale and total scores on the SSIS and the SRS between parents of children or adolescents with autism who participated in exposure to a CSA and parents of children or adolescents with autism who did not participate in exposure to a CSA.

$H1_a$. After controlling for child or adolescent demographics (gender, age, IQ, and comorbidity), there is a difference in parents' self-report of their child's or adolescent's social skills and social interactions as measured by the parents' subscale and total scores on the SSIS and SRS between parents of children or adolescents with autism who

participated in exposure to a CSA and parents of children or adolescents with autism who did not participate in exposure to a CSA.

To examine Research Question 1, two MANCOVAs and two ANCOVAs were conducted to assess if mean differences existed in social skills and social interaction scores when parents' self-reports of children or adolescents diagnosed with ASD who used a CSA were compared to the parents' self-reports of children or adolescents with ASD who did not use CSAs after controlling for demographics (gender, age, IQ, and comorbidity of the children or adolescents). Additionally, prior to analysis, the assumptions for the MANCOVA and ANCOVA were assessed. For this analysis, the dependent variables were the social skills (SSIS) and social interaction (SRS) subscale parent scores. The SSIS assesses seven social skills domains (communication, cooperation, assertion, responsibility, empathy, engagement, and self-control). The SRS assesses social awareness, social cognition, social communication, social motivation, and mannerisms consistent with ASD. The mean parent scores were compared by group (children or adolescents who use CSAs vs. those who do not). The demographic variables (gender, age, IQ, and comorbidity of the children or adolescents) were entered as covariates. One MANCOVA was conducted for each set of subscales. If the MANCOVA analyses were significant, individual ANCOVA analyses were examined. The dependent variables in the ANCOVA analyses were the total scores of the SSIS and the SRS.

Research question 2. For the parents of children or adolescents with autism who use a CSA, is there a significant relationship between parents' self-report of their child's

or adolescent's social skills and social interactions as measured by the parents' total scores of the SSIS and SRS, respectively?

$H2_0$. For the parents of children or adolescents with autism who use a CSA, there is no significant relationship between parents' self-report of their child's or adolescent's social skills and social interactions as measured by the parents' total scores of the SSIS and SRS, respectively.

$H2_a$. For the parents of children or adolescents with autism who use a CSA, there is a significant relationship between parents' self-report of their child's or adolescent's social skills and social interactions as measured by the parents' total scores of the SSIS and SRS, respectively.

To examine Research Question 2, a Pearson correlation was conducted to assess if a significant relationship existed between social skills and social interaction scores for children or adolescents with ASD who used a CSA based on parents' self-report. For this analysis, the social skills and social interaction variables (SSIS and SRS total parent scores) were compared in a correlation. The analysis examined only children or adolescents with ASD with a CSA, and the assumptions of a Pearson correlation were assessed prior to analysis.

Research Question 3. For the parents of children or adolescents with autism who use a CSA, is there a significant difference in parents' self-report of their child's or adolescent's social skills and social interactions by gender, age, IQ, and comorbidity, as measured by the parents' total and subscale scores of the SSIS and SRS, respectively?

$H3_0$. For the parents of children or adolescents with autism who use a CSA there is no significant difference in parents' self-report of their child's or adolescent's social skills and social interactions by gender, age, IQ and comorbidity as measured by the parents' total and subscale scores on the SSIS and SRS, respectively.

$H3_a$. For the parents of children or adolescents with autism who use a CSA there is a significant difference in parents' self-report of their child's or adolescent's social skills and social interactions by gender, age, IQ and comorbidity as measured by the parents' total and subscale scores on the SSIS and SRS, respectively.

To examine Research Question 3, eight MANOVAs were conducted to assess if mean differences existed in social skills and social interaction by gender, age, IQ and comorbidity of the children or adolescents. For this analysis, the independent variables were gender (male vs. female), age (8–12 vs. 13–18), IQ (categorical by SD), and comorbidity (ADHD vs. Anxiety vs. OCD vs. seizures vs. social skills deficit). The dependent variables in four of the analyses were the subscales of the SRS and the dependent variables in the other four analyses were the subscales of the SSIS. The analysis examined only children or adolescents diagnosed with ASD who used a CSA. For situations in which the MANOVA was significant, secondary analyses involving ANOVAs were conducted to assess each dependent variable by the corresponding grouping variable.

Protection of Human Subjects

Walden University IRB approval (09-20-11-0059717) was obtained prior to initiating recruitment of the sample or collecting any data. Several procedures were taken

to protect the privacy of the participants and their child or adolescent and to ensure that they were treated in an ethical manner. All ethical considerations for the protection of participants came from the standards put forth by the American Psychological Association (APA, 2010) and the Walden University IRB. First, the privacy of participants and their child or adolescent was ensured due to the recruitment methods. I contacted canine CSA training agencies, ABA centers, and schools who directly sent the introductory research letter via e-mail or postal mail to the participants. At no time did I have a list of prospective participants. The prospective participants directly contacted me if they were interested in taking part in the study. I then sent a copy of the cover letter describing the purpose of the study (Appendix B), a copy of the informed consent, copies of the SRS and SSIS, directions to complete the self-report measures (Appendix C), a participant information sheet (Appendix D), and two envelopes, one addressed to the researcher to return the materials and one for the participant to place their address to receive the inducement upon completion of the study. Secondly, the purpose of the study, an explanation of the procedures associated with the study, and an informed consent or assent letter ensured ethical treatment of the participants. Within the informed consent and cover letters, ethical guidelines were followed via informing participants of their right to withdraw from the study at anytime, by describing the potential benefits and risks associated with participation, by ensuring confidentiality, and by ensuring that participation was voluntary (APA, 2010). Third, the participants associated with this study were protected during the information analysis portion of the study because all identifying information was removed from the data. Each participant and their research

packet with the enclosed instruments were assigned identification codes such that the data could be analyzed without revealing the identity of the participant. To further ensure the protection of participants, I provided researcher and IRB contact information in the event that the participant had questions about the nature of the study or developed a mental health concern as a result of participation. The researcher provided a national crisis hotline telephone number in the event that a mental health concern resulted from participation.

Of particular concern to any research study is the introduction of researcher bias via the informed consent process. While it is important to tell participants about the purpose of the study, it may skew responses in an attempt to help the researcher validate their hypotheses. Likewise, participants may answer self-report measures in an inaccurate way because they do not perceive their child/adolescent accurately or do not want to present their child/adolescent in a socially undesirable way. To this end, to reduce participant bias and error it was decided not to include specific research questions and hypotheses in the cover or informed consent letters.

Dissemination of Findings

In line with the potential for social change, the findings of the current study have value to both the stakeholders as well as to the community at large. The stakeholders can be described as (a) those who use prolonged exposure CSAs, (b) individuals who have a primary diagnosis of ASD that are considering the use of CSAs, (c) school districts that are unsure of the value of this therapeutic modality, (e) mental health professionals, (f) CSA trainers, and (g) insurance companies that currently do not reimburse individuals

who seek to have CSAs. To this end, the findings of this study were dispersed to (a) all 50 state departments of education, (b) CSA training organizations, (c) the Delta Society, (d) major national health insurance companies, and (e) the Autism Research Institute. The dissemination of the results included an overview of what independent and dependent variables were studied, the inclusion and exclusion criteria for participation, the instruments used to measure the changes in dependent variables, the results and conclusions of the study, limitations of the study, and why the study was important in context to their organization. Suggestions for future research using CSAs in relation to their organizational goals were provided.

Summary

This chapter described the use of quantitative methods to determine if there were significant differences in social skills and social interactions parent scores when children or adolescents with ASD who used CSAs as a therapeutic modality were compared to those who did not. It was hypothesized that there were significant differences in social skills and social interaction between the groups of matched-participants (matched based on parents' child's/adolescent's age, gender, IQ, comorbidity). This chapter described the use of a matched-participant, equivalent, posttest-only design with nonrandomized sample selection research design, the population under study, the sampling method, the justification of the sample size as well as the sampling method, and the procedures for recruitment and data collection. This methodology chapter also reviewed the psychometric properties of the selected instruments as a means to justify their inclusion in the proposed study. The SSIS and SRS were used to measure differences in social

skills and social interaction. The sample size was selected based upon the use of effect size for inferential statistical analysis. Likewise, a data analysis plan per research question was included in the chapter. Differences in social skills and social interactions were measured using a series of MANCOVA tests with secondary analyses involving ANCOVA to assess each dependent variable when MANCOVA tests were significant. Pearson correlation was also used to determine if there was a relationship between social skills and social interaction scores. Additionally, MANOVA analyses examined the extent to which the covariates of age, gender, IQ, and comorbidity influencd the main effects. Follow-up ANOVA analysis occurred when it was determined that a covariate influenced significance on an dependent variable. The chapter concluded with the procedures which were used to protect participants from harm, how data was secured, and how the findings are important to the stakeholder as well as how the findings of the study were dispersed. Chapter 4 provides the results of each analysis by research question.

Chapter 4: Results

Introduction

The aim of the study was to determine if exposure to CSAs has efficacy as a therapeutic modality to improve social skills and social interactions in children or adolescents with ASD based on the self-reports of their parents' scores on the SSIS and SRS, respectively. Three hypotheses were tested using a series of MANCOVA, ANCOVA, , and Pearson correlations. This chapter summarizes the sample characteristics and provides the results of the statistical analyses.

Sample Characteristics and Demographics

Over a 16-week period in the fall of 2011, 128 prospective participants (parents) were recruited nationwide by CSA trainers, ABA centers, and specialty schools for individuals diagnosed with a form of ASD. In accordance with procedures described in Chapter 3, initial informed consent e-mails were sent to prospective participants who met the eligibility criteria. One hundred twenty-eight individuals agreed to participate. All of the families in the CSA and non-CSA participant groups consented and completed all of the research materials. It is important to note that, while parents were recruited as the participants and they provided the data, the data were about the parents' children or adolescents who used CSAs first.

The data were transferred into SPSS Version 18.0 for analysis. Data were screened for accuracy, missing data, and outliers. Descriptive statistics and frequency distributions were examined to determine if responses were within the possible range of values. The presence of outliers was tested by the examination of standardized residuals.

Standardized values were created for each subscale, and total score and cases were examined for values that fell above 3.29 or below -3.29 (Tabachnick & Fidell, 2006); six cases were removed. In the six cases that were removed, there were standardized scores on subscales that represented outlying data. Cases with missing data were examined for nonrandom patterns; no cases were removed. The responses from 122 participants were used in the final data analysis.

Descriptive Statistics

Of the 122 participants' data that were analyzed, the majority of the parents reported their child as male (*n* = 118, 96.7%); most of the children were rated by their parents as having Asperger's (*n* = 63, 51.6%). Participants reported their child's comorbidities as social skills deficits (*n* = 43, 44.3%), ADHD (*n* = 26, 26.8%), anxiety (*n* = 12, 12.4%), OCD (*n* = 10, 10.3%), and seizures (*n* = 6, 6.2%). Sixty-two (50.8%) of the children rated by the participants used a CSA. Frequencies and percentages for the children's demographics are presented in Table 1.

Table 1

Frequencies and Percentages for Children's Demographics

Demographic	*n*	%
Gender		
Male	118	96.7
Female	4	3.3
ASD Type		
Asperger's	63	51.6
High-Functioning	59	48.4
Comorbidity		
ADHD	26	26.8

(*table continues*)

Demographic	*n*	%
Anxiety	12	12.4
OCD	10	10.3
Seizures	6	6.2
Social Skills Deficits	43	44.3
Use CSA		
Yes	62	50.8
No	60	49.2

Means and standard deviations were examined for age and IQ. Participants' children or adolescent's ages ranged from 8-18 with a mean of 12.17 (*SD* = 2.74). Children or adolescent's IQ scores ranged from 78-114 with a mean of 93.34 (*SD* = 7.48). Means and standard deviations for age and IQ are presented in Table 2.

Table 2

Mean and Standard Deviation for Age and IQ

Variable	*M*	*SD*
Age	12.17	2.74
IQ	93.34	7.48

Analysis of Research Questions and Hypotheses

Research Question 1

After controlling for child or adolescent demographics (gender, age, IQ, and comorbidity), is there a significant difference in parents' self-report about their child's or adolescent's social skills and social interactions between parents of children or adolescents with autism who participated in exposure to a CSA and parents of children or adolescents with autism who did not participate in exposure to a CSA?

To examine Research Question 1, two MANCOVAs and two ANCOVAs were conducted to assess if there were differences in parents' perception of their child's or adolescent's social skills and social interaction as measured by the parents' subscale and total scores on the SSIS (Gresham & Elliott, 2008) and the SRS (Constantino & Gruber, 2005) between parents of children or adolescents with autism who participated in exposure to a CSA and parents of children or adolescents with autism who did not participate in exposure to a CSA, after controlling for demographics. The assumption of normality was assessed with Kolmogorov-Smirnov analysis. The results of the analysis were significant for all subscales and total scores, violating the assumption; however, non-normality has only a slight effect on Type I error (Stevens, 2009). The assumption of absence of multicollinearity was assessed by examining a Pearson correlation matrix between the dependent variables. No correlations between variables were above ±.80, and thus multicollinearity was considered absent. Equality of variance was assessed with Levene's test; the results of the tests were not significant for any variables and thus, the assumption was met.

The demographics that were assessed to be covariates were gender, age IQ, and comorbidity. The variable gender was removed from the model as a covariate because of unequal group sizes. The unequal group sizes caused the variable not to run in the analysis.

The first MANCOVA that was conducted assessed for simultaneous differences on the subscales of the SRS. The assumption of equality of covariance was assessed with the Box's Test of equality of covariance matrices. The results of the test were not

significant, and thus the Wilks' lambda statistic was used to assess significance. Results of the MANCOVA were significant for the five SRS subscales by CSA use, F (5, 64) = 106.92, $p < .001$, partial $\eta^2 = .893$. This suggested that there were simultaneous differences on the dependent variables (SRS subscales) by use of a CSA (yes vs. no), after controlling for age, IQ, and comorbidity. A partial $\eta^2 = .893$ indicated a strong strength of the relationship.

Children or adolescents who did not use a CSA scored significantly higher on all five subscales than those who did not. In other words, higher SRS scores suggest higher social interaction deficits measured on the subscales. In an examination of the social awareness scores, CSA users (M = 66.41; SD = 5.77) had mild impairment in their ability to pick up on social cues and use reciprocal social behaviors as exampled by mean scale scores below T = 75. Non-CSA users (M = 75.32; SD = 9.30) self-reports by parents reflected severe impairment in reciprocal behavior and ability to pick up on social cues. Similarly, social cognition scales reflected mild impairment for CSA users (M = 66.36; SD = 5.98) versus non-CSA users (M = 83.32; SD = 5.05). In other words, non-CSA users had severe impairment to interpret social cues which they perceived. Expressive or motoric social interaction was measured on the social communication subscale, and again, CSA users had moderate impairment in expressive communication (M = 73.31; SD = 3.48), while non-CSA users ability to use expressive social communication was severely impaired to nonexistent (M = 82.65; SD = 6.03). For the social motivation subscale, CSA users were rated on their parent's self-reports as having severe impairment in their motivation to engage in social interactions and reflects increased social anxiety as

well as lack of empathy towards others (*M* = 77.00; *SD* = 3.68). While CSA users were rated by their parents as having severe impairments in social motivation, non-CSAs users were rated by their parents as having statistical and significantly more severe deficits in social motivation (*M* = 86.92; *SD* = 7.10).The SRS subscale autistic mannerisms measures restrictive interests and stereotypical behaviors which may interfere with social interaction. Based on parent self-reports, CSA users had mild impairment (*M* = 67.54; *SD*= 6.25) while parents rated non-CSA users as having severe impairments (*M* = 86.92; *SD*= 4.10).

Results for the MANCOVA are presented in Table 3. Means and standard deviations for the five subscales by CSA use are presented in Table 4.

Table 3

Multivariate Analysis of Covariance for SRS Subscales by Use of CSA after Controlling for IQ, Age, and Comorbidity

		ANCOVA *F*				
Source	MANCOVA	Social awareness	Social cognition	Social communication	Social motivation	Autistic mannerism
IQ	1.53	0.65	0.63	1.10	4.32*	1.09
Age	0.18	0.30	0.01	0.02	0.05	0.40
Comorbidity	1.22	0.55	0.51	2.90*	0.96	1.39
Use CSA	106.92**	27.66**	147.51 **	73.37**	12.21**	252.48**

Note. * $p < 0.05$. ** $p < 0.01$.

Table 4

Means and Standard Deviations for SRS Subscales by Use of CSA

Variable	Used CSA		Did Not Use CSA	
	M	*SD*	*M*	*SD*
Social Awareness	66.41	5.77	75.32	9.30
Social Cognition	66.36	5.98	82.32	5.05
Social Communication	73.31	3.48	82.65	6.03
Social Motivation	77.00	3.68	81.59	7.10
Autistic Mannerisms	67.54	6.25	86.92	4.10

A second MANCOVA was conducted to assess for simultaneous differences on the subscales of the SSIS. Equality of variance was assessed with Levene's test; the results of the tests were not significant for any variables and thus, the assumption was met.

The demographics that were assessed to be covariates were gender, age, IQ, and comorbidity. The variable gender was removed from the model as a covariate because of unequal group sizes. The unequal group sizes caused the variable not to run in the analysis.

The assumption of equality of covariance was assessed with the Box's Test of equality of covariance matrices. The results of the test were not significant, and thus the Wilks' lambda statistic was used to assess significance. Results of the MANCOVA were significant for the seven SSIS subscales by use of a CSA, F (7, 62) = 52.45, $p < .001$, partial $\eta^2 = .856$. This suggested that there were simultaneous differences on the dependent variables (seven subscales of SSIS) by use of a CSA (yes vs. no), after controlling for age, IQ, and comorbidity. Due to reverse scoring, higher scores on the SSIS represent a better developed ability to acquire and perform with social skills. A partial $\eta^2 = .856$ indicated a strong strength of the relationship. Children or adolescents who did use a CSA scored significantly higher on communication, cooperation, assertion, responsibility, empathy, and engagement than those who did not. The mean score for the dependent variable, self-control, was higher for CSA users (M = 9.00, SD = 2.19), but the results of the MANCOVA suggest that the differences were nonsignificant.

In an examination of the communication scores, CSA users (*M* = 13.59; *SD* = 1.37) scored significantly higher than non-CSA users per parent self-reports. In other words, CSA users were reported as having fewer difficulties with "taking turns and making eye contact during a conversation, using appropriate tone of voice and gestures, and being polite by saying 'thank-you' and 'please'" (Gresham & Elliott, 2008; p. 1). The mean score of CSA users reflects an average rating of social skills meaning that individuals in the CSAs group have social skills performance deficits where the child or adolescent can use communication skills but does so infrequently. The non-CSA users; however, scored in the below average range (*M* = 11.05; *SD* = 2.31). Below average scores suggest social skills acquisition deficits where the individual does not sufficiently know communication skills or how to use the communications skills appropriately (Gresham & Elliott, 2008).

The cooperation subscale scores suggested that CSA users (*M* = 10.92; *SD* = 1.46) had significantly fewer difficulties with using skills which involve helping others, sharing, or following rules than reported by parents of non-CSA users (*M* = 8.65; *SD* = 1.65). Companion service animal users scores suggest infrequent use of cooperation skills while the below average non-CSA scores reflected insufficient knowledge or acquisition of cooperation social skills.

In a comparison of the mean scores of the assertion social skills, CSA users (*M* = 13.26; *SD* = 1.63) demonstrated an average ability to initiate conversations, respond to others in conversation, and introduce themselves at the start of conversations. Non-CSAs had significantly more difficulty with assertion skills (*M* = 8.54; *SD* = 2.09), and the

below average scores suggest acquisition deficits where individuals in this group may not know assertion skills or how to use them.

The responsibility social skills subscale addresses "showing regard for property or work and demonstrating the ability to communicate with adults" (Gresham & Elliott, 2008; p. 1), and CSA users scores (M = 15.03; SD = 1.73) reflected less deficits and ability to use responsibility skills than non-CSA users (M = 9.54; SD = 1.88). In other word, non-CSA users had difficulties with skill acquisition and use of the skills.

Examination of significant differences in empathy social skills suggested that both groups scored below average or nearly below average abilities and difficulties in "showing concern and respect for others' feelings and viewpoints" (Gresham & Elliott, 2008; p. 2), and the engagement social skills subscale measures "joining activities in progress and inviting others to join, initiating conversations, making friends, and interacting well with others" (Gresham & Elliott, 2008; p. 2). Companion service animal users (M = 13.03; SD = 1.75) scores suggested performance deficits where the individual knows how to engage with others but does so infrequently. Non-CSA users (M = 10.14; SD = 2.43) score below average suggesting engagement skills acquisition deficits where individuals often have no knowledge of the skills or how to use the skill once it has been introduced.

Results for the MANCOVA are presented in Table 5. Means and standard deviations for the seven subscales by CSA use are presented in Table 6.

Table 5

Multivariate Analysis of Covariance for SSIS Subscales by Use of CSA after Controlling for IQ, Age, and Comorbidity

		ANCOVA *F*						
Source	MANCOVA *F*	A	B	C	D	E	F	G
IQ	0.53	0.00	0.04	0.11	3.36	0.50	0.05	0.12
Age	1.52	1.92	0.10	0.01	1.02	0.08	5.85	4.34
Comorbidity	0.84	0.82	0.41	0.05	0.95	1.27	1.35	1.15
Use CSA	52.45**	32.94**	37.72**	110.40**	178.33**	5.24*	35.14**	0.04

Note. * $p < 0.05$. ** $p < 0.01$. A = Communication, B = Cooperation, C = Assertion, D = Responsibility, E = Empathy, F = Engagement, and G = Self-control.

Table 6

Means and Standard Deviations for SSIS Subscales by Use of CSA

Variable	Used CSA		Did Not Use CSA	
	M	*SD*	*M*	*SD*
Communication	13.59	1.37	11.05	2.31
Cooperation	10.92	1.46	8.65	1.65
Assertion	13.26	1.63	8.54	2.09
Responsibility	15.03	1.71	9.54	1.88
Empathy	9.74	1.48	8.76	2.25
Engagement	13.03	1.75	10.14	2.43
Self-Control	9.00	2.19	8.81	2.23

To further examine Research Question 1, two ANCOVAs were conducted to assess if there were differences in SRS and SSIS total scores by use of a CSA, after controlling for demographics. The assumption for normality was assessed with Kolmogorov-Smirnov analysis. The results of the analysis were significant for both total scores, violating the assumption; however, non-normality has only a slight effect on Type I error (Stevens, 2009).

The first ANCOVA that was conducted assessed differences on the SRS total score. The covariates included in the model were age, IQ, and comorbidity.

The assumption of equality of variance was assessed with Levene's test. The results of the test were not significant, and thus the assumption was met. Results of the ANCOVA were significant for the SRS total score by use of CSA, F (1, 68) = 516.50, p < .001, partial η^2 = .884. This suggested that SRS total scores were significantly different by use of CSA, after controlling for age, IQ, and comorbidity. A partial η^2 = .884 indicated a strong strength of the relationship. Children or adolescents who did not use a CSA (M = 86.78, SD = 2.65) scored significantly higher on the SRS than those who did use a CSA (M = 74.03, SD = 2.54). Results for the ANCOVA are presented in Table 7. Means and standard deviations for SRS total scores by CSA use are presented in Table 8.

Table 7
Analysis of Covariance for SRS Total Scores by Use of CSA after Controlling for Age, IQ, and Comorbidity

Source	*SS*	*MS*	*F* (1, 68)	*p*	η^2
Age	0.71	0.71	0.12	.729	.00
IQ	17.51	17.51	2.98	.089	.04
Comorbidity	89.75	22.44	3.81	.007	.18
Group	3039.31	3039.31	516.50	.001	.88
Error	400.15	5.88			

Table 8

Means and Standard Deviations for SRS Total Scores by Use of CSA

Variable	Used CSA		Did Not Use CSA	
	M	*SD*	*M*	*SD*
SRS Total	74.03	2.54	86.79	2.69

The second ANCOVA that was conducted assessed differences on the SSIS total score. The covariates included in the model were age, IQ, and comorbidity.

The assumption of equality of variance was assessed with Levene's test. The results of the test were not significant, and thus the assumption was met. Results of the ANCOVA were significant for SSIS total scores by use of CSA, F (1, 68) = 154.82, p < .001, partial η^2 = .695. This suggested that SSIS total scores were significantly different by use of CSA, after controlling for age, IQ, and comorbidity. A partial η^2 = .695 indicated a strong strength of the relationship. Children or adolescents who did use a CSA (M = 86.69, SD = 5.14) scored significantly higher on the SSIS than those who did not use a CSA (M = 72.11, SD = 5.08). Results for the ANCOVA are presented in Table 9. Means and standard deviations for SSIS total scores by CSA use are presented in Table 10.

Table 9

Analysis of Covariance for SSIS Total Scores by Use of CSA after Controlling for Age, IQ, and Comorbidity

Source	*SS*	*MS*	*F* (1, 68)	*p*	η^2
Age	19.39	19.39	0.76	.387	.01
IQ	16.64	16.64	0.65	.423	.01
Comorbidity	164.12	41.03	1.60	.183	.09
Group	3959.68	3959.68	154.82	.001	.70
Error	1739.18	25.58			

Table 10

Means and Standard Deviations for SSIS Total Scores by Use of CSA

Variable	Used CSA		Did Not Use CSA	
	M	*SD*	*M*	*SD*
SSIS Total	86.69	5.14	72.11	5.08

Research Question 2

For the parents of children or adolescents with autism who use a CSA, is there a significant relationship between parents' self-report of their child's or adolescent's social skills and social interactions as measured by the parents' total scores of the SSIS and SRS, respectively?

To examine Research Question 2, a Pearson product moment correlation was conducted only for those who used a CSA to assess the relationship between the total scores on the SRS and the SSIS. Prior to analysis, the assumptions of a Pearson correlation, linearity and homoscedasticity, were assessed with scatterplots. The assumptions were met. The correlation was not significant, r (62) = -.138, p = .283, suggesting there was not a statistically significant relationship between SRS total scores and SSIS total scores for those who used a CSA.

Research Question 3

For the parents of children or adolescents with autism who use a CSA, is there a significant difference in parents' self-report of their child's or adolescent's social skills and social interactions by gender, age, IQ, and comorbidity, as measured by the parents' total and subscale scores of the SSIS and SRS, respectively?

To examine Research Question 3, six MANOVAs were conducted to assess if there were differences in the subscales of the SRS and SSIS by age (8-12 vs. 13-18), IQ (categorical by standard deviation), and comorbidity (ADHD vs. anxiety vs. OCD vs. seizures vs. social skills deficits). Lack of female participant data resulted in gender being

removed from the model and no MANOVA analyses conducted. The assumption for normality was assessed with Kolmogorov-Smirnov tests. The results of the test were significant for many variables, violating the assumption; however, non-normality has only a slight effect on Type I error (Stevens, 2009). The assumption of absence of multicollinearity was assessed by examining a Pearson correlation matrix between the dependent variables. No correlations between variables were above ±.80, and thus multicollinearity was considered absent.

The first MANOVA

assessed differences of the subscales of the SRS by age (8-12 vs. 13-18). Equality of variance was assessed with Levene's tests and found to be not significant for any dependent variables. Results of the MANOVA were not significant for SRS subscales by age, F (5, 56) = 0.90, p = .490, partial η^2 = .074, suggesting that there were not simultaneous differences on the SRS subscales by age for those who use a CSA. Results for the MANOVA are presented in Table 11. Means and standard deviations for the SRS subscales by age are presented in Table 12.

Table 11

Multivariate Analysis of Variance for SRS Subscales by Age for CSA Users

		ANCOVA *F*				
Source	MANCOVA *F*	Social awareness	Social cognition	Social communication	Social motivation	Autistic mannerism
Age	0.90	0.62	1.34	0.05	0.01	1.15

Note. * $p < 0.05$. ** $p < 0.01$.

Table 12

Means and Standard Deviations for SRS Subscales by Age for CSA Users

Variable	8-12		13-18	
	M	*SD*	*M*	*SD*
Social Awareness	66.00	7.06	67.29	5.45
Social Cognition	66.94	5.22	65.21	6.53
Social Communication	74.09	4.91	73.82	4.32
Social Motivation	77.38	4.21	77.29	4.55
Autistic Mannerisms	68.12	7.52	70.18	7.54

The second MANOVA assessed differences of the subscales of the SRS by IQ (78-85.5 vs. 85.6-93.1 vs. 93.2-100.7 vs. 100.8-108.3 vs. 108.4-115.8). Intelligence Quotient (IQ) information was collected as a continuous variable and separated into categories by standard deviation for use in the analyses for Research Question 3. The categories were developed by making score categories by standard deviation. Equality of variance was assessed with Levene's tests and found to be not significant for any dependent variables. Results of the MANOVA were not significant for SRS subscales by IQ, F (20, 168) = 1.26, p = .212, partial η^2 = .131, suggesting that there were not simultaneous differences on the SRS subscales by IQ for those who used a CSA. Results for the MANOVA are presented in Table 13. Means and standard deviations for the SRS subscales by IQ are presented in Table 14.

Table 13

Multivariate Analysis of Variance for SRS Subscales by IQ for CSA Users

		ANCOVA *F*				
Source	MANCOVA *F*	Social awareness	Social cognition	Social communication	Social motivation	Autistic mannerism
IQ	1.26	0.70	0.50	1.04	1.34	1.59

Note. * $p < 0.05$. ** $p < 0.01$.

Table 14

Means and Standard Deviations for SRS Subscales by IQ for CSA Users

Variable	78-85.5		85.6–93.1		93.2–100.7		100.8–108.3		108.4–115.8	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Social Awareness	63.50	5.54	67.37	5.88	65.67	4.87	65.67	5.74	68.50	5.74
Social Cognition	64.83	7.78	67.74	6.92	66.25	5.99	64.44	5.00	65.50	6.36
Social Communication	72.67	3.14	73.95	3.58	74.42	3.37	71.67	3.35	73.50	2.12
Social Motivation	77.67	3.27	78.16	3.70	77.25	4.58	75.33	3.35	73.50	0.71
Autistic Mannerisms	64.00	7.35	68.58	5.78	71.17	6.59	67.44	5.82	65.00	0.00

The third MANOVA assessed differences of the subscales of the SRS by comorbidity (ADHD vs. anxiety vs. OCD vs. seizures vs. social skills deficits). Equality of variance was assessed with Levene's tests and found to be not significant for any dependent variables. Results of the MANOVA were not significant for SRS subscales by comorbidity, F (20, 176) = 0.45, p = .979, partial η^2 = .049, suggesting that there were not simultaneous differences on the SRS subscales by comorbidity for those who used a CSA. Results for the MANOVA are presented in Table 15. Means and standard deviations for the SRS subscales by comorbidity are presented in Table 16.

Table 15

Multivariate Analysis of Variance for SRS Subscales by Comorbidity for CSA Users

		ANCOVA *F*				
Source	MANCOVA *F*	Social awareness	Social cognition	Social communication	Social motivation	Autistic mannerism
Comorbidity	0.45	0.55	0.52	0.47	0.30	0.73

Note. * $p < 0.05$. ** $p < 0.01$.

Table 16

Means and Standard Deviations for SRS Subscales by Comorbidity for CSA Users

Variable	ADHD		Anxiety		OCD		Seizures		Social Skills	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Social Awareness	68.65	8.52	65.17	4.54	65.20	9.52	64.00	3.46	65.91	6.24
Social Cognition	67.36	4.63	65.83	4.36	68.40	8.82	66.00	1.73	65.18	5.97
Social Communication	75.14	5.63	75.50	6.16	73.40	2.61	73.00	1.73	73.36	4.55
Social Motivation	77.36	3.65	76.67	3.08	78.60	4.72	75.33	2.52	77.36	5.00
Autistic Mannerisms	70.00	6.13	68.50	4.63	71.00	8.25	63.33	9.24	68.41	8.58

The fourth MANOVA assessed differences of the subscales of the SSIS by age (8-12 vs. 13-18). Equality of variance was assessed with Levene's tests and found to be not significant for any dependent variables. Results of the MANOVA were not significant for SSIS subscales by age, F (7, 54) = 0.66, p = .490, partial η^2 = .074, suggesting that there were not simultaneous differences on the SSIS subscales by age for those who used a CSA. Results for the MANOVA are presented in Table 17. Means and standard deviations for the SSIS subscales by age are presented in Table 18.

Table 17

Multivariate Analysis of Variance for SSIS Subscales by Age for CSA Users

		ANCOVA *F*						
Source	MANCOVA *F*	A	B	C	D	E	F	G
Age	0.66	0.00	0.22	0.18	0.48	0.02	2.99	1.81

Note. * $p < 0.05$. ** $p < 0.01$. A = Communication, B = Cooperation, C = Assertion, D = Responsibility, E = Empathy, F = Engagement, and G = Self-control.

Table 18

Means and Standard Deviations for SSIS Subscales by Age for CSA Users.

Variable	8 -12		13 -18	
	M	*SD*	*M*	*SD*
Communication	13.76	1.35	13.75	1.62
Cooperation	10.85	1.67	11.04	1.37
Assertion	12.92	1.71	13.11	1.97
Responsibility	15.11	1.92	14.79	1.81
Empathy	9.59	1.56	9.64	1.59
Engagement	12.62	1.74	13.36	1.59
Self-Control	8.62	2.19	9.36	2.11

The fifth MANOVA assessed differences of the subscales of the SSIS by IQ (78-85.5 vs. 85.6- 93.1 vs. 93.2-100.7 vs. 100.8-108.3 vs. 108.4-115.8). Equality of variance was assessed with Levene's tests and found to be not significant for any dependent variables. Results of the MANOVA were not significant for SSIS subscales by IQ, F (28, 160) = 1.13, p = .309, partial η^2 = .165, suggesting that there were not simultaneous differences on the SSIS subscales by IQ for those who used a CSA. Results for the MANOVA are presented in Table 19. Means and standard deviations for the SSIS subscales by IQ are presented in Table 20.

Table 19

Multivariate Analysis of Variance for SSIS Subscales by IQ for CSA Users

		ANCOVA *F*						
Source	MANCOVA *F*	A	B	C	D	E	F	G
IQ	1.13	1.67	1.67	0.73	0.80	0.28	1.51	0.74

Note. * $p < 0.05$. ** $p < 0.01$. A = Communication, B = Cooperation, C = Assertion, D = Responsibility, E = Empathy, F = Engagement, and G = Self-control.

Table 20

Means and Standard Deviations for SSIS Subscales by IQ for CSA Users

Variable	78 - 85.5		85.6 - 93.1		93.2 - 100.7		100.8 - 108.3		108.4 - 115.8	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Communication	13.00	0.89	13.89	1.33	13.17	1.34	14.22	1.30	14.50	0.71
Cooperation	11.17	1.94	10.47	1.12	11.25	1.48	11.67	1.12	10.00	1.41
Assertion	13.67	0.82	13.00	1.56	13.58	2.27	13.78	1.79	12.00	0.00
Responsibility	16.17	1.17	14.79	1.90	15.58	1.24	15.22	1.56	16.50	2.12
Empathy	9.67	1.63	9.47	1.54	9.75	1.36	10.11	1.54	9.50	2.12
Engagement	12.33	1.63	13.37	1.67	12.33	1.44	13.67	1.87	14.00	1.41
Self-Control	8.00	1.55	9.37	2.01	8.92	2.11	9.56	1.88	8.00	5.66

The sixth MANOVA assessed differences of the subscales of the SSIS by comorbidity (ADHD vs. anxiety vs. OCD vs. seizures vs. social skills deficits). Equality of variance was assessed with Levene's tests and found to be not significant for any dependent variables. Results of the MANOVA were not significant for SSIS subscales by comorbidity, F (28, 168) = 1.06, p = .397, partial η^2 = .150, suggesting that there were not simultaneous differences on the SSIS subscales by comorbidity for those who used a CSA. Results for the MANOVA are presented in Table 21. Means and standard deviations for the SRS subscales by comorbidity are presented in Table 22.

Table 21

Multivariate Analysis of Variance for SSIS Subscales by Comorbidity for CSA Users

		ANCOVA *F*						
Source	MANCOVA *F*	A	B	C	D	E	F	G
Comorbidity	1.06	1.38	1.19	1.42	0.60	1.95	0.94	0.36

Note. * $p < 0.05$. ** $p < 0.01$. A = Communication, B = Cooperation, C = Assertion, D = Responsibility, E = Empathy, F = Engagement, and G = Self-control.

Table 22

Means and Standard Deviations for SSIS Subscales by Comorbidity for CSA Users

Variable	ADHD		Anxiety		OCD		Seizures		Social Skills	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Communication	13.21	1.25	13.67	0.82	12.60	1.14	14.00	1.00	14.09	1.87
Cooperation	11.14	1.66	10.17	1.94	11.00	1.41	9.33	1.52	11.14	1.58
Assertion	13.43	1.91	11.67	1.03	12.60	2.07	12.67	1.53	13.18	1.47
Responsibility	14.36	2.59	15.83	1.17	15.00	1.00	14.67	1.53	14.95	1.94
Empathy	10.21	1.85	9.83	0.75	10.20	0.84	7.67	1.15	9.59	1.53
Engagement	12.50	1.83	12.67	1.03	14.20	1.48	12.33	0.80	12.91	2.00
Self-Control	9.00	1.96	8.50	2.81	8.80	2.77	7.67	1.15	9.14	2.14

Summary

In a comparison between parents' self-reports, children and adolescents who used a CSA scored statistically lower on SRS subscales and SRS total scores. Lower scores on the SRS suggested less impairment in ability to socially interaction. In other words, parents in the non-CSA group rated their child or adolescent as having more social interaction difficulties than parents rated their child or adolescent in the CSA group. Scores on the SSIS subscales and total SSIS scores reflected that there were also differences between groups: CSA users were rated by their parents as having fewer deficits in social skills as reflected by significantly higher subscale and total SSIS scores. The SSIS utilizes reverse scoring meaning that higher scores reflect strengths in social skill use while lower scores represent deficient social skills or ability to use social skills when interacting. Thus, there was statistical support for the first hypothesis.

The second hypothesis was based on the notion that individuals must use social skills in their interactions with others. Additionally, if individuals have social skills deficits they would also demonstrate deficits in their overall ability to appropriately

interact socially. Results of the Pearson correlation analysis did not support the tenets of this argument. In other words, the relationship of association was small and nonsignificant.

The third hypothesis examined the extent to which covariates impacted social skills and social interaction. The MANOVA analysis did not demonstrate differences in age, comorbidity, or IQ in parent's perceptions of children who used a CSA. It is important to note that gender was removed from analysis due to unequal gender sizes reflected in the data. Two female sets of scores may have produced differences in error.

The interpretive findings in context to the theoretical frameworks of theory of the mind and attachment theory, a discussion of the limitations and strengths of the study, implications for social change, recommendations for action, and suggestions for future research are presented in Chapter 5.

Chapter 5: Discussion, Conclusions, and Recommendations

Introduction

The aim of the study was to determine if exposure to CSAs has efficacy as a therapeutic modality to improve social skills and social interactions in children or adolescents with ASD based on the self-reports of their parents' scores on the SSIS and SRS, respectively. This chapter provides a summary of the problem statement, research design, research questions and hypotheses, description of the sample; an interpretation of the findings; a discussion of the limitations and strengths of the study, the implications for social change, recommendations for action, and suggestions for future research.

The rate of ASD is approximated at 1 out of every 88 births in the United States (Baio, 2012). Individuals with ASD can have a wide range of social, intellectual, emotional, and language deficits (*DSM-TR-IV*, 2000) such that current therapeutic interventions need to be developed and studied to determine the efficacy of use of differing interventions. This study was conducted to better understand the role of CSAs in the improvement of social interactions and social skills. Individuals, aged 8-18, who had an ASD diagnosis and used a CSA, were compared to matched individuals who did not use CSAs; data were based on parents' self-reported perceptions of their child or adolescent. Further, this study used (a) the subscales of the SSIS (Gresham & Elliot, 2008) to further understand deficits in social skills use after exposure to a CSA; (b) the subscales of the Social Responsiveness Scale (Constantino & Gruber, 2005) to further understand deficits in social interaction within and between groups after exposure to a CSA. This study also attempted to determine whether there was a difference in parents'

perceptions of their child's social behaviors based on age, gender, comorbidity, and IQ in the CSA group. A series of MANCOVA, ANCOVA, and Pearson correlations were used to compare differences between and within groups as well as to compare the relationship between covariates and main effects.

Prior to this study, no quantitative data had been published on the social interactions or social skills of individuals with ASD after prolonged exposure to a CSA . Additionally, there were no quantitative data to suggest that through simple, prolonged exposure to canine-human interaction, individuals could create simple attachment bonds and could transfer those representative models to more complex human-human interactions.

According to TOM, an inability to accurately perceive social interactions (Hamilton, 2008) contributes to the inability of individuals with ASD to understand others' feelings or to empathize (Colle et al., 2007). Thus, social deficits are elevated due to an inability to perceive and predict behaviors in others (Hiller & Allinson, 2002). While TOM was used in the study to explain social behaviors deficits in individuals with ASD, attachment theory was used to guide interpretation of the the findings. Bowlby (1973, 1980) proposed that individuals form attachments with others and that these relationships and attachment experiences provide a foundation, or representational model, to guide future interactions and perceptions of others and their behaviors. Through the use of exposure to a CSA it was hypothesized that individuals with autism would be able to practice perceiving social cues as they interacted with their CSA, and then use their CSA as a transitional object from which human-human social interactions could occur

with less social and generalized anxiety as well as improve social skills and social interactions. Attachment theory was used in this study to explain the extent to which exposure to a CSA mediates social skills and interaction deficits in individuals diagnosed with ASD.

Interpretation of Findings and Discussion

Research Design and Sample

While it was not possible to conduct a true experimental study where data were collected prior to and after prolonged exposure, this quasi-experimental research design used a matched-participant, equivalent, posttest-only design with nonrandomized sample selection. In this way, parent participants of indivduals with ASD who did not use a CSA were matched based on their age, gender, IQ, and comorbidity to parent participants of individuals with ASD who did use a CSA. Thus, non-CSA users (Group B) represented pre-test scores while CSA users (Group A) represented posttest social behaviors scores. As discussed in Chapters 3 and 4, parent participants in Group A were recruited based on their child's covariate eligibility criteria and the parents completed the SRS, SSIS, and participant information sheet. Participants in Group B were then recruited with the help of ABA centers or ASD specialty schools based on the child demographic criteria from Group A. Parent participants in Group B completed the same research materials as Group A.

Many self-report measures which could have been used to measure social behaviors in individuals with ASD, and the SRS and SSIS are limited by their items. There were, however, advantages to using these measures. First, both the SRS and SSIS

have clinical utility and solid reliablity (SRS α = .97 combined by gender and SSIS median α = .84 for all ages and genders). In other words, both measures likely measure the constructs (social skills, social interactions, and ASD mannerisms) they purport to measure. Secondly, both measures are brief and have low grade-level readibility. Thus, in research they decrease the sense of intrusion from participation and increase the likihood that a prospective participant is willing to take part in a study.

Findings by Research Question

It was expected that there would be differences between the two groups due to theoretical support for the relationship between how social behavioral deficits arise in individuals diagnosed with ASD and how deficits can be mitigated through the development of attachments as outlined in chapter 2.

Research Question 1

The null hypothesis of Research Question 1 must be rejected. The MANCOVA analysis demonstrated that on the subscales of the SRS, parent participants' self-reports suggested that those who did not use a CSA scored statistically higher than those who did use a CSA, and 89.3% of the variance in scores accounted for the differences. That is, based on parent self-report, children and adolescents who used a CSA appeared to have less social interaction deficits than those in the non-CSA group with regard to interactions involving social awareness, social communication, social motivation, and autistic mannerisms. The ANCOVA analysis of the parents' total SRS score suggested that those who did not use a CSA scored statistically higher than those who did use a CSA, and 88.4% of the variance in scores accounted for the difference. That is, based on

parent self-report, children and adolescents who used a CSA appeared to have fewer social interaction impairments on all constructs measured on the SRS.

These findings are important when placed in the context of previous research. Mader et al. (1989) found that individuals with physical disabilities were more likely to engage in social interaction with strangers, friends, or acquaintances due to the canine acting as a social enhancement. Likewise, Bardill and Hutchinson (1997) found that exposure to a CSA improved overall mental health and that a CSA helped in the development of prosocial behaviors. The findings of the current study help support theoretical foundations of attachment theory that the use of CSAs aids in the establishment of positive social interaction schemata, and that new schemata serve as the model and expectation for future interactions with others, thereby reducing social anxiety, which inhibits social interaction (Winnicott, 1986).

Results from a second MANCOVA analysis suggested that on all subscales of the SSIS, expect for the self-control subscale, children or adolescents who used a CSA scored statistically higher than those who did not use a CSA, and 85.6% of the variance in scores accounted for the difference. That is, based on parent self-report, children and adolescents who used a CSA appeared to have fewer social skills deficits than those in the non-CSA group with regard to skills involving communication, cooperation, assertion, responsibility, empathy, engagement, and self-control. Due to reverse scoring, higher scores on the SSIS represent a better developed ability to acquire and perform with social skills.

The subscales of the SSIS measure social skills constructs similar to social skills constructs measured in previous research. Melson et al. (1992) found that individuals who demonstrated attachment to their pets used more empathy skills and expressed more empathy than individuals who did not own pets or did not have secure attachments with their pets. While both groups of parents in the current study rated their child or adolescent as below or nearly below average in ability to "show respect for others' viewpoints" (Gresham & Elliott, 2008, p. 2), the findings of this research study may suggest that the CSA acted similarly to the pets described by Melson et al. (1992) in that the CSA and individual with ASD were able to develop attachment bonds. Further, the attachment bonds between the CSA and individual with ASD may have occurred more naturally and readily due to the unconditional love and acceptance that animals offer to humans (Beck & Madresh, 2008), thus resulting in individuals who may be able to practice social skills with the CSA and then transfer the representational model of the social skills within a social interaction to human-human social interactions.

The ANCOVA results on the SSIS total scores suggested that children or adolescents who did use a CSA scored statistically higher than those who did not use a companion-service animal and 69.5% of the variance in scores accounted for the difference. That is, parent self-reports of children or adolescents who used a CSA had fewer deficits in social skills than the parent self-reports of children or adolescents who did not use a CSA based on all social skills constructs measured by the SSIS.

The tenets of attachment theory suggest that individuals with high attachment anxiety and social avoidance are not likely to engage in social interactions. The use of

social skills is necessary to participate in social interactions. It is proposed in theory of the mind (Baron-Cohen et al., 1985) that individuals do not perceive social cues and are thus not likely to use appropriate social skills. Therefore, the results of the two MANCOVA and ANCOVA are supportive of each other. One possible explanation for these findings could be that social skills deficits in the CSA group were mediated by the animal. An assertion by Winnicott (1986) was that the CSA acts as a transitional object from which the child or adolescent with ASD can practice social skills through interaction with the animal and then use the animal as a transitional object from which social skill use in human-human interactions improves. Alternatively, the lack of control for influences that could have impacted results such as family systems support, socioeconomic status, other current or previous social skills training interventions could have given false support for hypotheses tested for Research Question 1.

Research Question 2

The null hypothesis for Research Question 2 cannot be rejected. The Pearson correlation coefficient of -.138 represents a small but nonsignificant association between the two variables. This is important in relation to a better understanding of CSAs as a treatment modality. Relationships between variables should not be confused with causation. This introductory study did not investigate causation related to social skills acquisition causing improvement in social interaction. Further investigation is warranted to explore the lack of relationship between the two variables.

It had been expected that there would be a strong positive relationship demonstrating that as the number of social skills deficits increased (lower total SSIS

score) so would the number of social interactions deficits (higher total scores on the SRS). One alternative explanation for the lack of strong and positive correlation between the two variables may be that while parents' self-reports suggested that their child had social skills deficits, the CSA served as a transitional object and a form of social enhancement. In other words, the proximity of the animal encouraged others to approach the child-animal team and social interaction followed. The results support qualitiative data collected by Solomon (2010) on the use of CSAs with individuals with ASD. The canine-human interactions enabled attachment bonds to form easier than human-human bonds thus increasing emotions and emotional responses by the participants (Solomon, 2010). It was concluded that the emotional responses and social interactions between the canine and the participants served to mediate social interactions between the child with autism and their parents (Solomon, 2010).

Research Question 3

The null hypothesis for Research Question 3 cannot be rejected. Gender was removed from the MANOVA analyses due to females being represented in the data by two participants. Three MANOVA analyses revealed no differences for the SRS subscales by age, IQ, or comorbidity. Furthermore, there were no differences for the SSIS subscales by age, IQ, or comorbidity.

It had been expected that there would be age differences in social skills and social interactions. Based on attachment theory, representational models of social interactions are made during a child's early years, and that the representational models are then transferred to other social situations. As development continues, individuals are able to

distinguish between the context of the episode and the relational working model formulated in early childhood. Thus, individuals come to expect social interactions to be performed in certain ways based on past experience. So, the longer a person is alive, the more experiences they encounter with social success the less anxious they are and the more secure they feel in extending attachments to others (Ainsworth, 1989). One possible explanation of the lack of differences by age may be that the presence of the CSA reduced social anxiety because the CSA and individual with ASD had a secure attachment which decreased emotional stress as long as the individual remained in close proximity with the CSA (Slater, 2007).

When placed into context to previous research, it was found that CSAs served as social enhancements to increase social interactions for adolescent patients of a mental health facility as participants showed others how their pets preformed tricks (Bardill & Hutchinson, 1997). Thus, the age ranges understudy in the current study are similar to Bardill and Hutchinson. What is yet to be determined is if changes in social skills and social interactions is a function of age due to the small age ranges for eligibility for participation.

Limitations of the Findings

The results of this study should be interpreted with caution based on the limitations denoted in Chapters 1 and 3. Perhaps the most concerning limitation to the study was internal validity. Both the SRS and SSIS are self-report measures of parents' perceptions of their child's social behaviors. Many of the parents noted that their child had high-functioning autism or Asperger's; however, scores on the SRS and SSIS

suggested more deficits than these diagnoses would suggest. For example, the SRS subscale, Autistic Mannerisms, measures stereotypical behaviors and restricted ranges of interest which are often prevalent in individuals with ASD. Autistic Mannerisms scores for non-CSA users (M = 86.92) and CSA users (M = 67.50) suggested that both groups of parents reported that their child/adolescent as having behaviors consistent with ASD. However, children or adolescents in the CSA group had deficiencies in reciprocal social behavior resulting in mild to moderate difficulties with social interactions whereas children or adolescents in the non-CSA group had scores which are considered very severe meaning that social interactions are very impaired to nonexistent (Constantino & Gruber, 2005).

A second limitation of the study was a lack of controlling for confounding variables. There was a wide range of children and adolescents' exposure rates to CSAs from just a few months to years. This may have posed a threat to validity because it is not known the length of time it takes to maximize attachment between a canine and an individual with ASD. A third limitation to this study was the lack of diversity with respect to ethnicity and gender. Recruitment of the sample relied heavily on convenience sampling to ensure that maximum participation occurred; however, future research should focus on stratifying data to ensure that results are more generalizable to all individuals with ASD. Additionally, stratification would aid in reevaluation of gender differences demonstrated in the results. While the study was successful in recruiting the minimum number of participants to ensure statistical power for inferential statistics, results may not be able to be generalized to other individuals with ASD within the greater

population due to the sample lacking gender, ethnic, and socioeconomic diversity. It would have been more desirable for the sample to resemble census data for the population under study with respect to gender (*DSM-TR-IV*, 2000).

Implications for Social Change

Social change implications can be viewed in relation to the findings of this study. First, the results of this study increase awareness to the potential therapeutic benefits of exposure to CSAs, and guide social change as a means to increase understanding of how CSAs improve daily function. This is important in that the public at large has limited knowledge of the use of CSAs with individuals with invisible disabilities such as social behaviors deficits or mental health related disabilities. Therefore, any literature, pro-use or not, increases the likelihood that information becomes more mainstream or introduces the topic to future researchers.

Second, this study directly impacts social change by beginning to provide scientific and quantifiable data on the efficacy of this adjunct treatment such that third-party payers may begin to offset the financial burden associated with the acquisition of CSAs. This is important to note considering the average cost of a CSA is about $20,000 (Delta Society, 2010). Individuals with physical disabilities have greater access to service animals because the medical necessity increases likelihood of insurance companies paying for this treatment intervention.

Thirdly, social change implications are also apparent given the limitations addressed in the previous section. In short, limitations of this study can be addressed in future studies to enrich the data and literature. This study has implications for social

change as the use of CSAs may be extended to other psychological, educable, or medical problems as well as how public organizations, such as schools, view the use of CSAs for disabilities (other than those impacting physical function), and thus, could prompt policy changes. Much of the concern over giving individuals without a physical disability the same rights to access to public locations with their CSA has stemmed from concerns about zoonosis, allergies, or bites by an uncontrolled animal (Guay, 2001). Not only did the literature review in Chapter 2 denote that these concerns are largely unfounded, but the results of this study may aid in social change by helping organizations to recognize that the benefits of CSA use by individuals with ASD outweigh the risks to others in the community.

Fourth, this research is not inclusive of all of the ways CSAs benefit individuals with ASD. There are positive social implications for other researchers as well as program developers or clinical psychologists who are seeking to provide adjunct treatments to maximize therapeutic outcome. In this way, the results of this study impact social change by increasing the understanding of how CSAs are used, and how they influence an individual's overall social wellness.

Recommendations for Action and Future Study

Given the research problem of no known quantitative studies existing that have studied prolonged exposure to CSAs and their impact social behaviors, more studies are need to replicate this pre-post test study. Given the limitations of this study, a second recommendation would be to stratify the sample to increase diversity. An improved methodological approach would be to use a large-sized sample and take multiple

measurements over an extended period. In this way, pre-test data would be established, novelty of the introduction of a CSA would be controlled for, and there would be additional data collection points from which to determine if prolonged exposure is necessary to exact the most benefit. Due to the introductory nature of the study, the scope of the study made use of stringent inclusion and exclusion criteria. This study excluded parent self-reports of children/adolescents who had IQ scores under 79, had a diagnosis of low-functioning ASD, were nonverbal, or over 18 years of age. Future studies need to be conducted to explore CSA use with expanded populations parameters within the ASD spectrum.

Research questions should focus on the length of time to develop an attachment bond, and the optimum time it takes to improve social behaviors. To best collect longitudinal and true pretest-posttest data, there is a need to establish community partnerships with CSA trainers. At the current time, studies exploring CSA use with ASD have focused on attachment. Future studies are needed to explore how the death of a CSA would impact individuals with ASD. Areas of interest would include the relationship between the loss of animal on the grieving process in comparison to the loss of a human, loss of the animal on social behaviors, and the loss in relation to overall wellness.

This study did not address possible differences social behaviors between groups due to outside influences such as maturation or previous or concurrent educable or psychological treatments. Thus, studies which compare treatment benefits between treatments would be beneficial. For example, a study which compares the efficacy of a social skills training condition vs. a social skills training condition plus CSA vs. CSA

condition only would increase understanding of how CSAs mediate social behaviors deficits.

Conclusions

A service animal or CSA is allowed in any public location by law. Unfortunately, many organizations fail to recognize the inclusive nature of invisible mental health or educable disabilities associated with ASD. As such, individuals with ASD who use a CSA have been denied access to public places. This study sought to collect data to increase understanding of the benefits of CSA use. Results from this study may aid in improving access to public domains by individuals with ASD who use CSAs.

This study proposed that individuals with ASD have difficulties perceiving the intentions of others (Baron-Cohen et al., 1985). Through the development of an attachment bond, the individual with ASD could focus on the animal to reduce anxiety and practice social skills. Thus, the aim of this study was to determine if CSAs have efficacy as a therapeutic modality to improve social skills and social interaction. Specifically, a parent's self-report of their child or adolescent in the prolonged exposure CSA group would demonstrate significantly lower social skills and social interaction scores than a parent's self-report of their child or adolescent in the no exposure to CSAs group. Results from the study did suggest via MANCOVA and ANCOVA analyses that children and adolescents who did not use a CSA had more deficits in social interactions and social skills as reported in their parent's SRS and SSIS self-reports. In an examination of gender, age, IQ, and comorbidities' effect on social skills and social interaction scores within the CSA group, no differences were detected via MANOVA for

any of the SRS or SSIS subscales. Initial MANOVA analysis of SSIS detected differences for gender on the communication and empathy subscale after further ANOVA analysis, but due to the lack of equivalence in gender within the sample the analysis was excluded. The small number of female participant data could have accounted for differences being detected and thus, further study is needed.

While this study did have methodological limitations, it represented the first known attempt to quantify the extent to which prolonged exposure to a CSA benefited children or adolescents with a primary ASD diagnosis. Future research will be needed to replicate the current study, to longitudinally study the impact of prolonged exposure to a CSA, and to delineate pre-intervention and post-intervention experimental data.

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Appendix A: Cover Letters to Service Animal Trainers, ABA Centers, School Districts

Blessings Unleashed Foundation Letter of Cooperation

FROM: Dana @ dana@blessingsunleashed.org
TO: Melanie Hoffman @ Melanie.hoffman@waldenu.edu
SENT: March 7, 2011 at 3:27 p.m. CST
SUBJECT: Letter of Cooperation to Return to Hoffman

Here you go Melanie. I look forward to helping you with this. You may also want to contact Lori McIlwain with www.awaare.org She may be able to help as well.

Thank you,
Dana Hall

Blessings Unleashed Foundation, Inc.
PO Box 1743
Glasgow, KY 42142-1743
270-678-5908

February 28, 2011

Dear Ms. Melanie Hoffman,

Based on my review of your research proposal, I give permission for you to conduct the study entitled The Use of Prolonged exposure Companion service animal Pet Therapy to Change Social Anxiety, Generalized Anxiety, Social Skills and Social Interactions in Autistic Individuals through Simple Canine Contact within the Blessings Unleashed Foundation. As part of this study, I authorize you to distribute to the parents and children/adolescent participants the assent, consent, demographics sheet, the SSIS, SRS, STAIC/STAI, and RCMAS-2 self-report questionnaires. Individuals' participation will be voluntary and at their own discretion. We reserve the right to withdraw from the study at any time if our circumstances change.

I confirm that I am authorized to approve research in this setting.

I understand that the data collected will remain entirely confidential and may not be provided to anyone outside of the research team without permission from the Walden University IRB.

Sincerely,
Dana Emmitt-Hall
Founder, Blessings Unleashed Foundation
dana@blessingsunleashed.org

TO: Dana Hall @ dana@blessingsunleashed.org
FROM: Melanie Hoffman @ Melanie.hoffman@waldenu.edu
SENT: March 7, 2011 at 2:26 p.m. CST
SUBJECT: Letter of Cooperation in Recruitment of Participants for Dissertation Per Phone Call

Dear Dana Hall,

My name is Melanie Hoffman and I am a Walden University doctoral candidate in Clinical Psychology completing a dissertation study on the efficacy of companion service animals on social skills, social interaction, generalized anxiety, and social anxiety with autistic children and adolescents. I had previously spoken via telephone to someone at your organization on August 26, 2010 and again to you on March 3, 2011 to ascertain the total number of dogs placed with autistic individuals. At that time your organization had expressed an interest in my research and that your organization would gladly help me recruit participants to expand the research literature on this new and alternative treatment for autistic populations. Thus, this letter is a formal request for aid in recruiting potential participants for my study. In the following paragraph I fully describe your organization's role in recruitment and data collection.

In order to protect the privacy of the families that have had companion service animals placed in their homes by your organization; I will ask that your organization directly contact each potential participant to give them information about the study along with my e-mail and postal address should they decide that they would like to participate in my study. In this way, individuals that do not wish to participate will not have had their personal contact information disclosed by your organization. I may ask your organization to have secondary contact with families to maximize recruitment. Families wishing to participate will then be mailed pre-made packages by the researcher containing the consent/assent forms, the demographics sheet, the anxiety and social skills measures (SRS, SSIS, RCMAS-2, and STAIC/STAI), and a return envelope which will be mailed directly to the researcher. Upon completion of the data collection and data analysis the researcher will contact your organization to disseminate the findings.

If your organization still feels as though this is a worthy research endeavor that they would like to help in the recruitment and collection of data, I would very much appreciate if you could give written permission via postal mail or e-mail so that I can include the letter of cooperation in a institutional review of my research proposal. I cannot start collecting data until the Walden University Institutional Review Board (IRB) gives permission meaning that the research has value to the stakeholders and that data collection procedures are ethical and will not harm the participants. I am attaching a letter that gives me permission to recruit and collect data from your clients. All you have to do is type in the information that I have highlighted in yellow and return it to me via e-mail.

If you have any questions or would like to discuss this research project further, please feel free to contact me via e-mail, melanie.hoffman@waldenu.edu or via telephone 719-694-8539.

Sincerely,

Melanie Hoffman, M.S.
Doctoral Candidate, Clinical Psychology
Walden University
(address and phone number redacted from original address)
melanie.hoffman@waldenu.edu

Paws Assistance Dog Program Letter of Cooperation

TO: Melanie Hoffman @ Melanie.hoffman@waldenu.edu
FROM: Jeannie Bates @ jeannie@swflprofessionaldogtrainers.com
SENT: June 3, 2011 at 10:00 a.m. CST
SUBJECT: Letter of Cooperation in Recruitment of Participants for Dissertation Per Phone Call

Hi Melanie,

Attached is the authorization for you. I have 2 families, possibly 3 for you. Let me know when you are ready and I will have them contact you. I assume you'll begin with some sort of a questionnaire? Can you please plan on sharing the information with us as it comes in?

Thank you and we look forward to working with you!

Jeannie Bates

Letter of Cooperation from Community Research Partner

Paw Assistance Dogs Program
2496 Kirkwood Ave
Naples, FL 34112

June 3, 2011

Dear Ms. Melanie Hoffman,

Based on my review of your research proposal, I give permission for you to conduct the study entitled The Use of Prolonged-Exposure Companion-Service-Animal Pet Therapy to Change Social Anxiety, Generalized Anxiety, Social Skills and Social Interactions in Individuals with Autism Spectrum Disorder through Simple Canine Contact within the Paw Assistance Dogs Program organization. As part of this study, I authorize you to distribute to the parents and children/adolescent participants the assent, consent, demographics sheet, the SSIS, SRS, STAIC/STAI, and RCMAS-2 self-report questionnaires. Individuals' participation will be voluntary and at their own discretion. We reserve the right to withdraw from the study at any time if our circumstances change.

I confirm that I am authorized to approve research in this setting.

I understand that the data collected will remain entirely confidential and may not be provided to anyone outside of the research team without permission from the Walden University IRB.

Sincerely,

Jeannie C. Bates

Authorization Official
Contact Information

239.775.1660
JEANNIE@PAWSASSISTANCEDOGS.COM

TO: Melanie Hoffman @ Melanie.hoffman@waldenu.edu
FROM: Jeannie Bates @ jeannie@swflprofessionaldogtrainers.com
SENT: March 12, 2011 at 9:17 a.m. CST
SUBJECT: Letter of Cooperation in Recruitment of Participants for Dissertation Per Phone Call

Hi Melanie,

We would love to help. I will review the paperwork and return it to you shortly. I will also review our current placements and contact the families to see if they are interested in participating. I'm certain they will.

Kind regards,
Jeannie Bates

SW Florida Professional Dog Trainers Alliance In Partnership with Humane Society Naples
(239)775-1660 - www.swflprofessionaldogtrainers.com & www.hsnaples.org
PAWS Assistance Dogs - www.pawsassistancedogs.com
Provisional Member - Assistance Dogs International
Association of Animal Behavior Professionals - Member #210
Professional Member - IACP
Delta Society Team Evaluator, AKC S.T.A.R Puppy & CGC Evaluator & Coach
Certified PAWS Trainer, Mentor Trainer – ABC

TO: Jeannie Bates @ jeannie@swflprofessionaldogtrainers.com
FROM: Melanie Hoffman @ Melanie.hoffman@waldenu.edu
SENT: March 11, 2011 at 10:34 a.m. CST
SUBJECT: Letter of Cooperation in Recruitment of Participants for Dissertation Per Phone Call

Dear Jeannie Bates,

My name is Melanie Hoffman and I am a Walden University doctoral candidate in Clinical Psychology completing a dissertation study on the efficacy of companion service animals on social skills, social interaction, generalized anxiety, and social anxiety with autistic children and adolescents. I had previously spoken via telephone to someone at your organization on August 26, 2010 and again to you on March 3, 2011 to ascertain the total number of dogs placed with autistic individuals. At that time your organization had expressed an interest in my research and that your organization would gladly help me recruit participants to expand the research literature on this new and alternative treatment for autistic populations. Thus, this letter is a formal request for aid in recruiting potential participants for my study. In the following paragraph I fully describe your organization's role in recruitment and data collection.

In order to protect the privacy of the families that have had companion service animals placed in their homes by your organization; I will ask that your organization directly contact each potential participant to give them information about the study along with my e-mail and postal address should they decide that they would like to participate in my study. In this way, individuals that do not wish to participate will not have had their personal contact information disclosed by your organization. I may ask your organization

to have secondary contact with families to maximize recruitment. Families wishing to participate will then be mailed pre-made packages by the researcher containing the consent/assent forms, the demographics sheet, the anxiety and social skills measures (SRS, SSIS, RCMAS-2, and STAIC/STAI), and a return envelope which will be mailed directly to the researcher. Upon completion of the data collection and data analysis the researcher will contact your organization to disseminate the findings.

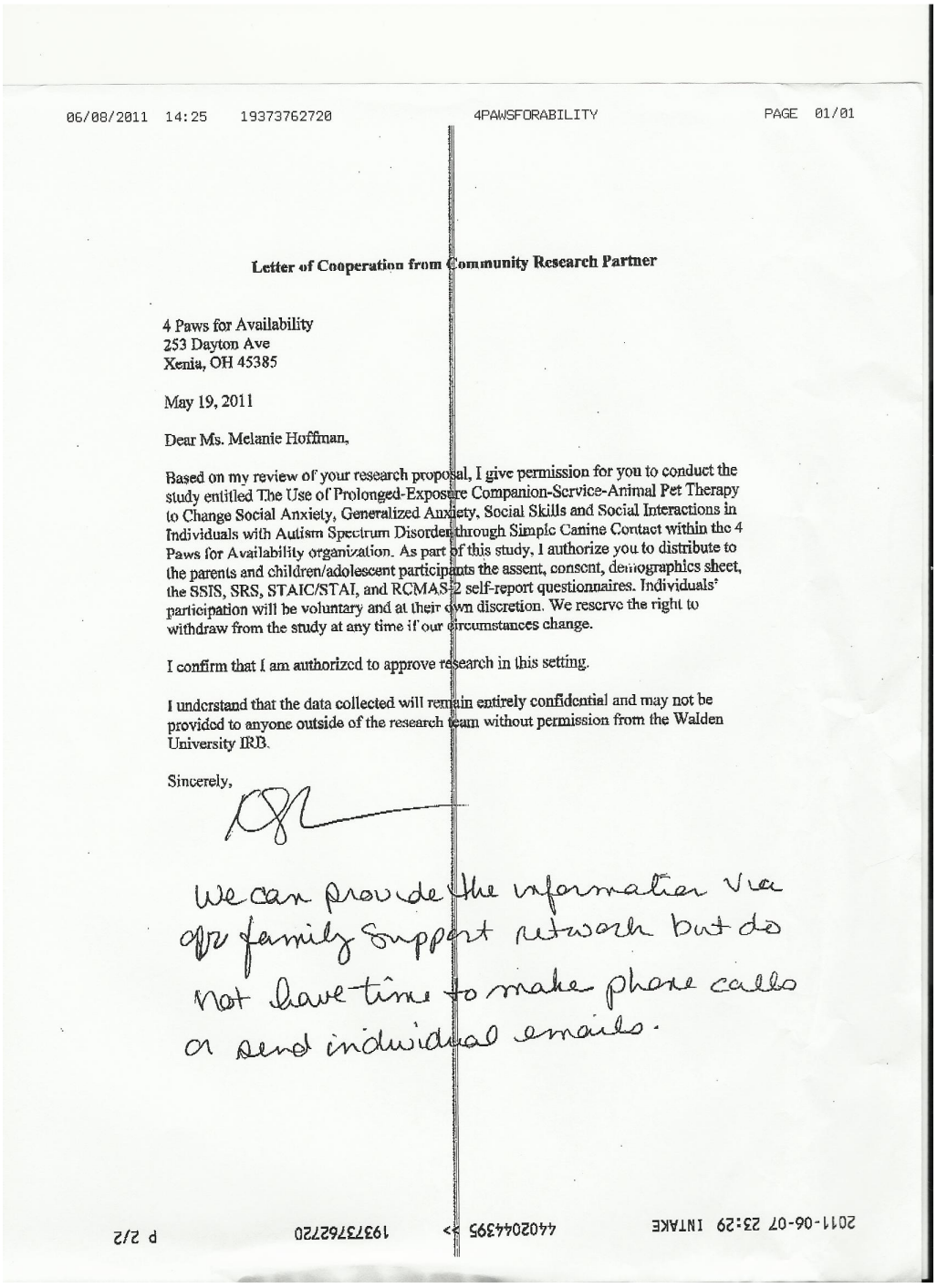
If your organization still feels as though this is a worthy research endeavor that they would like to help in the recruitment and collection of data, I would very much appreciate if you could give written permission via postal mail or e-mail so that I can include the letter of cooperation in a institutional review of my research proposal. I cannot start collecting data until the Walden University Institutional Review Board (IRB) gives permission meaning that the research has value to the stakeholders and that data collection procedures are ethical and will not harm the participants. I am attaching a letter that gives me permission to recruit and collect data from your clients. All you have to do is type in the information that I have highlighted in yellow and return it to me via e-mail. If you have any questions or would like to discuss this research project further, please feel free to contact me via e-mail, melanie.hoffman@waldenu.edu or via telephone 719-694-8539.

Sincerely,

Melanie Hoffman, M.S.
Doctoral Candidate, Clinical Psychology
Walden University
(address and phone number redacted from original e-mail)
melanie.hoffman@waldenu.edu

4 Paws for Ability

FAX FROM: 937-376-2720 4 PAWS FOR ABILITY Karen Shirk
Fax TO: 440-204-4395 Melanie Hoffman
SENT: June 8, 2011 at 2:25 p.m. EST



06/08/2011 14:25 19373762720 4PAWSFORABILITY PAGE 01/01

Letter of Cooperation from Community Research Partner

4 Paws for Availability
253 Dayton Ave
Xenia, OH 45385

May 19, 2011

Dear Ms. Melanie Hoffman,

Based on my review of your research proposal, I give permission for you to conduct the study entitled The Use of Prolonged-Exposure Companion-Service-Animal Pet Therapy to Change Social Anxiety, Generalized Anxiety, Social Skills and Social Interactions in Individuals with Autism Spectrum Disorder through Simple Canine Contact within the 4 Paws for Availability organization. As part of this study, I authorize you to distribute to the parents and children/adolescent participants the assent, consent, demographics sheet, the SSIS, SRS, STAIC/STAI, and RCMAS-2 self-report questionnaires. Individuals' participation will be voluntary and at their own discretion. We reserve the right to withdraw from the study at any time if our circumstances change.

I confirm that I am authorized to approve research in this setting.

I understand that the data collected will remain entirely confidential and may not be provided to anyone outside of the research team without permission from the Walden University IRB.

Sincerely,

We can provide the information via our family support network but do not have time to make phone calls or send individual emails.

2011-06-07 23:29 INTAKE 4402044395 >> 19373762720 P 2/2

TO: Karen4paws@aol.com
FROM: Melanie Hoffman @ Melanie.hoffman@waldenu.edu
SENT: April 6, 2011 at 1:02 p.m. CST
SUBJECT: Letter of Cooperation in Recruitment of Participants for Dissertation Per Phone Call

Dear Karen,

My name is Melanie Hoffman and I am a Walden University doctoral candidate in Clinical Psychology completing a dissertation study on the efficacy of companion service animals on social skills, social interaction, generalized anxiety, and social anxiety with autistic children and adolescents. I had previously spoken via telephone to someone at your organization on August 26, 2010 to ascertain the total number of dogs placed with autistic individuals. At that time your organization had expressed an interest in my research and that your organization would gladly help me recruit participants to expand the research literature on this new and alternative treatment for autistic populations. Thus, this letter is a formal request for aid in recruiting potential participants for my study. In the following paragraph I fully describe your organization's role in recruitment and data collection.

In order to protect the privacy of the families that have had companion service animals placed in their homes by your organization; I will ask that your organization directly contact each potential participant to give them information about the study along with my e-mail and postal address should they decide that they would like to participate in my study. In this way, individuals that do not wish to participate will not have had their personal contact information disclosed by your organization. I may ask your organization to have secondary contact with families to maximize recruitment. Families wishing to participate will then be mailed pre-made packages by the researcher containing the consent/assent forms, the demographics sheet, the anxiety and social skills measures (SRS, SSIS, RCMAS-2, and STAIC/STAI), and a return envelope which will be mailed directly to the researcher. Upon completion of the data collection and data analysis the researcher will contact your organization to disseminate the findings.

If your organization still feels as though this is a worthy research endeavor that they would like to help in the recruitment and collection of data, I would very much appreciate if you could give written permission via postal mail or e-mail so that I can include the letter of cooperation in a institutional review of my research proposal. I cannot start collecting data until the Walden University Institutional Review Board (IRB) gives permission meaning that the research has value to the stakeholders and that data collection procedures are ethical and will not harm the participants. I am attaching a letter that gives me permission to recruit and collect data from your clients. All you have to do is type in the information that I have highlighted in yellow and return it to me via e-mail. If you have any questions or would like to discuss this research project further, please feel free to contact me via e-mail, melanie.hoffman@waldenu.edu or via telephone 719-694-8539.

Sincerely,

Melanie Hoffman, M.S.

Melanie Hoffman, M.S.
Doctoral Candidate, Clinical Psychology
Walden University
(phone number and address redacted from original e-mail)
melanie.hoffman@waldenu.edu

The Joshua School Letter of Cooperation

TO: Melanie Hoffman @ Melanie.hoffman@waldenu.edu
FROM: Jason Gruhl @ jasongruhl@yahoo.com
SENT: March 16, 2011 at 3:07 p.m. CST
SUBJECT: Letter of Cooperation- The Joshua School

The Joshua School
2303 E. Dartmouth Ave.
Englewood, Co 80113

March 7, 2011

Dear Ms. Melanie Hoffman,

Based on my review of your research proposal, I give permission for you to conduct the study entitled The Use of Prolonged exposure Companion service animal Pet Therapy to Change Social Anxiety, Generalized Anxiety, Social Skills and Social Interactions in Autistic Individuals through Simple Canine Contact within the Joshua School organization. As part of this study, I authorize you to distribute to the parents and children/adolescent participants the assent, consent, demographics sheet, the SSIS, SRS, STAIC/STAI, and RCMAS-2 self-report questionnaires. Individuals' participation will be voluntary and at their own discretion. We reserve the right to withdraw from the study at any time if our circumstances change.

I confirm that I am authorized to approve research in this setting.

I understand that the data collected will remain entirely confidential and may not be provided to anyone outside of the research team without permission from the Walden University IRB.

Sincerely,

Jason Gruhl, Executive Director
The Joshua School
2303 E. Dartmouth Ave.
Englewood, CO 80113
303-758-7171
jgruhl@joshuaschool.org

TO: Jason Gruhl @ thejoshuaschool@yahoo.com
FROM: Melanie Hoffman @ Melanie.hoffman@waldenu.edu
SENT: March 7, 2011 at 3:00 p.m. CST

SUBJECT: Letter of Cooperation in Recruitment of Participants for Dissertation Per Phone Call

Dear Jason Gruhl,

My name is Melanie Hoffman and I am a Walden University doctoral candidate in Clinical Psychology completing a dissertation study on the efficacy of companion service animals on social skills, social interaction, generalized anxiety, and social anxiety with autistic children and adolescents. I had previously spoken via telephone to someone at your organization on March 7, 2011; at that time your organization had expressed an interest in my research and that your organization would gladly help me recruit participants to expand the research literature on this new and alternative treatment for autistic populations. Thus, this letter is a formal request for aid in recruiting potential participants for my study. In the following paragraph I fully describe your organization's role in recruitment and data collection.

In order to protect the privacy of the families at your center or within your school district; I will ask that your organization directly contact each potential participant to give them information about the study along with my e-mail and postal address should they decide that they would like to participate in my study. In this way, individuals that do not wish to participate will not have had their personal contact information disclosed by your organization. I may ask your organization to have secondary contact with families to maximize recruitment. Families wishing to participate will then be mailed pre-made packages by the researcher containing the consent/assent forms, the demographics sheet, the anxiety and social skills measures (SRS, SSIS, RCMAS-2, and STAIC/STAI), and a return envelope which will be mailed directly to the researcher. Upon completion of the data collection and data analysis the researcher will contact your organization to disseminate the findings.

If your organization still feels as though this is a worthy research endeavor that they would like to help in the recruitment and collection of data, I would very much appreciate if you could give written permission via postal mail or e-mail so that I can include the letter of cooperation in a institutional review of my research proposal. I cannot start collecting data until the Walden University Institutional Review Board (IRB) gives permission meaning that the research has value to the stakeholders and that data collection procedures are ethical and will not harm the participants. I am attaching a letter that gives me permission to recruit and collect data from your clients. All you have to do is type in the information that I have highlighted in yellow and return it to me via e-mail. If you have any questions or would like to discuss this research project further, please feel free to contact me via e-mail, melanie.hoffman@waldenu.edu or via telephone 719-694-8539.

Sincerely,

Melanie Hoffman, M.S.
Doctoral Candidate, Clinical Psychology
Walden University
(address and phone number redacted from original e-mail)
melanie.hoffman@waldenu.edu

Creative Perspectives, Inc. Letter of Cooperation

TO: Melanie Hoffman @ Melanie.hoffman@waldenu.edu
FROM: Amy Gearhard @ amy.gearhard@creativeperspectives.org
SENT: March 14, 2011 at 11:57p.m. CST
SUBJECT: Letter of Cooperation in Recruitment of Participants for Dissertation Per Phone Call

Hi Melanie,

I've returned the letter of consent here. I'm out of town this week, but will be back in the office the following week. I run slightly crazy schedule, but will do my best to keep up with you. Please let me know what we need to do next. I may involve my Assistant Clinical Director somewhere along the way, as he can help move the process along. I don't want to keep you waiting on me for anything! Talk to you soon.

Best,

Amy K. Gearhard, M.S., BCBA
CPI Autism Centers of Colorado
Clinical Director
Board Certified Behavior Analyst
Direct Line: 303.589.8941
Email: amy.gearhard@creativeperspectives.org
Hours: Tuesday - Friday from 9:00 a.m. - 5:00 p.m.
Englewood: 901 Englewood Parkway, Suite 118, Colorado, 80110
Lafayette: 1724 Majestic Drive, Suite 109, Colorado, 80026

Creative Perspectives, Inc.
901 Englewood Parkway, Suite 118
Englewood, Co 80110

March 7, 2011

Dear Ms. Melanie Hoffman,

Based on my review of your research proposal, I give permission for you to conduct the study entitled The Use of Prolonged exposure Companion service animal Pet

Therapy to Change Social Anxiety, Generalized Anxiety, Social Skills and Social Interactions in Autistic Individuals through Simple Canine Contact within the Creative Perspectives organization. As part of this study, I authorize you to distribute to the parents and children/adolescent participants the assent, consent, demographics sheet, the SSIS, SRS, STAIC/STAI, and RCMAS-2 self-report questionnaires. Individuals' participation will be voluntary and at their own discretion. We reserve the right to withdraw from the study at any time if our circumstances change.

I confirm that I am authorized to approve research in this setting.

I understand that the data collected will remain entirely confidential and may not be provided to anyone outside of the research team without permission from the Walden University IRB.

Sincerely,
Amy K. Gearhard, M.S., BCBA
Clinical Director, Board Certified Behavior Analyst
Creative Perspectives, Inc. Autism Centers of Colorado

901 Englewood Parkway, Suite 118, Englewood, Colorado 80110
Phone: 303.589.8941
Email: amy.gearhard@creativeperspectives.org

TO: Amy Gearhard @ amy.gearhard@creativeperspectives.org
FROM: Melanie Hoffman @ Melanie.hoffman@waldenu.edu
SENT: March 7, 2011 at 3:16 p.m. CST
SUBJECT: Letter of Cooperation in Recruitment of Participants for Dissertation Per Phone Call

Dear Amy Gearhard,

My name is Melanie Hoffman and I am a Walden University doctoral candidate in Clinical Psychology completing a dissertation study on the efficacy of companion service animals on social skills, social interaction, generalized anxiety, and social anxiety with autistic children and adolescents. I had previously spoken via telephone to someone at your organization on March 7, 2011; at that time your organization had expressed an interest in my research and that your organization would gladly help me recruit participants to expand the research literature on this new and alternative treatment for autistic populations. Thus, this letter is a formal request for aid in recruiting potential participants for my study. In the following paragraph I fully describe your organization's role in recruitment and data collection.

In order to protect the privacy of the families at your center or within your school district; I will ask that your organization directly contact each potential participant to give them information about the study along with my e-mail and postal address should they decide that they would like to participate in my study. In this way, individuals that do not wish to participate will not have had their personal contact information disclosed by your organization. I may ask your organization to have secondary contact with families to maximize recruitment. Families wishing to participate will then be mailed pre-made packages by the researcher containing the consent/assent forms, the demographics sheet, the anxiety and social skills measures (SRS, SSIS, RCMAS-2, and STAIC/STAI), and a return envelope which will be mailed directly to the researcher. Upon completion of the data collection and data analysis the researcher will contact your organization to disseminate the findings.

If your organization still feels as though this is a worthy research endeavor that they would like to help in the recruitment and collection of data, I would very much appreciate if you could give written permission via postal mail or e-mail so that I can include the letter of cooperation in a institutional review of my research proposal. I cannot start collecting data until the Walden University Institutional Review Board (IRB) gives permission meaning that the research has value to the stakeholders and that data collection procedures are ethical and will not harm the participants. I am attaching a letter that gives me permission to recruit and collect data from your clients. All you have to do is type in the information that I have highlighted in yellow and return it to me via e-mail. If you have any questions or would like to discuss this research project further, please feel free to contact me via e-mail, melanie.hoffman@waldenu.edu or via telephone 719-694-8539.

Sincerely,

Melanie Hoffman, M.S.
Doctoral Candidate, Clinical Psychology
Walden University
(phone number and address redacted from original e-mail)
melanie.hoffman@waldenu.edu

Appendix B: Recruitment Flyer

FROM: [**name of the agency, Applied Behavioral Analysis center, school, or companion service animal trainer**]

We are asking for your help. We are working with a graduate student named Melanie Hoffman from Walden University. Melanie is completing a doctorate degree in Clinical Psychology and would like to determine if companion service animals help children and adolescents with autism improve their social skills and the way they interact socially.

Melanie has not been given your name, address, e-mail address, or phone number because we [**name of the agency, Applied Behavioral Analysis center, school, or companion service animal trainer**] know how important your privacy is to you. If you are interested in helping expand the research about alternative treatments used with children with autism please contact Melanie Hoffman directly. Her phone number is XXX-XXX-XXXX and her e-mail address is melanie.hoffman@waldenu.edu

If you have any questions about the researcher, you can contact Walden University representative, Dr. Leilani Endicott, at 1-800-925-3368, extension 1210. Please mention the research number (# 09-20-11-0059717).

Melanie has asked us to give you a brief description of the study:

- You were chosen because you have a child that has autism between the ages of 8-18, because they might use a companion service animal, and because they have an IQ greater than 79.
- **Purpose:** to determine if companion service animals help children and adolescents with autism improve their social skills and the way they interact socially.
- **Voluntary Nature of the Study:** You have the right to chose to participate. No one at [**name of the agency, Applied Behavioral Analysis center, school, or companion service animal trainer**] will treat you differently if you decide for yourself to not be in the study, and no one at [**name of the agency, Applied Behavioral Analysis center, school, or companion service animal trainer**] will know if you choose not to be in the study. Even if you begin the study, you can withdraw at anytime.
- **Confidentiality:** Any information you give will be kept private. I will not use your name, or any identifying information in reporting the results of the study. I will only use the information gathered to purposes of the study.
- **Risks and Benefits:** There are no potential physical risks and no benefits associated with participation in this study.
- **Procedures:**

  - Sign the consent form which means you agree to be in the study.
  - Complete Social Skills Improvement System questionnaire which takes about 15-20 minutes, complete the Social Responsiveness Scale which takes about 15 minutes, and complete the Participant Information sheet which takes about 10-25 minutes to complete.
  - Return the questionnaires, Participant Information Sheet, and consent form within one week of receiving the research materials.
- **Compensation:** Receive a $5 gift certificate to either Wal-Mart or Target upon the return of the materials.
- **Contact and Questions:** Melanie Hoffman (Student researcher), XXX-XXX-XXXX or melanie.hoffman@waldenu.edu Dr. Leilani Endicott at Walden University, 1-800-925-3369, extension 1210. Walden University's approval number for this study is (# 09-20-11-0059717) and it expires on (September 19, 2012).

If you would like to discuss this research project further, or would like to participate, please contact me by phone XXX-XXX-XXXX, by mail at Melanie Hoffman, **(address redacted)**, or by e-mail at Melanie.hoffman@waldenu.edu

Sincerely,

Melanie Hoffman, M.S.
Doctoral Candidate, Clinical Psychology
Walden University
XXX-XXX-XXXX
Melanie.hoffman@waldenu.edu

Appendix C: Directions for Self-Report Measures

- **Social Responsiveness Scale (SRS)**: "For Each question, circle the number that best describes the child's behavior over the **past 6 months**" where *1 = NOT TRUE*, 2 = *SOMETIMES TRUE, 3 = OFTEN TRUE, and 4 = ALMOST TRUE*. There are 65 questions that take about 15 minutes to complete. Please do not separate the carbon paper.

- **Social Skills Improvement System (SSIS)**: "Please read each question and think about your child's behavior during the **past 2 months**. Then, decide **HOW OFTEN** your child displays the behavior" where *N = NEVER, S = SELDOM, O = OFTEN, or A = ALMOST ALWAYS*. "Please also rate **HOW IMPORTANT** you think the behavior is to your child's development" where *n = not important, I = important, and c= critical.* There are 79 questions that take about 15-20 minutes to complete. Please do not separate the carbon paper.

- Please Sign and return the Consent form. One copy needs to be returned to me, and one copy is for you to keep.

- **Participant Information Sheet:** Please complete the information sheet. You may skip any question you feel is too personal. The information sheet will take about 10-25 minutes to complete.

- Please answer all of the questions on both questionnaires. I kindly ask that the questionnaires be completed in a calm and quiet location, free from distractions. Please do not discuss the items on the questionnaires with anyone other than the researcher, and do not ask anyone except the researcher for help in completing the questionnaires.

- Please send the completed and unused questionnaires back to the researcher in the provided security envelope **without** folding the questionnaires. Please enclose your consent form and Participant Information Sheet.

- If you have any questions about an item please call me at (phone number redacted from original) or e-mail me at melanie.hoffman@waldenu.edu

Appendix D: Participant Information Sheet

Participant Information Sheet

Your completion of this information sheet is significant for describing the characteristics of the population that uses or does not use companion service animals and *may* impact the results of this study**.** Your information will remain confidential. Any reports that *may be* published as a result of this study will *not* include *any* identifying participant information.

Participant #_____ (TO BE FILLED IN BY THE RESEARCHER)

Child's Gender:

- ☐ Male
- ☐ Female

Date of Birth (Month/Day/Year):_____/_____/_____

Child's Age_____ Grade:_____
Ethnicity:

- ☐ European American/White
- ☐ African American
- ☐ Asian
- ☐ Hispanic/Latino
- ☐ Native American
- ☐ Eskimo
- ☐ Pacific Islander
- ☐ Other _____

Number of other children in household:____

Number of parents in household:____

Approximate annual household income: $_____

Is the language spoken at home English?

- ☐ Yes
- ☐ No

Has your child ever participated in pet therapies outside the home (Examples: therapist's office, occupational therapy, sensory integration training, school)?

- ☐ Yes
- ☐ No

Is there currently a companion service animal in your home?

- ☐ Yes
- ☐ No

Have you ever had a companion service animal in the home?

- ☐ Yes
- ☐ No

Are there pets in your home other than the companion service animal, if applicable?

- ☐ Yes
- ☐ No

If Yes, please indicate the number and type of pets in your home:

Quantity: _____Type:_____
Quantity:_____ Type:_____
Quantity:_____ Type:_____

If you have a companion service animal in your home, please indicate the length of time you have had the companion service animal:

Years: ____Months:_____ Days:_____

Does your child have any Reading learning disabilities?

- ☐ Yes
- ☐ No

Does your child have any Math learning disabilities?

- ☐ Yes
- ☐ No

Does your child have any Writing learning disabilities?

- ☐ Yes
- ☐ No

Does your child have any Speech learning disabilities?

- ☐ Yes
- ☐ No

Does your child have any learning disabilities not already listed above?

- ☐ Yes
- ☐ No

If Yes, please describe:

_____

_____

Please report your child's IQ:_____

What type of autism has your child been diagnosed with?

- ☐ High-functioning autism
- ☐ Low-functioning autism
- ☐ Asperger's
- ☐ PPD-NOS
- ☐ other_____

Does your child have any other health conditions?

- ☐ Seizures
- ☐ ADHD
- ☐ OCD
- ☐ Social skills deficits
- ☐ Anxiety
- ☐ Depression
- ☐ Other _____

Is your child currently taking prescribed medications?

- ☐ Yes
- ☐ No

If Yes, please list them and describe what they are used for:

_____

_____

_____

Please describe the reason(s) why your child uses the companion service animal. For example, to read to, to practice making conversations, to help him or her get across the street:

_____
_____
_____

Please describe where your child uses the companion service animal. For example, school, church, the grocery store:

_____
_____
_____

Please describe the benefits your child gets from using the companion service animal. For example, the companion service animal calms him or her down, is a friend:

_____
_____
_____

Appendix E: Letters of Cooperation from Psychological Testing Services

PAR Letter of Cooperation

TO: Melanie Hoffman @ Melanie.hoffman@waldenu.edu
FROM: Daniel McFadden @ DMcfadde@parinc.com
SENT: March 7, 2011 at 3:47 p.m. CST
SUBJECT: Permission Letter

Dear Melanie,

It was a pleasure speaking with you today. Here is a copy of the letter you requested. I sincerely hope this information is helpful. Please let me know if you need any additional assistance.

Thank you and have a great day,

Daniel McFadden
Senior Technical Support Specialist
Psychological Assessment Resources, Inc.
Custsup@parinc.com
(800) 331-8378 or US+ 813 968 3003 Telephone
(800) 727-9329 or US+ 813 968 2598 Fax
http://www.parinc.com

16204 North Florida Avenue
Lutz, Florida 33549
Tel: (813) 968-3003
Fax: (813) 968-2598
http://www.parinc.com

March 7, 2011
Dear Melanie Hoffman,
Thank you so much for taking the time to contact me today regarding the use of the **STAI, RCMAS-2, SRS and STAIC** in your research project.
As you requested, the purpose of this letter is to verify that you have permission to use the published forms for your project based on your purchase of the materials from us.

Our records do indicate that you have completed the necessary qualification form to allow purchase of the test. Thank you for helping to insure the ethical use of psychological assessment products.

We very much appreciate your business and the opportunity to be of service to you. If you have any further questions or concerns, please do not hesitate to contact me directly at 1-800-331-8378.

Sincerely,

Daniel McFadden, Sr. Technical Support Specialist

Western Psychological Service Letter of Cooperation

TO: Melanie Hoffman @ melanie.hoffman@waldenu.edu
FROM: Kristin Ratliff **kratliff@wpspublish.com**
SENT: Mon, Jul 25, 2011 01:47 PM CDT
SUBJECT: SRS data collection

Hi Melanie,

Thank you for contacting WPS about the Social Responsiveness Scale (SRS). Yes, the SRS can be administered through secured mail using the questionnaire form, as long as the content of the scale items are not altered. Please note, that the Parent Autoscore Forms (W-399AP) and Teacher Autoscore Forms (W-399AT) include a Profile Sheet (attached to the outside of the AutoScore form) to transpose raw scores into standardized T-scores. The Profile Form should be detached prior to distribution and not included in the materials sent through the mail.

Please let me know if you have further questions, and thanks for your interest in WPS.

Best Regards,

Kristin Ratliff, Ph.D.
Project Director

Western Psychological Services
625 Alaska Avenue, Torrance, CA 90503-5124

Phone: (424) 201-8800 ext. 8827
(800) 648-8857
Fax: (424) 201-6950

wpspublish.com - Test with Confidence®
CreativeTherapyStore.com - *Get Creative*™

Pearson Psychological Testing Corp Letter of Cooperation

TO: Melanie Hoffman Melanie.hoffman@waldenu.edu
FROM: William Schryver William.Schryver@Pearson.com
SENT: Mon, Jul 25, 2011 11:12 AM CDT
SUBJECT: RE: Melanie Hoffman dissertation request to use the SSIS assessment product

Dear Ms Hoffman,

As long as the SSIS Manual provides the option of either handing or mailing the SSIS Parent Form to parents/caregivers for completion and return, Pearson has no objection to this methodology and you have permission to use this option if necessary.

Regards,

William H. Schryver
Senior Licensing Specialist
Clinical Assessment
Pearson
19500 Bulverde Road
San Antonio, TX 78259
T: (210) 339-5345
F: (210) 339-5059
E: pas.licensing@pearson.com

Pearson
Always Learning
Learn more at www.psychorp.com

From: Melanie Hoffman [mailto:melanie.hoffman@waldenu.edu]
Sent: Friday, July 22, 2011 9:53 AM
To: Schryver, William
Subject: Melanie Hoffman disseration request to use assessment product

Sir,

On March 7, 2011 you were kind enough to supply me with a licensing permission to use the SSIS (Social Skills Improvement System) in my dissertation as long as I did not translate or reprint any of the questions.

My plan is to send the parent participants the parent form through the mail and have them complete them at home and return them to me by postal mail. Unfortunately, the IRB

ethics committee for Walden University has brought to my attention some concerns about the permission to do this.

Page 7 of the SSIS manual (2008) indicates, "If the parent or guardian is unable to complete the Parent Form at your location, it can be given or mailed to him or her to be completed independently."

Would it be possible, to have you e-mail me permission to send the SSIS Parent Forms through the mail to participants to complete independently? If you have any questions or would like to discuss this with me further, please do not hesitate to call me or contact me via e-mail at melanie.hoffman@waldenu.edu

Thank-you in advance for your support!

Melanie Hoffman
(Address and phone number redacted from original correspondence)
melanie.hoffman@waldenu.edu

TO: Melanie Hoffman @ Melanie.hoffman@waldenu.edu
FROM: William Schryver @ pas.Licensing@pearson.com
SENT: March 7, 2011 at 4:19 p.m. CST
SUBJECT: Permission Requested related to the SSIS for student research at Walden University

Dear Ms Hoffman,

Permission to use a Pearson assessment is inherent in the qualified purchase of the test materials in sufficient quantity to meet your research goals. In any event, Pearson has no objection to you using the Social Skills Improvement System (SSIS) and you may take this e-mail response as formal permission from Pearson to use the test in your dissertation research.

I recommend you take advantage of Pearson's Research Assistance Program (RAP) that will, if approved, allow a 50% discount on your test material purchases. If you do not yet meet the purchase qualifications, your professor or faculty supervisor may assist you by lending their qualifications.

Some computer links you may find useful are:

Research Assistance Program:
http://psychcorp.pearsonassessments.com/pai/ca/support/rap/ResearchAssistanceProgram.htm
The product page in our online catalog:
http://psychcorp.pearsonassessments.com/HAIWEB/Cultures/en-us/Productdetail.htm?Pid=PAa3400&Mode=summary

Finally, because of test security and validity concerns, permission is not granted for appending tests to theses, dissertations, or reports of any kind. You may not include any actual assessment test items, discussion of any actual test items or inclusion of the actual assessment product in the body or appendix of your dissertation or thesis. You would only be permitted to discuss the fact that you used the Test(s), your analysis, summary statistics, and the results.

Regards,

William H. Schryver
Senior Licensing Specialist
Clinical Assessment
Pearson
19500 Bulverde Road
San Antonio, TX 78259
T: (210) 339-5345F: (210) 339-5059
E: William.schryver@pearson.com

Pearson Always Learning
Learn more at www.psychorp.com

From: melanie.hoffman@waldenu.edu [mailto:melanie.hoffman@waldenu.edu]
Sent: Mon 3/7/2011 3:53 PM
To: HAS-SAT Shared Dist. and Licensing; HAIWEBADMIN (HAS-SAT)
Subject: Permission Requests

The following is feedback submitted via the Contact Us page on the www.PearsonAssessments.com Website:
Contact Information
Name: Ms MELANIE D HOFFMAN
Position / Title: GRADUATE STUDENT
Company Name: WALDEN UNIVERSITY
Email Address: melanie.hoffman@waldenu.edu
Address: XXXX XXXXXXX XXX XXXXX
City, State, Zip: XXXXXXXX XXXXXXX, XX, XXXXX
Country/Region: US
Telephone: XXX-XXX-XXXX (Redacted from original correspondence)

Legal Department/Permission Requests
Title of publication: SOCIAL SKILLS IMPROVEMENT SYSTEM
Edition: 1ST

Author, if available: FRANK GRESHAM & STEPHEN ELLIOTT
Copyright Date: 2008

Brief description of your request:
I WOULD LIKE FORMAL PERMISSION TO USE THIS ASSESSMENT TOOL IN MY DISSERTATION STUDY TITLED:THE USE OF PROLONGED EXPOSURE COMPANION SERVICE ANIMAL PET THERAPY TO CHANGE SOCIAL ANXIETY, GENERALIZED ANXIETY, SOCIAL SKILLS, AND SOCIAL INTERACTIONS IN AUTISTIC INDIVIDUALS THROUGH SIMPLE CANINE CONTACT. I DO NOT PLAN ON USING A TRANSLATED VERSION NOR DO I PLAN ON REPRINTING ANY OF THE COPYRIGHTED MATERIALS. I SIMPLY WANT TO ADMINISTER THE STUDENT AND PARENT VERSIONS OF THE ASSESSMENT TOOLS. I WANT TO COMPARE THE SCORES OF ASD INDIVIDUALS AND THEIR PARENTS THAT USE COMPANION SERVICE ANIMALS TO ASD INDIVIDUALS AND THEIR PARENTS THAT DO NOT HAVE SERVICE ANIMALS IN THE HOME.

Specific list of materials to reproduce: NONE

Number of subjects/copies needed per year: 80 TO 121
Name of responsible party: MELANIE HOFFMAN
Inclusive Dates: 2011 TO 2013
Adaptation and/or format changes required: NONE
Is this request for permission to translate? No
Is this request for permission to use materials in a book? No

Appendix F: Confidentiality Agreement form Statistics Solutions

CONFIDENTIALITY AGREEMENT

Name of Signer: James Lani, CEO of Statistics Solutions

During the course of my activity in analyzing data for this research: "The Use of Prolonged-Exposure, Companion-Service-Animal, Pet Therapy to Change Social Anxiety, Generalized Anxiety, Social Skills and Social Interactions in Autistic Individuals through Simple Canine Contact" I will have access to information, which is confidential and should not be disclosed. I acknowledge that the information must remain confidential, and that improper disclosure of confidential information can be damaging to the participant.

By signing this Confidentiality Agreement I acknowledge and agree that:

1. I will not disclose or discuss any confidential information with others, including friends or family.
2. I will not in any way divulge, copy, release, sell, loan, alter or destroy any confidential information except as properly authorized.
3. I will not discuss confidential information where others can overhear the conversation. I understand that it is not acceptable to discuss confidential information even if the participant's name is not used.
4. I will not make any unauthorized transmissions, inquiries, modification or purging of confidential information.
5. I agree that my obligations under this agreement will continue after termination of the job that I will perform.
6. I understand that violation of this agreement will have legal implications.
7. I will only access or use systems or devices I'm officially authorized to access and I will not demonstrate the operation or function of systems or devices to unauthorized individuals.

Signing this document, I acknowledge that I have read the agreement and I agree to comply with all the terms and conditions stated above.

Signature: **Date:** 3-10-11

Curriculum Vitae

Melanie D. Hoffman, MS
(information redacted)
Melanie.hoffman@waldenu.edu

Education:

PhD in progress in Clinical Psychology — Expected Year: 2012
Walden University, Minneapolis, Minnesota
GPA: 4.0

Master of Science in Psychology — Year: 2009
Walden University, Minneapolis, Minnesota
GPA: 4.0

Bachelor of Science in Secondary Education/Biological Sciences — Year: 1996
Lock Haven University, Lock Haven, Pennsylvania
*** Student Teaching with Honors

Professional Experience:

Pre-doctoral Internship Student — 2011-2012
The Nord Center
Lorain, Ohio

- Provided individual therapy for a case load of 182 clients of various mental health diagnoses, group therapy, risk assessments, case management, treatment planning, referrals to psychiatric services, completed diagnostic assessments, psychological assessments and report writing, completed disability assessments and paperwork, developed curricula for Adolescent Drug Court group and Woman's Trauma/ PTSD group.

Practicum Student — 2010-2011
Department of Behavioral Health, Evans Army Community Hospital
Fort Carson, Colorado

- Provided individual therapy, conducted risk assessments/acute care, psychological testing and report writing, group marriage counseling, received CES and EMDR training.

Homeschooling Instructor — 2006-2008
Fort Lee, Virginia

- Developed and advanced the curricula appropriately based on student's needs, abilities and interests. Maintained attendance records, grade folders, student cumulative folder.

Math, Science, Reading Teacher — 2005- 2006
Ormond Beach Middle School, Ormond Beach, Florida

Math, Literature Teacher — 2002-2004
East Columbus Magnet Academy, Columbus, Georgia

- Helped develop and implement school improvement plans to ensure federal funding for subsequent school years. Increased at risk students performance levels and pass rates from 32% to 86% in 18 weeks. Served as Teacher Team Leader, a go between for teacher- administrator relations. Responsible for implementing new procedures to make daily school activities flow smoothly. Maintained a student security plan to make the building safer and more secure. Advisor for Junior National Honor Society. Collected dues, directed club and community service activities. Developed and advanced the curricula appropriately based on student's needs, abilities and interests. Maintained attendance records, grade folders, student cumulative folders, and discipline records.

Science Teacher 2001-2002
Dinwiddie Middle School, Dinwiddie, Virginia

Fourth Grade Teacher 2000-2001
Beckwith Christian School, Deridder, Louisiana

Science Teacher 1999-2000
Leesville High School, Leesville, Louisiana

Honors:

- Nominated for Teacher of the Year, 2003-2004

Other Experience:

Vision Therapist Assistant 2007-2008
Richmond, Virginia

- Implement Developmental Optometrist's plans to improve ocular motor control, increase tracking and reading rate, utilized neurological tools and interventions to change perception.

Community Service:

Family Readiness Group Leader and Member, United States Army	1996-Present
Parent Teacher Organization	1999-Present
Boy Scouts of America Leader	2004-2008
Habitat for Humanity	2010-Present
The Humane Society	2010-Present
Assistant Soccer Coach	2009

Licenses and Certifications:

Permanent Certification, Educator grades 5-12	1996-Present
Cranial Electrotherapy Stimulation Certified	2010-Present
EMDR Certified; EMDR Institute	2011-Present

Professional Affiliations:

EMDRIA Member	2011-Present

Student Member, American Psychological Association	2009-Present
Student Member, Midwestern Psychological Association	2010-Present
National Educational Association	1995-Present
Autism Speaks	2007-Present
Defeat Autism Now!	2001-Present
Autism Research Institute	2004-Present

References:

Christie Campanella

Assistant Principal, Ormond Beach Middle School

151 Domicilio Avenue, Ormond Beach, Florida

(386) 676-1250 Ext. 53924

ccampane@volusia.k12.fl.us

Pamela Hampton

Lead 8th Grade Reading Teacher, Ormond Beach Middle School

151 Domicilio Avenue, Ormond Beach, Florida

(386) 676-1250

pkhampto@volusia.k12.fl.us