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by

Erica Weidler Baimbridge

August 2013

**THERAPEUTIC HORSEBACK RIDING IN
CHILDREN WITH AUTISM SPECTRUM DISORDERS**

**A Thesis Presented to the
Faculty of the College of Education
University of Houston**

**In Partial Fulfillment
of the Requirements for the Degree**

Master of Education

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Abstract

Animals have long served humans in a working capacity but they have also served as companions and thus, many humans have a bond with animals. Several studies have demonstrated the health benefits of animals on certain ailments and health conditions. While there have been some studies showing the effectiveness of therapeutic riding and hippotherapy on children with disabilities, there has only been one study to date that has evaluated the effects of therapeutic horseback riding (TR) on children with autism spectrum disorders (ASD), yielding tentative positive results in social motivation, sensory seeking/sensitivity, and less distractibility and inattention. The current study sought to expand and partially replicate the previous study to determine possible further effects of therapeutic horseback riding in children with ASD related to social reciprocity, anxiety, repetitive behaviors, and quality of life. Significant main effects were found for TR on social responsiveness and repetitive behaviors, but not for anxiety or quality of life. Implications and limitations of the current study are discussed.

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Chapter I

Autism Spectrum Disorders

Autism spectrum disorders (ASD) are a group of pervasive developmental disorders that include Autistic disorder, Asperger's disorder, and Pervasive Developmental Disorder- Not Otherwise Specified (PDD-NOS). These disorders were first described in the 1940's but in recent years have gained more attention from research, medical and mental health communities, and the media. In 1911, Eugen Bleuler was the first to use the term autism to describe persons with schizophrenia after they had lost touch with reality (Mash & Barkley, 2003). Autism was first used to describe children with impaired social relationships, abnormal communication skills, and repetitive behaviors in the 1943 by Leo Kanner. Kanner posited these children had lost touch with reality much like the people that Bleuler described. Kanner described children with autism as having "an inability to relate themselves in the ordinary way to people and situations from the beginning of life." He further described these children as having "an obsessive desire for the maintenance of sameness." From the 1940's until the 1970's, it was thought that the mothers were cold and distant and it was this rejection that caused these children to be socially isolated (Mash & Barkley, 2003). Many of the therapies were all about teaching the mother how to be more open and inviting with her child. Because of this belief, treatments up until the 1970's have included teaching mothers to be less cold and rejecting (Mash & Barkley, 2003). Rimland (1964), along with Schopler and Reichler (1971), was the first to argue that parenting styles were not the cause for their child's disorder, and Rimland proposed that the disorder was a neurological impairment.

Today, ASDs are characterized by impairments in three major areas: 1) reciprocal social interactions, 2) communication, and 3) restricted and repetitive behaviors (American Psychiatric Association [APA], 2000). Autistic disorder is characterized by qualitative impairments in social interactions and communication skills and the presence of restricted, repetitive behaviors. This can manifest in different ways at different developmental stages. Infants may have an indifference to touch or cuddling whereas toddlers and young children may ask for assistance without making eye contact. Older children may lack any interest in forming or maintaining appropriate peer relationships. Language can be completely absent or severely hindered. The behaviors, interests or activities are stereotyped and consist of a preoccupation of abnormal intensity or focus, strict adherence to routines, or repetitive bodily movements (i.e., hand flapping or body rocking). There is a lack of imaginative play, and instead, individuals may be more preoccupied with moving parts or a fascination with the parts of objects. There also is a deficit in showing, bringing, or sharing objects with others (APA, 2000).

More recently, the appearance of autistic symptoms can be characterized into two types: (a) congenital, which is where the child is exhibiting symptoms early on or since birth; (b) regressive, which is where the child develops normally then regresses or stagnates at a later developmental age usually around the age of two when language is emerging (Goin-Kochel & Myers, 2005). These characteristics must have an onset before the age of three years for a diagnosis of Autistic disorder. In many cases, there is usually a related diagnosis of intellectual disability, formally mental retardation, ranging from mild to severe.

Asperger's was first described by Hans Asperger in 1944. Asperger was seeing similar children as Kanner, though less severe and in different parts of the world. The children that Asperger was describing differed in that the children he saw had developed good language skills. While these children could speak without difficulty, they lacked the social knowledge to have a meaningful conversation with others (Mash & Barkley, 2003). Asperger's disorder is similar to autistic disorder in that it is characterized by impairments in social interactions and a display of abnormal, repetitive behaviors, but in contrast, there are no language or communication deficits. The mechanics of communication with others may be impaired, but language skills are not delayed, with some children having an "adult-like" (e.g., little professor) vocabulary. Many of the social impairments are similar between Autistic disorder and Asperger's disorder; however, youth with Asperger's do not have cognitive deficits and are often normal in intellectual development. There is a marked deficit in social interactions and communication with regard to eye contact, facial expressions, and body language. As with Autistic disorder, these individuals may not show, bring or point out objects of interest. A strong lack in emotional reciprocity is present and they are not able to understand the social norms with interactions. There is a preoccupation of abnormal intensity or focus to certain behaviors, interests, or activities. Children with Asperger's disorder may remember a great deal of facts or information about a particular topic and will talk about this topic regardless of the interests of the other person. These children usually develop normally in adaptive behaviors and a curiosity of the environment (APA, 2000). Pervasive Developmental Disorder-Not Otherwise Specified (PDD-NOS) is reserved for children with an atypical presentation of ASD symptoms. This includes

children who may not meet the full criteria for autism due to a late onset or atypical symptomatology (APA, 2000).

The prevalence of ASDs in the general population averages to around 1 in 88 children and an estimated prevalence of about 1% (Center for Disease Control and Prevention [CDC], 2009; CDC, 2012). From 2002 to 2006, there has been a marked increase in the prevalence rates of ASDs ranging from 27% to 95%. This may be due to an increase in diagnosing from practitioners. While the incidence and prevalence rates have increased, to date there is no clear cause of ASDs. Research has shown that there does seem to be a genetic component to ASDs. In identical twins, if one child is afflicted, there is a 60-96% chance that the other will be affected as well (CDC, 2010). Roughly 20% of siblings of affected children will also have the disorder (Bolton et al., 1994). ASD affects more boys than girls with a ratio of about 6:1, but affected females usually have more severe mental retardation (APA, 2000; CDC, 2009).

Therapies for Autism Spectrum Disorders

As previously stated, the rates of autism have been increasing and so has the attention it has been receiving in the field of research, medicine and mental health, the American public and the media. Parents seemingly undergo a great deal of distress when caring for a child with autism and it is because of this distress that many parents will try multiple treatments for their child. Some of these treatments are empirically supported (e.g., therapies based on applied behavioral analysis) while other therapies lack data supporting their efficacy and effectiveness (e.g., elimination diets and foregoing vaccines). In 1998, a task force was created to help researchers understand the levels of efficacy when it comes to interventions (Chambless et al., 1998). Chambless and

colleagues have established criteria for empirically validated treatments. Well-established treatments are either two studies using a between group design from different researchers, or a series of studies by different researchers using a single case design that demonstrates efficacy of treatment. Probably efficacious treatments are studies that do not meet the criteria for well-established because the sample size is too small, the treatment was favorable but not efficacious, or the findings were not supported by two different researchers.

Evidence based interventions for ASD. Applied behavior analysis (ABA) therapies are the only therapies that has been rigorously tested and scientifically backed as successfully treating children with ASDs and is considered a well-established treatment based on the criteria set forth by Chambless and colleagues (Chambless et al., 1998; Eikeseth, Smith, Jahr, & Eldevik, 2002; Eikeseth, 2009; Eldevik, Eikeseth, Jahr, & Smith, 2006; Granpeesheh, Tarbox, & Dixon, 2009; Lovaas, 1987; Smith, 2010; Virues-Ortega, 2009). In 2011, the Counsel for Exceptional Children (CEC) published an updated review of evidence-based treatment (EBT) recommendations for teachers to utilize with their students with ASDs (Ryan, Hughes, Katsiyannis, McDaniel, & Sprinkle, 2011). Among the EBTs the CEC recommended was ABA, discrete trial training (DTT), developmental, individual-difference, relationship-based model (DIR), picture exchange communication system (PECS), social stories, and treatment and education of autistic and communication related handicapped children (TEACCH). Each one takes into account different aspects of ASDs and tries to improve the behaviors and social impairments associated.

Up until the 1960's to 1970's, psychodynamic/psychoanalytic therapy was the only treatment modality used in children with autism. However, research had yet to prove any benefits, and therefore, psychologists began to look towards the behavior theories for help. Ivar Lovaas and colleagues developed a new intervention based on behavior modification and the modern learning theory (DeMyer, Hingtgen, & Jackson, 1981; Lovaas, 1987). A manual was published by Lovaas in 1980 detailing the techniques utilized in treatment. Lovaas treated children intensively in all aspects of the disorder and across all environments. The techniques can vary across different sites but many employ the same core principles. These procedures are performed in a way that will reinforce or extinguish certain behaviors. The core principles are reinforcement, extinction, stimulus control, and generalizations. The specific procedures utilized in ABA are prompting, fading, shaping and chaining. Prompting is assisting a child to produce a behavior that would otherwise not be there. For example, a therapist might get the child to ask for an item by first stating the child to ask for it. When the child would ask for the item, that behavior is reinforced. Fading is reducing the assistance or prompt to eventually have the child ask for the item on his or her own. Shaping is the reinforcement of a certain behavior that is building on the full behavior. If the child cannot name the item, the therapist may name the sound of the first syllable to get the child to repeat that. Once the child can say the syllable, the therapist and child move onto the full word. Chaining is the act of teaching a behavior in small steps so that the autistic child can understand the components (Granpeesheh et al., 2009).

Lovaas believed that children below the age of four years would benefit most from this treatment because they would more likely be able to repeat the advancements

across all environments as the child matured. In 1987, Lovaas published promising results for families and children with autism. To date, there have been many studies replicating the findings Lovaas et al. (1987) reported and the research has enriched the scientific validity of its use (Eikeseth et al., 2002; Eikeseth, 2009; Eldevik et al., 2006; Fenske, Zalenski, Krantz, & McClannahan, 1985; Granpeesheh et al., 2009; Virues-Ortega, 2009).

The programs are quite intensive and require that a child be engaged in ABA therapy for about 20-40 hours per week for at least two years. Some studies evaluating ABA in a less intensive manner have shown poorer results (Lovaas, 1987; Eldevik et al., 2006). Eldevik and colleagues (2006) reported that children receiving ABA therapy for an average of 12 hours a week did have a significant improvement in outcome but the progress was comparatively modest. Studies have confirmed Lovaas' initial recommendation in that more intensive treatments early in the child's development are more beneficial than waiting until the child is older (Fenske et al., 1985). Parents are also engaged in the therapy and encouraged to continue the techniques when the child returns home. The therapy is recommended to begin at an early age, preferably before the age of 3.5 years. Early intervention has shown to be beneficial to this population (Eikeseth, Smith, Jahr, & Eldevik, 2007; Fenske et al., 1985; Lovaas, 1987; Virues-Ortega, 2010). The techniques are reinforced in typical environments such as home and school and with peers. It is important for these kids to be integrated into regular education classes to reinforce the techniques learned.

Pivotal Response Therapy (PRT) is another treatment that like ABA focuses on increasing desired behaviors and also reducing negative ones but also takes into account

“motivational strategies”. Under the criteria for empirically validated treatments, PRT is considered a well-established treatment, although ABA is still the primary therapy used in this population. PRT “focuses on increasing and maintaining the intrinsic motivational qualities with the stimulus-response-consequence interaction” (Koegel, Koegel, Vernon, & Brookman-Frazee, 2010). Several strategies are employed: reinforcement, task variation, the child’s choice of tasks, and the maintenance of tasks. The number of hours varies from a few hours a week to 40 but the recommendation is 25 hours per week. Parents are encouraged to participate in the therapy as this model puts great emphasis in the parents’ willingness to do the therapy and parent education. Research has shown that if the treatment begins before the age of 3 years, 95% of children will become verbal. If treatment begins between 3-5 years of age, 85% become verbal. Unfortunately, if the treatment is started after 5 years of age, only 20% will become verbal.

Training and Education of Autistic and other Communication Handicapped Children (TEACCH) is widely used to treat autism founded by Eric Schopler in 1966. According to Gresham, Beebe-Frankenberger, and MacMillan (1999) while the research does seem to show positive results, TEACCH is not considered well-established. However, with more research being done in recent years, it is now considered a probably efficacious treatment. Yet, it is one of the most commonly used treatments by schools and special educators (Eikeseth, 2009; Gresham et al., 1999; Hess, Morrier, Heflin, & Ivey, 2008; Ryan et al., 2011). This therapy occurs more often in the classroom and focuses on structural teaching where a group of five children to one teacher learn work skills. This therapy also teaches communication and visual processing skills as well as

academic skills such as reading and writing. Parents are usually involved in the therapy process.

Alternative therapies. While ABA therapy is the only therapy that has been extensively researched and is considered the gold standard, there are many other alternative therapies that the popular media and parents have endorsed. These alternative therapies are not empirically supported and not considered Efficacious Treatments.

Wakefield and colleagues (1998) published a study on the impact of vaccines on the gastrointestinal system in a population of children. These children were all described as having gastrointestinal (GI) issues and certain abnormalities demonstrated on biopsy. The article described a loose association between the measles-mumps-rubella (MMR) vaccine and the occurrence of autism-like symptoms similar to that of Heller's disease. Wakefield et al. stated that all of the GI and neurodevelopmental symptoms started after the MMR vaccine. They commented that the symptoms of Heller's disease is similar to the symptoms of autism and occurs after measles encephalitis further implicating the MMR vaccine as a cause for autism. This article has now been retracted and there have been many studies in order to either replicate or disprove these results. Of the many studies done, there has been no link found between the MMR vaccines or the vaccine additive, thimerosal (also implicated), to date (Gerber & Offit, 2009; Hornig et al., 2008).

In 1997, the Food and Drug Administration (FDA) began requiring the reporting of mercury levels present in food. In 1999, the FDA determined that children were receiving too much mercury by the age of six months (Gerber & Offit, 2009). Even though the harm of the quantities had not been determined, the American Academy of Pediatrics (AAP) called for the immediate removal of mercury additives (thimerosal)

from all vaccines. This seemed to fuel the already strong fire of vaccines being a cause for autism. Since then, the Center for Disease Control (CDC) and the AAP have reviewed several studies on thimerosal (Schultz, 2010) and, to date, have found no causal link of vaccines on autism (Nelson & Bauman, 2003). Parents are still wary about vaccinating their children even though there has been no evidence as to vaccines causing autism. In a sense, not vaccinating is a treatment because these parents believe they can avoid autism if vaccines are not administered. This decline in vaccinations nationwide has created concern as vaccine-preventable diseases are on the rise. According to the CDC, measles cases from January to June 2011 saw an increase in the incidence rates when compared to the same period in 1996.

Another popular alternative treatment for ASD is diet modification. Gluten and casein sensitivities are suspected of exacerbating the symptoms of autism (Autism Web, 2011; WebMD, 2010). Because of this, some parents have adopted a gluten-free or casein-free diet for their child in hopes that it would lessen the symptoms of ASD. Gluten sensitivity is an autoimmune disorder where the person's immune system thinks that gluten, a wheat protein, is a foreign body and acts against it. Gluten sensitivity can manifest as gastrointestinal upset. A person who has gluten sensitivity may experience abdominal pain, diarrhea and abdominal distention or bloating. Whey and casein are the proteins found in milk products, and these too can cause problems in a person who has sensitivity to them. It has been reported that children with autism have higher rates of abdominal pain, constipation, diarrhea, reflux and bloating (Goodwin, Cowen, & Goodwin, 1971).

More recent studies have examined the prevalence of GI symptoms in children with ASD. Prevalence rates have varied from as high as 85% to as low as 22% (Adams, Johansen, Powell, Quig, & Rubin, 2011; Horvath, Papadimitriou, Rabszty, Drachenberg, & Tildon, 1999; Valicenti-McDermott et al., 2006; Valicenti-McDermott, McVicar, Cohen, Wershil, & Shinnar, 2008). However, rates of abdominal pain in the general population and among healthy children can be quite high as well, ranging from 45-60% (Saps, Szteinberg, & DiLorenzo, 2006). It has also been suggested that children with autism and language regression have higher reports of family history with GI and autoimmune disorders and, therefore, may belong to a certain phenotype (Valicenti-McDermott et al., 2008). A 30-year longitudinal study that was published in 2009 found that children with autism were not more likely to have GI diseases when compared to healthy controls (Mouridsen, Rich, & Isager, 2009). Because there is no clear evidence in the literature of the relationship of GI symptoms and diet to the onset of autism, more research is warranted to determine if these diets are truly beneficial to children with ASD.

Animals in Therapy

Animal Assisted Therapy (AAT) is a form of treatment by a trained professional that utilizes animals as a therapy tool. AAT has specific goals and measured objectives. AAT should be differentiated from animal assisted activities (AAA), which includes any activity (usually recreational or educational) that involves the use of animals for enhancing quality of life. AAA can have specially trained individuals directing the activities but volunteers may also partake. There are no clear goals or measured objectives in AAA (Fine, 2000). Equine-facilitated psychotherapy (EFP) is psychotherapy which uses the horse in a number of activities which include but are not

limited to riding, grooming, or handling. EFP should be directed by only a licensed mental health professional that collaborates with someone who specializes in equines or the therapist themselves can become credentialed as an equine professional. The treatment goals with a horse are determined and maintained by the therapist in cooperation with the client. Hippotherapy is therapy performed by a speech, occupational or physical therapist to improve the motor skills and movement. The horse is used to improve posture, gait, balance, and other gross or fine motor skills (Fine, 2000). Therapeutic horseback riding (TR) is similar to hippotherapy and EFP but with a few notable differences. TR not only uses the horse to improve motor function like in hippotherapy but also uses the horse to improve physical and mental health and helps facilitate social bonding with an animal like in EFP (Selby, 2009). TR is one form of animal-assisted therapy called equine-assisted activity or therapy (EAAT). EAAT is a group of therapies with horses for anyone with a disability or special needs (Professional Association of Therapeutic Horsemanship International, 2011). EAAT is usually carried out by a certified instructor.

Animals have long served humans in a working capacity but they have also served as companions and thus, many humans have a bond with animals. According to the Humane Society of the United States in 2009, 39% of US households own at least one dog and 33% of US households own at least one cat (The Human Society of the United States, 2011). While studies of the effects of animals are not new, there is continuing research to support the anecdotal evidence that animals can provide humans with health benefits.

One of the first and most well-known of these studies was done on patients after having coronary heart surgery. Of the patients that went home after surgery and owned a pet, 6% died within the first year after discharge. To the contrary, 28% of the patients who went home after surgery and did not own a pet died within the first year (Friedmann, Katcher, Lynch, & Thomas, 1980). Other studies also have demonstrated the decrease in stress levels or improvements in health in adults when pets were present (Allen, Blascovich, Tomaka, & Kelsey, 1991; Allen, Blascovich, & Mendes, 2002; Allen, Shykoff & Izzo, 2001; Miller et al., 2009). In one study conducted in China, where pet ownership is rather novel, the dog owners had fewer sleepless nights, fewer sick days and fewer doctor visits (Headey, Na, & Zheng, 2008). Multiple studies have found similar results in which pet owners had better general overall health than non-pet owners (Friedmann, Thomas, Cook, Tsai, & Picot, 2007; Morrison, 2007; Raina, Waltner-Toews, Bonnett, Woodward, & Abernathy, 1999; Siegel, 1990; Serpell, 1991).

Animal assisted therapy with children. Humans, and especially children, have an affinity to animals and living creatures. This fascination of living creatures has been termed biophilia. Biophilia is the theory that humans have evolved to be especially attentive to life forms (McCardle et al., 2011; Melson, 2003). Studies have shown that children are more likely to respond to a living object as opposed to an inanimate object. Kidd and Kidd (1987) demonstrated that infants ranging from 6 to 30 months were more likely to smile, follow and make sounds like a live animal such as a pet as opposed to a battery operated toy. DeLoache, Pickard, and LoBue (2011) reported that infants 4 to 12 months observed animals significantly longer than inanimate objects. Piaget and Vygotsky, both developmental psychologists and theorists, posited that children are more

likely to learn when a companion animal is present because children are more likely to learn from something to which they are emotionally invested, and because the animal displays novel information (Melson, 2003).

It is clear that animals are also considered to be important when it comes to intimate relationships among children. In a one study, children ages 7 to 10 years old included their pets in a list of the most important relationships in their lives (Bryant, 1985). Another study reported that 42% of children mentioned their pets when asked who they turned to when they wanted to share a secret or they were feeling angry, sad, or happy (Melson, 2003). It has also been reported that children who are more attached to their pets are more likely to be empathetic to their peers (Bryant, 1985; Melson, Peet & Sparks, 1991).

Not only has research shown that the bond between animals is important for our health and development, animals are also proven tools for therapy (Mallon, 1992; Mallon, 1994; Nimer & Lundahl, 2007; Schultz, Remick-Barlow, & Robbins, 2007; Selby, 2009; Souter & Miller, 2007). There have been several studies that have examined the relationship and benefits of animals in therapy with children with disabilities such as cerebral palsy and Down's syndrome but also in children with psychiatric conditions (Macauley & Gutierrez, 2004; Nathanson & de Faria, 1993; Prothmann, Bienert, & Ettrich, 2006; Sterba, Rogers, France, & Vokes, 2002). Canines, horses and exotic animals such as dolphins have been utilized as therapy tools. The findings from the literature have all demonstrated positive effects on these groups of children.

Animal Assisted Therapy for Youth with ASDs

There are only a few research studies that have been conducted using animals as therapy tools for children with an ASD (Bass, Duchowny, & Llabre, 2009; Burrows, Adams, & Spiers, 2008; Martin & Farnum, 2002; Nimer & Lundahl, 2007; Sams, Fortney, & Willenbring, 2006; Viau et al., 2010). Canines are the most commonly utilized animals in any animal-assisted therapy and this is not the exception for the ASD population (Burrows et al., 2008; Martin & Farnum, 2002; Nimer & Lundahl, 2007; Viau et al., 2010).

Nimer and Lundahl (2007) reported in their meta-analysis that the overall effect sizes for animal assisted therapy for children with autism were high. Burrows and colleagues (2008) evaluated the effects of safety on children with autism using service dogs. They found that not only was the dog effective in helping to keep the child with autism safe, but parents also reported that there was increased sense of well-being and calm within the family. Another study also evaluated the effect of service dogs on children with autism spectrum disorders (ASDs). In this study researchers aimed to see if the service dogs affect the salivary cortisol levels of these children. Cortisol is a hormone increased in the body during stressful times. They discovered that the cortisol levels in these children were reduced from 58% to 10% once the dog was placed in the home for the four week trial period. When the dog was removed from the child's environment during the post 2 week period, the cortisol levels increased back up to 48% (Viau et al., 2010).

Martin and Farnum (2002) conducted a small study on AAT with 10 children who were diagnosed with an ASD. These children underwent a total of 45 sessions in a 15

week time span 3 times per week. In each session, the child was exposed to a ball, a stuffed dog, or a live dog. The researchers coded the behaviors and interactions that the children had with each item as well as administered the Psychoeducational Profile-Revised (PEP-R). While there are some limitations to this study, there were some positive results. Qualitatively, the children seemed happier by laughing more frequently and less distractible when being asked questions or in talking with the therapist in the dog condition vs. the stuffed dog or the ball. Children were more likely to interact favorably with the dog by offering it treats and conversing with it.

To date, there is only one study evaluating the effects of therapeutic horseback riding on children with ASD. Bass, Duchowny, and Llabre (2009) studied 34 children (riding group [n=19] vs. waitlist control group [n=15]) during a 12 week course of therapeutic riding. Their aim was to evaluate the social functioning of these children with two standardized measurements given to the parents: the Social Responsiveness Scale (SRS) and the Sensory Profile (SP). On both measurements, there was significant change in the overall scores from pre- to post-testing in the children receiving the therapeutic riding vs. the waitlist control group. There were statistically significant differences on 4 of the 5 subscales for the SP measurement for the riding group vs. the control group: sensory seeking, attention and distractibility, sensory sensitivity, and sedentary. The social motivation scale was significant on the SRS for the riding group vs. the control group. One of the limitations suggested by the authors was that the therapeutic riding program was not longer than 12 weeks. The authors believed that future research should increase the length in order to determine if there were greater improvements in social functioning. A second limitation of this study was that the

medications or other treatments were not documented for the participants. A third limitation was subject attrition and a final limitation is that they only used two standardized measures: the Social Responsiveness Scale (SRS) and the Sensory Profile (SP).

For the past four decades, there have been more and more studies published to determine the effects of animals on humans and the implications for our health and well-being. Studies have demonstrated that there is an association of animals to reducing stress levels, improving health status after medical procedures, and improving interactions with others both in healthy children and children with special needs. However, because there is usually a lack of rigorous scientific design in most studies, researchers have been calling for more empirically supported treatments that can catapult the field of animal-assisted therapies into the well-established treatment group.

The goal of this current study was to expand on the research of animals in children with ASD and determine whether therapeutic horseback riding can be a beneficial treatment to this population potentially leading to additional evidence to TR in becoming a well-established treatment option for children with ASD. To date, there has been only one other study evaluating the effects of TR on children with ASD, showing that equine therapy can improve the social responsiveness in children with ASD (Bass, Duchowny, & Llabre, 2009). The current study sought to address the following questions:

1. Does TR improve social responsiveness in children with ASDs?

Hypothesis 1: TR will improve social responsiveness in children with ASDs.

2. Does TR reduce repetitive behaviors in children with ASDs?

Hypothesis 2: TR will reduce repetitive behaviors in children with ASDs.

3. Does TR reduce stress/anxiety levels in children with ASDs?

Hypothesis 3: TR will reduce the stress/anxiety levels in children with ASDs.

4. Does TR improve the overall quality of life (QOL) in children with ASDs?

Hypothesis 4: TR will improve the overall QOL in children with ASDs.

THERAPEUTIC HORSBACK RIDING IN ASD

Chapter II

Method

Participants and Setting

The sample included two groups of children: one group received the therapeutic riding classes (TR) and a control group. Parents of children ages 6 to 17 years of all races/ethnicities and gender in the riding group were invited to participate in the study. Their children were enrolled in SIRE and have been diagnosed with an Autism Spectrum Disorder (e.g., Autistic Disorder, Asperger's Disorder, or Pervasive Developmental Disorder-Not Otherwise Specified).

SIRE is a nonprofit organization that offers therapeutic riding to children with special needs and is a Professional Association of Therapeutic Horsemanship (PATH) International Premier Accredited Center. SIRE serves the greater Houston area with sites in Hockley, Spring, and Fort Bend at Sienna Stables. SIRE keeps a record of the child's diagnosis on a document that the child's physician signs for their records, and we will ask the parent for a copy of this document. The children were chosen for the program based on SIRE's standard enrollment procedures. SIRE requires doctor permission/approval prior to participating in their program. The children will be selected on a first-come, first-serve basis based upon the enrollment procedures at SIRE. SIRE cannot accommodate all children applying for the program in a given semester and we hoped to include children who were placed on a wait-list. SIRE only had two children for the semester that met this criterion; therefore, we added two additional sites in order to recruit children for the control group.

The Westview School is a private, non-profit school for children with Autism Spectrum Disorders. The school provides a learning environment for children with learning differences which prevent them from being successful in regular programs. The Westview School is located in West Houston. Coach Bo's Special Friends is a company that offers gymnastics and tumbling classes to children with special needs. This is a company that travels to schools such as the Westview School and a private gymnasium to provide the gymnastics classes.

A total of 18 horseback riders and 16 controls were enrolled. However, two of the controls withdrew from the project after providing consent. Two of the horseback riders did not complete the full 16 weeks of horseback riding and therefore were not included in these analyses, leaving 16 children in the TR group and 14 children in the control group. Table 1 shows the final samples' demographics. A chi-square analysis was performed on the group differences with regards to severity of the ASD. There was a statistically significant difference in the severity of the disorder between the TR group and the control group [$\chi^2(3, n=30) = 12.177, p = 0.002$]. The other variables evaluated (age, child's gender, race/ethnicity, concurrent meds, concurrent therapies, and SES) were not statistically significant. Due to the small sample size, these results should be interpreted with caution.

Table 1

Demographics

Characteristic	TR Group (n= 16)	Control Group (n= 14)
Gender		
Males	14	13
Females	2	1
Age	10.56 (3.95)	8.43 (1.95)
Race/Ethnicity		
White	11	9
Black	1	1
Hispanic	1	3
Other	3	1
ASD Type		
Autistic Disorder	10	10
Asperger's Disorder	3	1
PDD-NOS	3	3
ASD Severity		
Mild	2	10
Moderate	9	4
Severe	5	0
Concurrent Therapies		
Yes	10	8
No	6	6

Note. Ages are listed in M (SD).

Measures

Demographic questionnaire. The demographic questionnaire is a self-report questionnaire that asked the parent or primary care giver, which was usually the mother, to report on the familial background information, the child's background, medications the child may be taking and any other treatments they may be taking (see Appendix A).

Social Responsiveness Scale. Social Responsiveness Scale (SRS) is a 65-item rating scale that measures the severity of autism spectrum symptoms in the social realm such as: social impairments, social awareness, social information processing, social

communication, social motivation, and autistic preoccupations and traits (Constantino & Gruber, 2005). Parent report is available for children ages 4-18 years of age. The Cronbach alpha for the parent report is 0.94 and the test-retest reliability score ranges from 0.77 to 0.85 for females and males, respectively. Inter-rater reliability scores range from 0.75 to 0.91. The SRS has also been extensively researched with good evidence of validity (Constantino & Gruber, 2005). Total *T*-scores ranging from 60 to 75 indicate a mild to moderate deficiency in social reciprocity. *T*-scores 76 and above indicate a severe deficiency in social reciprocity. The variance of the scores on any subscale by one to two standard errors of the mean (SEMs) from one testing period to the next may indicate a treatment effect. This measure was completed by the parent. Due to copyright issues, this questionnaire is not attached in the Appendix.

Behavior Assessment System for Children-2 Parent Rating Scale. The Behavior Assessment System for Children-2 (BASC-2) Parent Rating Scale is a measure used to assess a range of behavioral and personality traits in children and has support for reliability, content, and construct validity (Reynolds & Kamphaus, 2004). The parent scale is available for children 6-21 years of age and includes 18 subscales which include: Hyperactivity, Aggression, Conduct Problems, Anxiety, Depression, Somatization, Atypicality, Withdrawal, Attention Problems, Behavioral Symptoms Index, Adaptability, Social Skills, Leadership, Activities of Daily Living, Functional Communication and Adaptive Skills, Externalizing Problems, and Internalizing Problems. The overall and subscale Cronbach alpha coefficients are quite high ranging from the mid .80's to the middle .90's. The overall and subscale test-retest reliability scores are also high ranging from the high 0.70's to the low 0.90's. The inter-rater reliability coefficients range from

0.69 to 0.77 for the varying age ranges. This measure also has internal validity indices in the F score, the Response Pattern Index, and the Consistency Index. *T*-scores are considered at risk if they are 60-69, except for personal adjustment score which 31-40 are at risk & less than or equal to 30 are clinically significant. *T*-scores that are 70 or greater are clinically significant. This study will be using the Anxiety scale. The parent completed this questionnaire. Due to copyright issues, this questionnaire is not attached in the Appendix.

Repetitive Behavior Scale- Revised. Repetitive Behavior Scale-Revised (RBS-R) is a 43-item validated assessment that evaluates the repetitive behaviors in autism. The scales are Ritualistic/Sameness Behavior, Stereotypic Behavior, Self-Injurious Behavior, Compulsive Behavior, and Restricted Interests (Lam, 2004). Subscale interrater reliability ranged from 0.55 (Sameness Behavior) to 0.78 (Self-Injurious Behavior), and test-retest data ranged from 0.52 (Ritualistic Behavior) to 0.96 (Restricted Interests). The alpha coefficients ranged from 0.78 (Restricted Interests) to 0.91 (Ritualistic/Sameness Behavior). Inter-rater reliability medians in two different samples ranged from 0.67 to 0.72. This questionnaire was completed by the parent or primary care giver (see Appendix B).

The PedsQL Core. The PedsQL Core Scales is a 23-item questionnaire that assesses the following scales: Physical Functioning (8 items), Emotional Functioning (5 items), Social Functioning (5 items), and School Functioning (5 items) (Varni, Seid, & Kurtin, 2001). It was developed through focus groups, cognitive interviews, pre-testing, and field testing measurement development protocols (Varni et al., 2001; Varni, Seid, & Rode, 1999). The PedsQL Core consists of both child self-report and parent report

questionnaires. Child self-report includes ages 5-7, 8-12, and 13-18 years. Parent report includes ages 2-4 (toddler), 5-7 (young child), 8-12 (child), and 13-18 (adolescent), and assesses parent's perceptions of their child's health related quality of life (HRQOL). The instructions ask how much of a problem each item has been during the past one month. A 5-point response scale is utilized across child self-report for ages 8-18 years and parent report (0 = never a problem; 1 = almost never a problem; 2 = sometimes a problem; 3 = often a problem; 4 = almost always a problem). Items are reverse-scored and linearly transformed to a 0-100 scale (0=100, 1=75, 2=50, 3=25, 4=0), so that higher scores indicate better HRQOL. This study only utilized the parent report measurements. Due to copyright issues, this questionnaire is not attached in the Appendix.

Global questionnaire. The global questionnaire is a two question measure that assesses expectation and outcome of an intervention. The responses were measured on a 6 point Likert scale anchored with "A lot Worse" or "A lot Better". Parents also wrote in their expectations at the beginning of the therapy and noted if their expectations were met at the end (See Appendix C).

Procedures

Recruitment. Parents of youth participants were selected for the upcoming sessions which lasted 15 to 16 weeks each semester by SIRE. The parents were informed via email by a staff member at SIRE that a study was to be done by a graduate student from the University of Houston on the effects of therapeutic horseback riding in children with ASDs. The parents were told about the study at the time they are notified their child will start the SIRE program for the upcoming semester. They were told that they would be contacted by someone conducting the research to give them more details about the

study. The parents were contacted via the telephone and given the details of the study. The parents from the Westview School and Coach Bo's Special Friends were approached in person and told of the study details. The consent process for the parents took place in person either at the house, the school or gymnasium before the questionnaires were administered.

Pre-test measurements. The parents in the horseback riding group were asked if they prefer to have some research study personnel come to their home to complete the questionnaires or if they prefer to complete the questionnaires during their child's first riding class. All of the parents chose to complete the questionnaires at their home. The parents in the control group were asked if they preferred to complete the questionnaires while at the school or gymnasium waiting to pick up their child or if they preferred to take the questionnaires home to complete. Most parents chose to take the questionnaires home. The parents in both groups completed the measures up to one week before or at the start of the therapeutic riding sessions and up to two weeks after the start of the therapeutic riding sessions.

Intervention. The riding lessons occurred once a week at a specified time for one hour. There was one week taken off for Spring Break. Two parents indicated that their children missed one other day due to inclement weather. During that hour the children learned various riding skills which included but were not limited to: mounting, walking, and two-point. Usually the skills become more advanced as the semester progresses. Each child rider has one leader who leads the horse around the arena during the skills, and two helpers who assist the child in sitting properly, keeping his or her feet in the stirrups, etc. This may change for each child depending on the level of riding skills

advancement. The specific goals and tasks that each child completes throughout the program are tailored to the specific needs of the child. The certified instructors evaluate these needs and develop lesson plans that include but are not limited to: (a) therapeutic riding- range of motion, attention span, spatial organization, sensory awareness, reasoning, sequential performance; (b) horsemanship skills- reining, cantering, stable management, horse handling/ground skills. The goal for all kids is to develop self-esteem and increase functionality. For some individuals, there are also competitions offered (i.e. Special Olympics).

Post-test measurements. One week before or up to two weeks after the child is to complete the TR semester at SIRE, the parents were contacted again to complete the questionnaires as a post measurement (Appendices B-E).

Analysis

SPSS Version 20.0 was used to analyze the variables for this study. A 2x2 mixed design repeated measure analysis of variance (ANOVA) was utilized to examine effects of treatment for the experimental group compared to the control group. Effect sizes were noted using Eta squared (Cohen, 1998).

Chapter III

Results

Social Responsiveness Scale (SRS)

Time was statistically significant for SRS [$F(1, 1) = 13.299, p = 0.001, \eta^2 = 0.32$] demonstrating that the overall means for both the TR group and the control group went down (see Figure 1). Group was also statistically significant for SRS [$F(1, 1) = 7.595, p = 0.01, \eta^2 = 0.21$] showing that the overall mean for the TR group was significantly higher than those for the control group (see Figure 1). The interaction between time and group was not statistically significant (see Table 2).

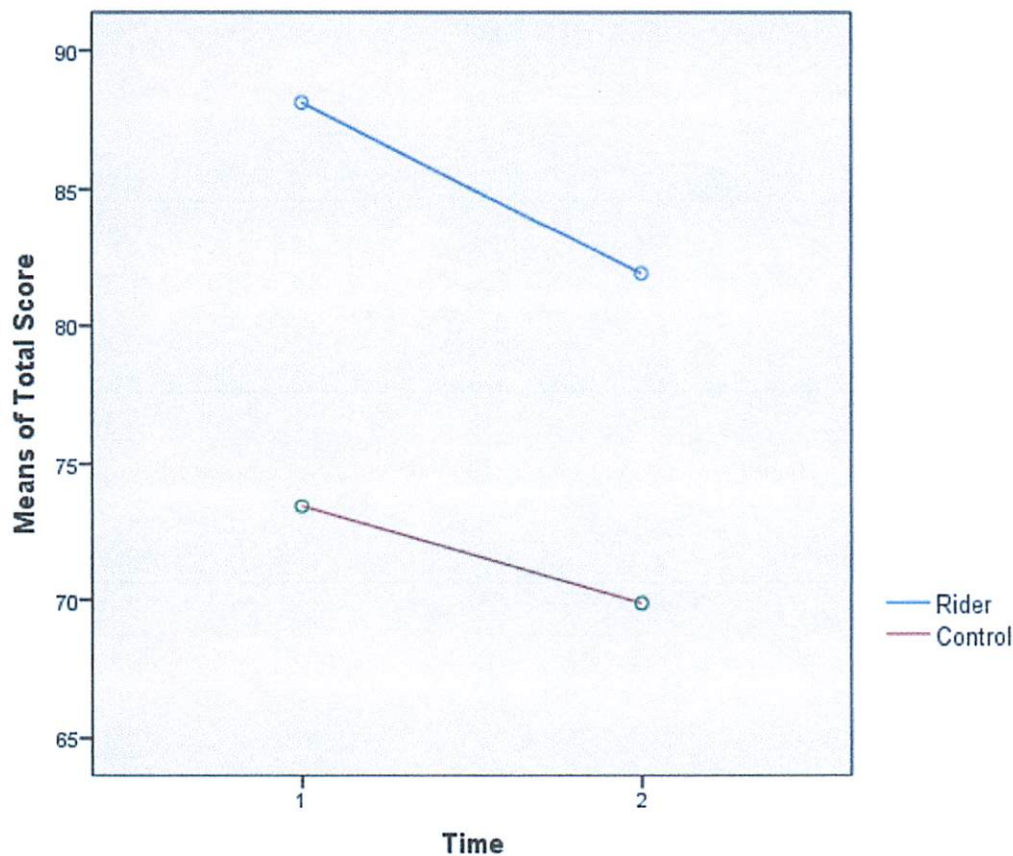


Figure 1. SRS over Time and Between Groups

Anxiety Subscale for the Behavior Assessment System for Children-2 Parent Rating Scale

There were no statistically significant differences for time [$F(1, 1) = 0.115, p = 0.74, \eta^2 = 0.004$] or group [$F(1, 1) = 3.283, p = 0.08, \eta^2 = 0.11$] on anxiety. The time and group interaction also was not statistically significant (see Table 2).

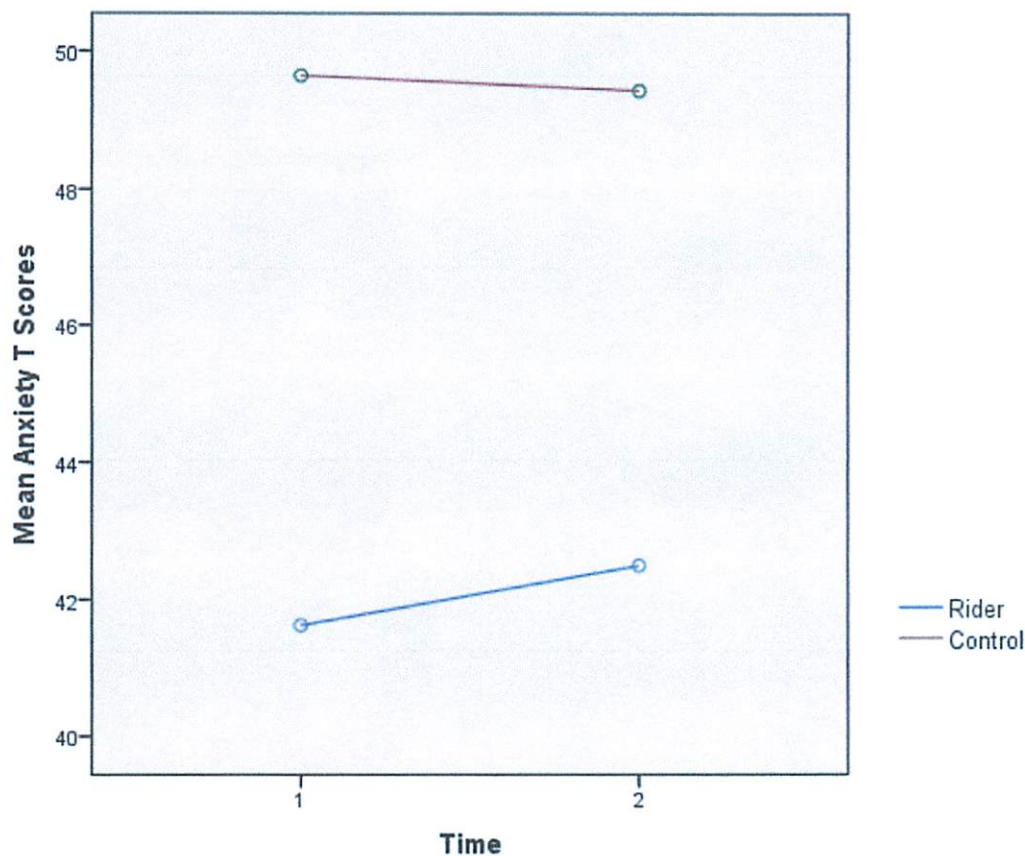


Figure 2. Anxiety over Time and Between Groups

Repetitive Behavior Scale- Revised (RBS-R)

Time was statistically significant for RBS-R [$F(1, 1) = 12.57, p = 0.001, \eta^2 = 0.31$]. The overall means for both groups saw a reduction over time (see Figure 2).

Group was also statistically significant for RBS [$F(1, 1) = 5.604, p = 0.02, \eta^2 = 0.17$].

The TR group had a higher overall mean for repetitive behaviors than those in the control

group (see Figure 2). The Time X Group interaction was not significant (see Table 2).

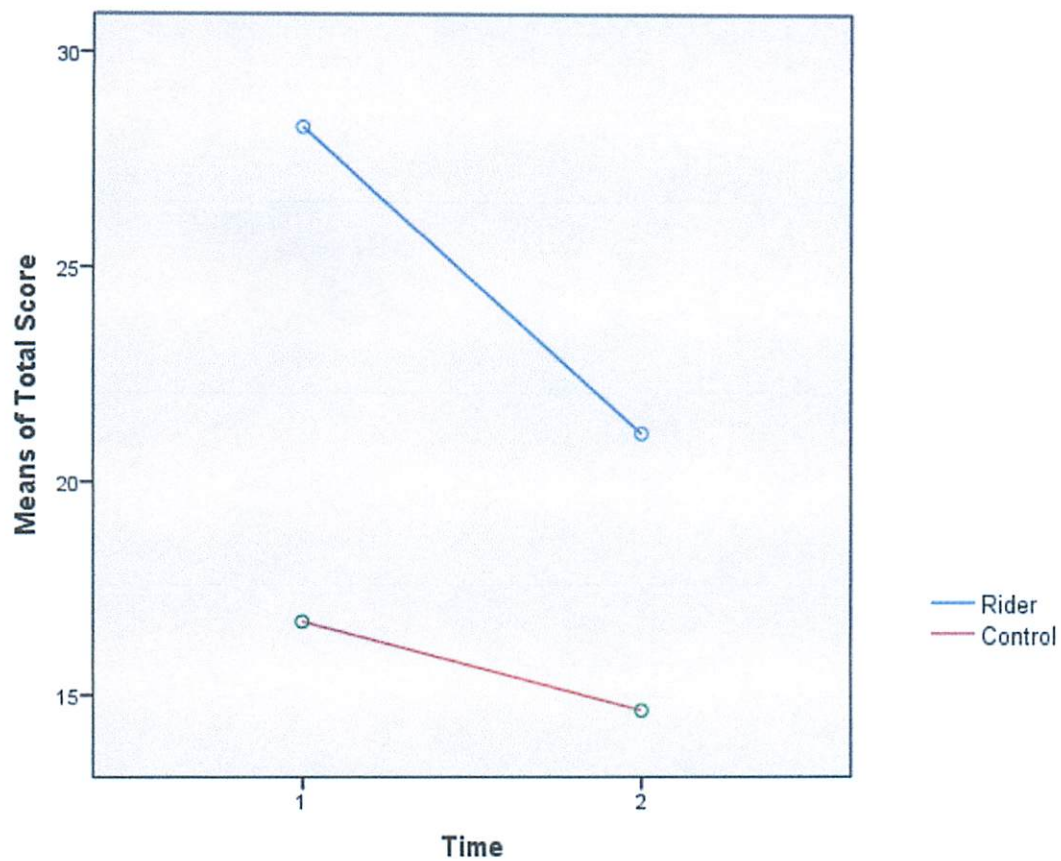


Figure 3. RBS-R over Time and Between Groups

The PedsQL Core

Time was statistically significant for quality of life (QOL) [$F(1, 1) = 75.520, p \leq 0.001, \eta^2 = 0.73$] with both groups showing an improvement in quality of life scores over time (see Figure 3). Group was not statistically significant for QOL [$F(1, 1) = 1.010, p = 0.32, \eta^2 = 0.04$]. The interaction between time and group was not statistically significant (see Table 2).

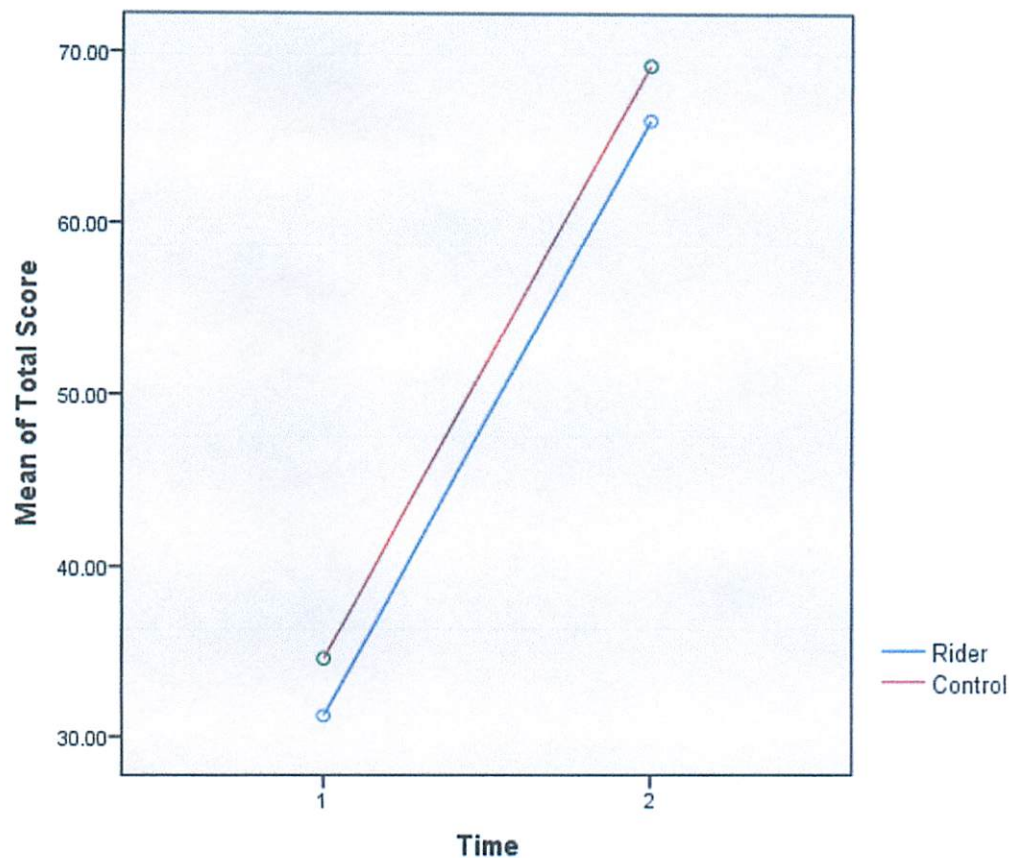


Figure 4. QOL over Time and Between Groups

Global Questionnaire

Parents in the TR group rated their expectation on how they believed their child would do in the upcoming semester of horseback riding. Parents then rated how they believed their child did after the semester was over. The means were 4.75 and 4.44, respectively (see Figure 5). Prior to TR, three parents expected their child would be “The Same”, two parents endorsed the “A Little Better” category, seven parents believed their child would be “Somewhat Better”, and four parents expected their child would be “A Lot Better”. For the outcome, four parents rated their child as “The Same”, five rated their child as doing “A Little Better”, three parents endorsed the “Somewhat Better” category, and four believed their child was doing “A Lot Better”.

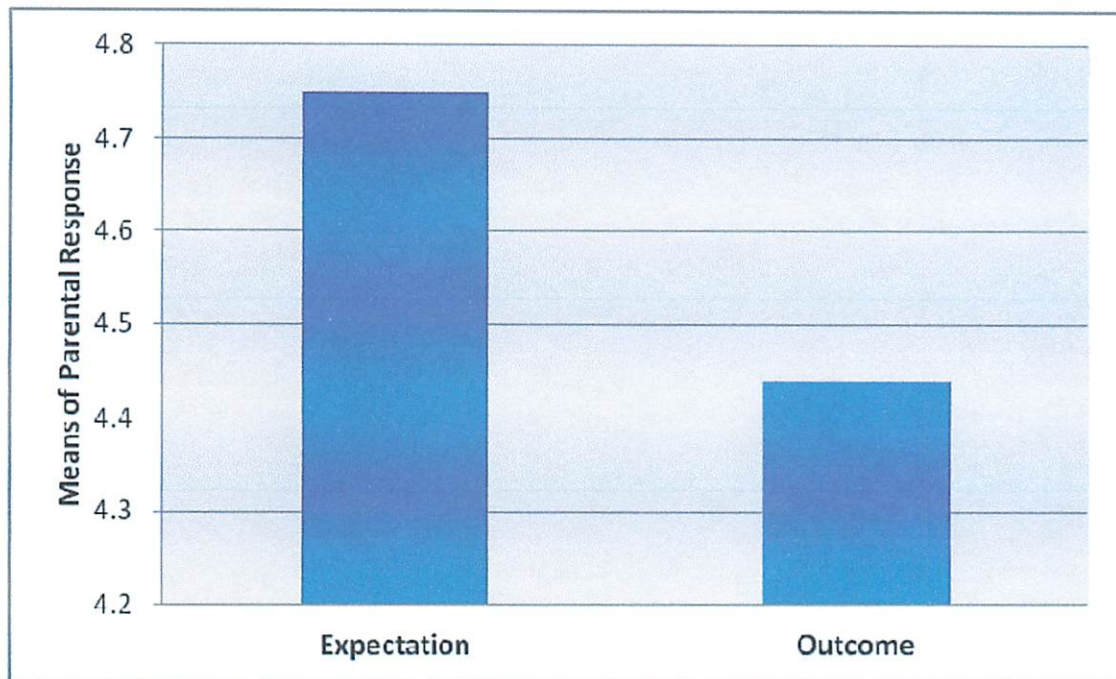


Figure 5. Parental Expectation and Outcome of Their Child for the TR Semester

Table 2

Time and Group Interactions

Variable	TR Group		Control Group	
	(n= 16)		(n= 14)	
	Pre	Post	Pre	Post
	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>
Anxiety	41.63 (3.06)	42.5 (2.72)	49.64 (3.27)	49.43 (2.91)
Repetitive Behaviors	28.25 (2.73)	21.13 (2.77)	16.71 (2.91)	14.64 (2.96)
Social Responsiveness	88.13 (3.15)	81.86 (3.70)	73.43 (3.36)	69.86 (3.96)
Quality of Life	31.25 (3.35)	65.97 (3.69)	34.63 (3.58)	69.18 (3.95)

THERAPEUTIC HORSEBACK RIDING IN ASD

Chapter IV

Discussion

This study sought to determine whether therapeutic horseback riding could improve social responsiveness, reduce repetitive behaviors, reduce stress/anxiety levels, and improve overall QOL in children with ASDs. The results indicate that children who completed the TR were more likely than controls to have greater improvements over time with regard to social responsiveness and communication and repetitive behaviors. Both groups improved equally in quality of life and neither group improved in anxiety scores.

We anticipated that TR would improve the social responsiveness of children with ASDs. The results showed that both the TR group and the control group had improvements over time; however, the TR groups had drastic improvements whereas the control group only had minimal improvements in the overall scores. The effect size was 0.32 for time and 0.21 for group for the SRS. Eta squared can be interpreted 0.1 to 0.3 is a small effect, 0.3 to 0.5 is a moderate effect, and anything greater than 0.5 is a large effect (Cohen, 1988). These results are in contrast to the previous TR study (Bass, Duchowny, & Llabre 2009) in that they found the overall score was more likely to go down in the TR group but the control group stayed the same. This is possibly due to the fact that in this study there were noted group differences. The parents in the TR group rated their children as more severe in relation to social responsiveness. This could be explained by the control group not being comprised of wait-list controls as previously planned. Perhaps the parents of the control group see their children as better adjusted and less severe than the TR group.

Because this current study also found an improvement in social communication and responsiveness, perhaps animals, namely horses, do help children with ASDs learn to better communicate and respond to social cues with humans. Perhaps the child with an ASD relates to the horse better and can learn certain behaviors that help he or she translate into human communication. Other studies have shown that children, in general, respond better to live animals than stuffed animals (Kidd & Kidd, 1985; Martin & Farnum, 2002). Further research needs to be done to replicate the results from this study and the previous TR study or determine further how horseback riding may improve the lives of children with ASDs.

We expected that TR would reduce repetitive behaviors in the children with ASDs. Both groups did improve over time; however, the TR group improved more dramatically than the control group. Therapeutic riding did appear to help children reduce their repetitive behaviors over time when compared to the control group. Perhaps this is because the horse can bring a sense of peace to the child which in turn can reduce repetitive behaviors. Repetitive behaviors are known to increase when a child is more anxious. It is also possible that while the child is engaged in riding activities, he or she may feel that they are in more control of their environment, thus helping to reduce repetitive behaviors. More research needs to be done in order to replicate this study's findings of a decrease in repetitive behaviors.

We projected that TR would improve stress/anxiety levels in children with ASDs. These results showed no changes in anxiety levels in either group over time. The parents generally rated their children as non-anxious. Another study evaluating children with

high anxiety levels at baseline could potentially better assess the effects of TR on children with ASDs and anxiety.

We anticipated that TR would improve overall QOL in children with ASDs. The TR group did not have a greater improvement over time in QOL when compared to the control group. In spite of this, both groups had improvements in QOL from baseline to post-study. The results showed that there were no group differences both at baseline and post-study. Because we did not exclude children who were undergoing concurrent therapies, it is possible that the QOL scores improved over time due to these therapies being done in conjunction with this study. Perhaps parents in both groups rated their children as having a higher quality of life at post-treatment because of temporal reasons. The post-treatment measurements were collected in May which is when the school year ends. It is possible that both groups of children were more relaxed because they had less stress regarding school and structure, and therefore, the parents rated them as having a better quality of life. However, when the subscales were evaluated separately (physical functioning, emotional functioning, social functioning, and school functioning), all of the scores improved over time.

Overall the parents expected their child would do a little better before starting the TR. At outcome, the parents rated their child as doing a little better overall. The mean scores did not change from expectation to baseline. The parents seemed to perceive outcomes similar to their expectations. Qualitatively, most parents rated their child as having improved and meeting or exceeding their goals during this semester of TR. Some parents believed that their child's motor skills had improved while some rated their child as having gained more confidence and independence in their riding skills. Many parents

believed that their child was happier in general because of the TR. A few parents believed that this semester of TR had no impact on their child's skills or abilities. In general, parents believe that TR has more positive outcomes for their child than not, which is why many of them re-enroll for multiple semesters.

There were some limitations to this study. First, the sample size was smaller than expected. Second, there was subject attrition. Two children from the TR group had to be dropped from analyses because they did not complete the full 16 weeks of horseback riding. Two parents from the control group changed their mind about participating after signing consent. Third, the control group was comprised of children whose parents viewed them as being less severe than the TR group. It is possible that the effects that were found for the SRS and RBS-R could be attributed to a regression to the mean. More studies would need to be carried out in order to determine if there is a true treatment effect. And lastly, this current study was not able to exclude children who had previous TR due to time constraints. Future research should exclude children with previous TR so as not to convolute any treatment effects.

Bass and colleagues (2009) looked not only at the total score from the SRS but also at the subscales. This is in contrast to what this study evaluated. Furthermore, the current study looked at three more measures in addition to the SRS. The previous study's sample also was more homogenous in that both groups were seeking therapeutic horseback riding. The sample from the previous study did have a larger sample size as well. Bass and colleagues (2009) found a decrease in the total score for the SRS, consistent with the current study; however, our samples' mean total scores were still in the severe range while the scores from the Bass study fell from the severe to the moderate range. The

previous study decreased scores in a shorter time frame than this study did as well (12 weeks vs. 16 weeks, respectively). One of the main differences in our sample from the previous study's sample was that our horseback riders were not novel to the therapy. Most of the riders had taken TR for some amount of time. The previous study enrolled children who had never received TR in the past. More research is needed with larger sample sizes to further evaluate TR for children with ASD.

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THERAPEUTIC HORSEBACK RIDING IN ASD

Appendix A

Demographic Questionnaire

Therapeutic Horseback Riding in Children with Autism Spectrum Disorders (ASDs)

Subject No. _____

Date: _____

1. What is your relationship to child?

- a. Mother
- b. Step-Mother
- c. Father
- d. Step-Father
- e. Grandmother
- f. Grandfather
- g. Other (please specify) _____

2. How many people are in your household? _____

3. What is the make-up of your household?

(please insert number of each)

- a. ____ Mother
- b. ____ Step-Mother
- c. ____ Father
- d. ____ Step-Father
- e. ____ Children
- f. ____ Grandparent
- g. ____ Partner/Significant Other

If child has siblings, what is his or her birth order? _____

4. What is your child's date of birth? _____

5. What is your child's gender: M F

6. What is your child's ethnicity?

____ Non-Hispanic or Latino

____ Hispanic or Latino

What is your child's race?

____ American Indian/Alaska Native

____ Asian

____ Black/African American

____ Native Hawaiian or Other Pacific Islander

____ White/Caucasian American

____ More Than One Race (specify): _____

____ Some Other Race (specify): _____

7. Was your child born at full term (37-40 weeks)? YES NO

How many weeks was your baby? _____ weeks

8. How much did your child weigh at birth? _____ pounds _____ ounces

9. What kind of ASD does your child have?

- ☐ Autism
☐ Asperger's
☐ Pervasive Developmental Disorder - Not Otherwise Specified (PDD-NOS)
☐ Don't know

10. Could you specify the severity of the ASD of your child?

- ☐ Mild
☐ Moderate
☐ Severe/profound
☐ Don't know

11. Does your child have any intellectual disabilities, and if so, what is the severity?

- ☐ No mental retardation
☐ Mild mental retardation
☐ Moderate mental retardation
☐ Severe/profound mental retardation
☐ Don't know

12. What kind of school setting does your child attend?

(If no longer in school, please indicate what placement they were last in):

- ☐ Regular class in a regular school (may include some special provisions in class)
☐ Special class in a regular school (may include those in mainstreaming activities)
☐ Special school
☐ Other: _____

13. Does your child have any problems with the following? If so, indicate how much of a problem they are:

- Too much anxiety, fears, or nervousness:

_____ None _____ Mild _____ Moderate _____ Severe

- Aggression towards others or property:

_____ None _____ Mild _____ Moderate _____ Severe

- Depression, tearfulness, sadness:

_____ None _____ Mild _____ Moderate _____ Severe

- Irritability, easily upset, mood swings:

_____ None _____ Mild _____ Moderate _____ Severe

- ADHD-like symptoms (hyperactivity, distractibility, impulsivity):

_____ None _____ Mild _____ Moderate _____ Severe

- Other: _____
 _____None _____Mild _____Moderate _____Severe

14. Does your child CURRENTLY take any medications? If so, please list them below:

15. Does your child CURRENTLY participate in other therapies? If so, please list them below:

16. Mother (or Step-Mother) Employment Status:

- a. Is Mother employed? (please circle) YES NO
- b. Is Mother employed outside the home? (please circle) YES NO
- c. Is Mother employed part time or full time? PART TIME FULL TIME
- d. What is Mother's type of employment?
 (please specify) _____

17. What is Mother's Educational History?

(please circle)

- a. Some High school
- b. High school graduate
- c. Some College
- d. Specialty/technical training (please specify) _____
- e. College graduate
- f. Some Advanced College/Graduate work
- g. Advanced College degree (please specify) _____
- h. Other (please specify) _____

18. Father (or Step-Father) Employment Status:

- a. Is Father employed? (please circle) YES NO
- b. Is Father employed outside the home? (please circle) YES NO
- c. Is Father employed part time or full time? PART TIME FULL TIME
- d. What is Father's type of employment?
 (please specify) _____

19. What is Father's Educational History?

(please circle)

- a. Some High school
- b. High school graduate
- c. Some College
- d. Specialty/technical training (please specify) _____
- e. College graduate
- f. Some Advanced College/Graduate work
- g. Advanced College degree (please specify) _____
- h. Other (please specify) _____

20. Family's Annual Combined Gross Income

- a. < \$25,000
- b. \$25,000- \$50,000
- c. \$50,001-\$75,000
- d. \$75,001-\$100,00
- e. >\$100,000
- f. Prefer not to answer

THERAPEUTIC HORSEBACK RIDING IN ASD

Appendix B

Repetitive Behavior Scale – Revised (RBS-R)

Instructions:

Please rate this person's behavior by reading each of the items listed and then choosing the score that best describes how much of a problem the item is for the person. Be sure to read and score all items listed. Make your ratings based on your observations and interactions with the person over the last month. Use the definitions in the box given below to score each item.

0 = behavior does not occur

1 = behavior occurs and is a mild problem

2 = behavior occurs and is a moderate problem

3 = behavior occurs and is a severe problem

At the end of each section, there will be three questions asking you to rate that section's behaviors in terms of (a) how frequently they occur, (b) how upset the person becomes when repetitive behaviors are interrupted, and (c) how much the behaviors interfere with ongoing events. You will indicate the score by marking along each line, which represents a range of frequencies and severities. For example, if this person does those behaviors many times a day you may put the mark quite close to the right side:

Never _____|_____Constantly

I. Stereotyped Behavior Subscale

(DEFINITION: apparently purposeless movements or actions that are repeated in a similar manner)

1	WHOLE BODY (Body rocking, body swaying)	0 1 2 3
2	HEAD (Rolls head, nods head, turns head)	0 1 2 3
3	HAND/FINGER (Flaps hands, wiggles or flicks fingers, claps hands, waves or shakes hand or arm)	0 1 2 3
4	LOCOMOTION (Turns in circles, whirls, jumps, bounces)	0 1 2 3
5	OBJECT USAGE (Spins or twirls objects, twiddles or slaps or throws objects, lets objects fall out of hands)	0 1 2 3
6	SENSORY (Covers eyes, looks closely or gazes at hands or objects, covers ears, smells or sniffs items, rubs surfaces)	0 1 2 3

Please answer the following questions about the behaviors described above (put a vertical mark (|) on the line to show your answer):

How often do they happen?

(If Never, skip to Section II)

Never _____ Constantly

How upset does this person get when interrupted?

Not at all _____ Extremely

How much do these behaviors get in the way of ongoing events?

Not at all _____ Severe Interference

0 = behavior does not occur
 1 = behavior occurs and is a mild problem
 2 = behavior occurs and is a moderate problem
 3 = behavior occurs and is a severe problem

II. Self-Injurious Behavior Subscale

(DEFINITION: movement or actions that have the potential to cause redness, bruising, or other injury to the body, and that are repeated in a similar manner)

7	HITS SELF WITH BODY PART (Hits or slaps head, face, or other body area)	0 1 2 3
8	HITS SELF AGAINST SURFACE OR OBJECT (Hits or bangs head or other body part on table, floor or other surface)	0 1 2 3
9	HITS SELF WITH OBJECT (Hits or bangs head or other body area with objects)	0 1 2 3
10	BITES SELF (Bites hand, wrist, arm, lips or tongue)	0 1 2 3
11	PULLS (Pulls hair or skin)	0 1 2 3
12	RUBS OR SCRATCHES SELF (Rubs or scratches marks on arms, leg, face or torso)	0 1 2 3
13	INSERTS FINGER OR OBJECT (Eye-poking, ear-poking)	0 1 2 3
14	SKIN PICKING (Picks at skin on face, hands, arms, legs or torso)	0 1 2 3

Please answer the following questions about the behaviors described above (put a vertical mark (|) on the line to show your answer):

How often do they happen?
 (If *Never*, skip to Section III)

Never _____ Constantly

How upset does this person get when interrupted?

Not at all _____ Extremely

How much do these behaviors get in the way of ongoing events?

Not at all _____ Severe Interference

0 = behavior does not occur
 1 = behavior occurs and is a mild problem
 2 = behavior occurs and is a moderate problem
 3 = behavior occurs and is a severe problem

III. Compulsive Behavior Subscale

(DEFINITION: behavior that is repeated and is performed according to a rule, or involves things being done "just so")

- | | | |
|----|-----------------------------------------------------------------------------------------------------------------------------|---------|
| 15 | ARRANGING / ORDERING (Arranges certain objects in a particular pattern or place; Need for things to be even or symmetrical) | 0 1 2 3 |
| 16 | COMPLETENESS (Must have doors opened or closed; Takes all items out of a container or area) | 0 1 2 3 |
| 17 | WASHING / CLEANING (Excessively cleans certain body parts; Picks at lint or loose threads) | 0 1 2 3 |
| 18 | CHECKING (Repeatedly checks doors, windows, drawers, appliances, clocks, locks, etc.) | 0 1 2 3 |
| 19 | COUNTING (Counts items or objects; Counts to a certain number or in a certain way) | 0 1 2 3 |
| 20 | HOARDING/SAVING (Collects, hoards or hides specific items) | 0 1 2 3 |
| 21 | REPEATING (Need to repeat routine events; In / out door, up / down from chair, clothing on/off) | 0 1 2 3 |
| 22 | TOUCH / TAP (Need to touch, tap, or rub items, surfaces, or people) | 0 1 2 3 |

Please answer the following questions about the behaviors described above (put a vertical mark (|) on the line to show your answer):

How often do they happen?
 (If *Never*, skip to Section IV)

Never _____ Constantly

How upset does this person get when interrupted?

Not at all _____ Extremely

How much do these behaviors get in the way of ongoing events?

Not at all _____ Severe Interference

0 = behavior does not occur
 1 = behavior occurs and is a mild problem
 2 = behavior occurs and is a moderate problem
 3 = behavior occurs and is a severe problem

IV. Ritualistic Behavior Subscale

(DEFINITION: performing activities of daily living in a similar manner)

- | | | |
|----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|
| 23 | EATING / MEALTIME (Strongly prefers/insists on eating/drinking only certain things; Eats or drinks items in a set order; Insists that meal related items are arranged in a certain way) | 0 1 2 3 |
| 24 | SLEEPING / BEDTIME (Insists on certain pre-bedtime routines; arranges items in room "just so" prior to bedtime; Insists that certain items be present with him/her during sleep; Insists that another person be present prior to or during sleep) | 0 1 2 3 |
| 25 | SELF-CARE – BATHROOM AND DRESSING (Insists on specific order of activities or tasks related to using the bathroom, to washing, showering, bathing or dressing; Arranges items in a certain way in the bathroom or insists that bathroom items not be moved; Insists on wearing certain clothing items) | 0 1 2 3 |
| 26 | TRAVEL / TRANSPORTATION (Insists on taking certain routes/paths; Must sit in specific location in vehicles; Insists that certain items be present during travel, e.g., toy or material; Insists on seeing or touching certain things or places during travel such as a sign or store) | 0 1 2 3 |
| 27 | PLAY / LEISURE (Insists on certain play activities; Follows a rigid routine during play / leisure; Insists that certain items be present/available during play/leisure; Insists that other persons do certain things during play) | 0 1 2 3 |
| 28 | COMMUNICATION / SOCIAL INTERACTIONS (Repeats same topic(s) during social interactions; Repetitive questioning; Insists on certain topics of conversation; Insists that others say certain things or respond in certain ways during interactions) | 0 1 2 3 |

Please answer the following questions about the behaviors described above (put a vertical mark (|) on the line to show your answer):

How often do they happen?
 (If Never, skip to Section V)
 Never _____

Constantly

How upset does this person get when interrupted?
 Not at all _____

Extremely

How much do these behaviors get in the way of ongoing events?
 Not at all _____

Severe Interference

0 = behavior does not occur
 1 = behavior occurs and is a mild problem
 2 = behavior occurs and is a moderate problem
 3 = behavior occurs and is a severe problem

V. Sameness Behavior Subscale

(DEFINITION: (resistance to change, insisting that things stay the same)

29	Insists that things remain in the same place(s) (e.g. toys, supplies, furniture, pictures, etc.)	0 1 2 3
30	Objects to visiting new places	0 1 2 3
31	Becomes upset if interrupted in what he/she is doing	0 1 2 3
32	Insists on walking in a particular pattern (e.g., straight line)	0 1 2 3
33	Insists on sitting at the same place	0 1 2 3
34	Dislikes changes in appearance or behavior of the people around him/her	0 1 2 3
35	Insists on using a particular door	0 1 2 3
36	Likes the same CD, tape, record or piece of music played continually; likes same movie / video or part of movie / video	0 1 2 3
37	Resists changing activities; Difficulty with transitions	0 1 2 3
38	Insists on same routine, household, school or work schedule everyday	0 1 2 3
39	Insists that specific things take place at specific times	0 1 2 3

Please answer the following questions about the behaviors described above (put a vertical mark (|) on the line to show your answer):

How often do they happen?

(If Never, skip to Section II)

Never _____ Constantly

How upset does this person get when interrupted?

Not at all _____ Extremely

How much do these behaviors get in the way of ongoing events?

Not at all _____ Severe Interference

0 = behavior does not occur
 1 = behavior occurs and is a mild problem
 2 = behavior occurs and is a moderate problem
 3 = behavior occurs and is a severe problem

VI. Restricted Behavior Subscale

(DEFINITION: Limited range of focus, interest or activity)

40	Fascination, preoccupation with one subject or activity (e.g., trains, computers, weather, dinosaurs)	0 1 2 3
41	Strongly attached to one specific object	0 1 2 3
42	Preoccupation with part(s) of object rather than the whole object (e.g., buttons on clothes, wheels on toy cars)	0 1 2 3
43	Fascination, preoccupation with movement / things that move (e.g., fans, clocks)	0 1 2 3

Please answer the following questions about the behaviors described above (put a vertical mark (|) on the line to show your answer):

How often do they happen?

(If *Never*, skip to Section to end)

Never _____ Constantly

How upset does this person get when interrupted?

Not at all _____ Extremely

How much do these behaviors get in the way of ongoing events?

Not at all _____ Severe Interference

FINAL QUESTION: Overall, if you lump together all of the behaviors described in this questionnaire, how much of a problem are these repetitive behaviors (both for the person with autism, as well as how they affect the people around them)?

Please rate on a scale from 1 to 100, where 1 = not a problem at all, and 100 = as bad as you can imagine:

Score from 1-100: _____

Appendix C

Global Questionnaire

(Pre Treatment)

Expectancy:

By participating in this study, do you think your child overall will be:

0= a lot worse

1= somewhat worse

2= a little bit worse

3= the same

4= a little better

5= somewhat better

6= a lot better

What are some of your expectations that you hope will come of your child's participation in this program?

(Post Treatment)

Outcome:

After participating in this study, do you think your child overall is:

0= a lot worse

1= somewhat worse

2= a little bit worse

3= the same

4= a little better

5= somewhat better

6= a lot better

Did your child reach the goals you set out to reach in the beginning of the therapeutic horseback riding?
