

# The Effects of Equine-Assisted Therapy on the Social Functioning of Autistic Adults

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## ***Abstract***

**Background:** Autism Spectrum Disorders (ASD's) are among the most prevalent neurodevelopmental disorders diagnosed in the United States each year. Equine-assisted therapy is a treatment strategy where an occupational therapist uses a horse as a modality during which the patient responds to the therapeutic effects of the horse. This study aimed to see if an intervention of equine-assisted therapy would improve the social functioning of autistic adults.

**Methods:** Ten participants with ASD's engaged in a thirty-minute intervention every Sunday for a period of eight weeks. This intervention included riding and engaging in animal husbandry. The Social Responsiveness Scale (SRS) was administered pre and post intervention to the guardians of the participants.

**Results:** Participants were observed to have better focus and moods when engaged in riding than when off the horse. A paired two-sample t-test was used to analyze the data from the SRS. All participants scored in the severe range during pre and post, indicating severe social impairment; however, there was a significant improvement from pre to post intervention. (p-value was .00001)

**Conclusions:** This study shows that equine-assisted therapy has a positive effect on the social functioning of autistic individuals. More comparative research must be conducted with a larger pool of participants to confirm the validity of this research.

## ***Review of Literature***

Autism Spectrum Disorders (ASDs), sometimes known as Pervasive Developmental Disorders (PDD) are among the most prevalent neurodevelopmental disorders diagnosed in the United States each year (Hoffmann et al 2009). There has been a significant increase from the average diagnosis of 1 in every 5000 children in the United States in 1975 to 1 in every 110 children in the United States as of 2009 (Rice, 2008). Several therapies have been implemented in order to improve the state of autistic individuals, none however showing dramatic improvements, particularly in social and cognitive functioning (Fine 2010). Animal-assisted therapy (AAT) can be defined as the interaction between patients and an animal with the aim of improving mental wellbeing and diminishing anxiety and agitation in patients. (Hoffmann et al 2009). The animal interventions don't replace the traditional occupational, speech, physical etc. therapy altogether, rather they act as a catalyst in addition to the normal therapy in stimulating recovery or better well-being. These interventions are thus complimentary practices that are still trying to prove their efficacy and validity, due to fears by therapy settings such as hospitals and schools of the spread of germs from animal to human or the fear of allergies (Kruger et al 2006).

Nonetheless, AAT brings a variety of psychological, physical, and emotional benefits to people with a variety of disorders in a variety of settings such as schools, hospitals, and counseling offices. A range of different animals can be used within the process, including horses, dogs, rabbits, dolphins, cats, llamas, lizards, and even fish. It has been shown that a great array of benefits comes from the use of horses as guides in therapy, and this process is called hippotherapy. Hippotherapy can be defined as the

treatment strategy in which an occupational therapist uses a horse as a modality in which the patient responds to the therapeutic effects of the horse. (Murphy et al 2008).

Autism spectrum disorders are a group of neurodevelopmental disorders characterized by core deficits in three domains: social interaction, communication, and repetitive or stereotypic behavior. (Newschaffer et al 2006). It has been shown that ASD's are four times more prevalent in males than females, with many neurodevelopment symptoms such as speech delays. (Newschaffer et al 2007).

Individuals who have ASD's, regardless of the severity, often have trouble making friends, expressing their thoughts clearly, or behaving properly in public. They tend to find comfort in repetitive behaviors such as snapping their fingers or clapping their hands, and feel threatened when told to stop. Research has shown an increasing prevalence of autism spectrum disorders during the last decade (Matson et al 2010). Due to this rapid increase, various therapies have been tried to help those diagnosed with ASD's have a better quality of life, and one of these therapies is animal-assisted therapy. It has been shown that with the use of AAT, individuals with ASD's show an increased use of language and social interaction (Sams et al 2006). It has also been shown that the incorporation of animals into traditional therapy yields fewer autistic and more socially appropriate behaviors in these individuals. (Sams et al 2006).

Hippotherapy has also been shown to bring a wide range of benefits to individuals with physical disorders, such as cerebral palsy. The physical effects of hippotherapy include improvements in balance, strength, coordination, spasticity, joint range of motion, weight bearing, posture, gait, and sensory proceeding (Murphy et al 2008). Murphy's study found that most children had significant improvement in

functional outcomes in addition to improved mood during the intervention. The positive effects on a rider's functional outcomes come about because a horse's movements affect the riders, and this opens possibilities to influence the rider's pelvic and torso motor activity via voluntary and involuntary movements. (Hakanson et al 2007).

McGibbon et al in 2009 compared the effects of 10 minutes of hippotherapy with 10 minutes of barrel sitting with children with cerebral palsy on adductor activity, motor function, and self-concept. Results showed that hippotherapy significantly improved adductor muscle asymmetry. In addition, patients enjoyed the hippotherapy intervention more and improvements in moods and playfulness were observed.

A review of hippotherapy by Cumella et al assessed the variety of emotional benefits of hippotherapy to a variety of different emotional disorders, including eating disorders, anxiety disorders, and depression (Cumella et al,1997). Some of these benefits include enhanced patient confidence, increased feelings of self-efficacy, increased trust, reduced anxiety, and feelings of joy and spiritual connection. In addition, hippotherapy brings about a greater awareness of one's emotions, which leads to improved communication about emotions. For individuals with diseases such as anorexia, where they keep their emotions to themselves, this brings a great deal of benefits and helps them to seek help. A study performed by Schultz et al in used the Children's Global Assessment of Functioning (GAF) to determine psychological, social, and school function for children with a variety of psychiatric disorders before and after involvement in hippotherapy. Results of this study showed that all children had improvements in GAF scores with additional improvements in behavior and communication (Schultz et al, 2006). Another study performed by Haylock et al

assessed the effect of equine therapy on patients recovering or living with cancer. Results found that the participants were overjoyed to ride, and that being able to ride and interact with the horses served as an escape from their disease. ( Haylock et al, 2006)

A hippotherapy session can provide a multi-sensory experience for individuals with autism because these activities involve the senses of vision, hearing, smell, and tactile (Sams et al 2006). A study by Bass et al evaluated the effects of hippotherapy on children ages 5-9 with ASD. Participants engaged in horse-related activities lasting about an hour and fifteen minutes, and were assessed using a Sensory Profile (SP) and a Social Responsiveness Scale, which measure social functioning. Results of this study showed improvements in cognition, communication, motivation, and mannerisms. (Bass et al, 2010) It has been shown that the communication with the animal acts a model to the individual with ASD of another human; they learn that they should carry the kindness and love they show toward the animal to other humans and behave just as appropriately. (Fine 2010). Trust in the animal helps the individual trust the therapist, therefore they can receive their traditional therapy and enjoy what they are doing at the same time.

### ***Objectives of Research***

Prior research concerning equine-assisted therapy has mainly dealt with the physical benefits of horseback riding on children with disorders such as cerebral palsy, and few studies have measured the emotional effects of equine assisted therapy on individuals with autism. Additionally, few studies have measured physical or emotional benefits of equine-assisted therapy on adults, as most have concerned children and

adolescents. In this study, the objective was to discover whether or not an intervention of equine-assisted therapy had an impact on the social functioning of adults with ASD's, both quantitatively and through observation. It was hypothesized that equine-assisted therapy would have a positive effect on the social functioning of autistic adults with the use of the Social Responsiveness Scale (SRS). It was also hypothesized that, through careful observation, there would be a noticeable, positive change within the participants when observing their behaviors off the horse upon arrival at the farm and when observing their behaviors while riding and engaging in various forms of animal husbandry.

### ***Methods***

This study took place at Hidden Hollow Farm in Milan, New York with help from the owner of this establishment, Stephanie Fitzpatrick, for a course of eight weeks in July and August 2012. A total of 11 adult participants with ASD's (8 male, 3 female, age: ) participated. Prospective participants were eliminated prior to the study if they had a fear of horses, an allergy to anything within farm-related settings, or simply an unwillingness to comply. Consent was obtained by the directors of the autism homes that the participants were recruited from as well as from the Institutional Review Board (IRB) at Briarcliff High School.



The intervention took place every Sunday morning, with about 3-4 participants allowed within the riding ring at a time. Prior to the first session, the counselors and guardians of the participants were given a copy of the Social Responsiveness Scale to fill out based on the normal behaviors of the participants. The participants then engaged in a thirty minute riding session within the riding ring, whether this included riding the horse or guiding the horse around the perimeter of the ring, before going back up to the barn to engage in various forms of animal husbandry. This included petting the horse, grooming the horse, or even feeding the horse a peppermint, any type of engagement with the horse that didn't involve riding.

Throughout the duration of this study, careful qualitative observations were kept in order to see if there was a visible change from the time the participants arrived at the farm to the time they stopped engaging with the horses. Careful notes were taken whenever a participant displayed any types of more socially acceptable behaviors instead of characteristically autistic behaviors, such as whenever a participant would clearly announce the commands on the horse or whenever they would cease to rock back and forth in order to maintain a firm posture while riding.

At the end of the study, the Social Responsiveness Scale was re-administered to the guardians who accompanied the participants to the farm. The scale was filled out this time based on the visual observations of the previous eight weeks, seeing if the guardians saw improvements in the participants from when they arrived at the farm to when they started engaging with the horses. The surveys from pre and post intervention were statistically analyzed using a T-test to see if there was a significant improvement in the scaled scores of the survey between pre and post intervention.

## ***Qualitative Results***

After observing the interventions during this study, there were some obvious improvements shown from the time the participants arrived at the farm to the time they started engaging with the horses in their behaviors, speech, and demeanors. Most individuals affected with ASD's have various ticks or repetitive behaviors that are noticeable and often disruptive. These behaviors can include rocking back and forth, grunting, or even snapping their fingers or clapping their hands. When off the horse, the participants were noticed to engage in all of these behaviors, but when on the horse, their behaviors completely shifted. Instead of rocking back and forth or slapping their thighs, they would sit firmly upright on the horse and keep their hands firmly on the reigns for the entire intervention, never letting go or reverting back to their characteristically autistic behaviors. Additionally, because of their impaired ability to communicate, many would not be able to listen to basic instruction when off the horse because of distractions from themselves and the environment around them. If given commands when not mounted on the horse, such as stand up or sit down, it would take a noticeable amount of time and a couple of instances of restating the task before it was actually performed. When the participants were riding, when given a command to give to the horse, the participants responded right away and gave the horses the commands to go or to stop.

In terms of speech, most of the participants had noticeably impaired speech while off the horse. Some spoke hardly at all, and others had noticeable speech impediments or would simply grunt to indicate an answer to a question. However, when riding a horse, it is imperative to give various commands to control the horse such

as “walk on” to have the horse start moving or “whoa” in order to make the horse stop. Although the horses were being led by those facilitating the equine-assisted therapy, these commands were still given in order to help improve the speech of the participants.

These participants, with the minimal communication they possessed while not riding, were able to clearly verbalize the commands they needed to give while riding, instead of grunting them under their breaths or simply not saying them at all. Their speech was clear and understandable enough that the horse would listen to them, and they would therefore be in control of their own riding experiences as a result.



One of the most noticeable changes, however, when watching the participants as they arrive at the setting and when they are actually on the horse, however, is in their demeanors. Most people characterized with ASD's are not always outwardly content, and do not smile often when they are not engaged. Upon arrival at the farm, it was rare to see any of the participants smiling, and they were quite frequently found to be confused or even looking upset. However, upon the start of engaging with the horse, whether it was riding or engaging in animal husbandry up in the barn, there was almost always a smile on the participants' face. They were noticeably enjoying themselves, and only seemed to laugh or joke around when engaged with the horses, and for a short while after finishing the intervention.

## Results

All ten participants scored higher than a T-score of 76 during both pre and post and intervention. This result indicates that their social functioning is in the severe range, and is strongly associated with a clinical diagnosis of Autism Spectrum Disorders, proving that those who engaged in this study were severely

affected by their illness and while the intervention was beneficial, it was not curative.

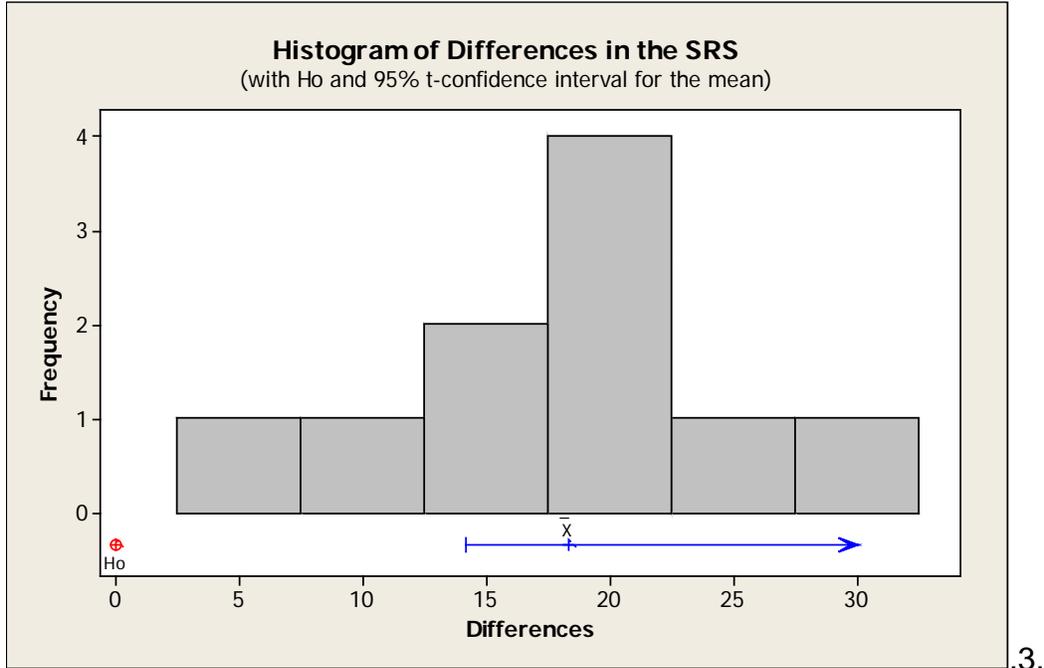
A paired two-sample t-test was conducted to analyze the scores of the pre and post intervention scores.

Although all participants scored in the severe range, lower scores in the post intervention still indicate better social functioning. The average score for the pre-intervention was 151, while the average score of the post intervention was 132.7, showing an obvious difference between pre and post. The mean difference

**Figure 1: SRS Scores**

	Pre-Intervention Score	Post-Intervention Score
	134	130
	154	135
	154	135
	154	135
	154	134
	160	135
	157	135
	145	134
	144	127
	144	127
N=	10	10
AVERAGE=	151	132.7
STDEV=	9.0431066	3.368151488

between pre and post intervention was 18.3.



**Figure 2:** Assuming 95% confidence in the Social Responsiveness Scale data, the lower boundary is 14.163 with the mean difference is 18.3, indicating significance.

According to the paired two-sample t-test, the test statistic was 8.11 and the p-value was equal to .00001 ( $p = 0.0$ ). Therefore, the results were very significant. This proves that the participants displayed a significant improvement in their social functionings through a decrease on their scores on the Social Responsiveness Scale, confirming the original hypothesis.

## Discussion

As shown in Figure 2 and according to the p-value of .00001, it is valid that an intervention of equine-assisted therapy for a population of autistic adults can have a positive effect on the social functioning of the participants. By being encouraged to communicate both with the facilitators of the therapy and with the horse itself, the

participants learn how to better engage their social skills by speaking more clearly, becoming less socially awkward, and ceasing any ticks that they have, such as slapping their knee or flicking their fingers. Although all participants received a score significantly above 76T, which indicates severe social functioning, there was a significant decrease between pre and post intervention that suggests the improvement in the social functioning of every participant.

Although the scores of the Social Responsiveness scale showed this significant decrease between pre and post intervention, there were also other obvious improvements noticed between the time the participant arrived at the location and when the intervention begun for each session. The participants were effected with moderate to severe forms of ASD's, which meant that they all showed obvious speech impediments and unusual tasks. These impediments were unnoticeable during the intervention, as the therapy encouraged them to focus and helped them to learn concentration and better speech skills.

All forms of animal-assisted therapy are still trying to prove their efficacy, because many fear that any interventions involving animals lead to unsanitary or unsafe conditions. However, animal-assisted therapy programs are carefully controlled in order to prevent any injuries or spread of germs. Precautions such as constant hand washing, veterinary treatments for the animals, and the use of helmets and gloves are consistently taken. In addition, this form of therapy brings obvious benefits to those involved, both proven statistically and observably. Equine-assisted therapy can not only just help those that were involved in this study, but can possibly assist many people, children and adults, with disorders ranging from ASD's to eating disorders to cerebral

palsy, because of the confidence it instills within the participants and because of the focus and concentration that helps better the social functioning, the cognitive functioning and the inner well-being

### ***Limitations***

The main limitation in this experiment was the number of participants, as there were only ten who were involved. Because the sample size was so small, the significant correlations found between pre and post intervention would need to be reinvestigated within a larger set of participants to prove its validity even further and more clearly.

Another limitation was the degree of severity of the ASD's of the participants. Most of the participants were so severely affected by autism that they were unable to speak very much, and this made some of the questions of the Social Responsiveness Scale difficult to understand because they had to do with speech or communication skills. If this study were to be performed again, it would be advantageous to include individuals with a lower degree of ASD's because all of the questions would certainly be applicable.

### ***Future Research***

The greatest limitation of this research was the number of participants, so in the future, it would be helpful to this field of study to reinvestigate this question with a larger sample size. If this study were to be performed again, a minimum of thirty participants would be much more useful in proving the notion that equine-assisted therapy can positively benefit the social functioning of autistic adults. To accomplish this, more participants would have to be recruited from more homes or schools, seeing if they met the exclusion criteria.

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