



Mount Saint Mary College Journal of Psychology Research Proposals
<http://brainwaves.msmc.edu>

The Effect of Therapy Dogs on Social Anxiety in Children with Autism Measured by Physiological Arousal

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Autism spectrum disorder (ASD) is a prevalent and debilitating disorder estimated to affect up to 1 in 68 children in the US (Baio, 2014). The core feature of this disorder is impairment in social interaction and communication (O'Haire, McKenzie, Beck, & Slaughter, 2013). Animal-Assisted Therapy (AAT) may help children that have these difficulties adjust to social environments. Preliminary evidence suggests that individuals with ASD may seek out interaction with animals and acquire social benefits from them (O'Haire, McKenzie, McCune, & Slaughter, 2014). There is limited research on the physiological benefits of AAT for children with ASD. The current study aims to explore the effectiveness of AAT on social anxiety and stressful situations for children with ASD aged eight years old. It is hypothesized that children on the spectrum who receive a therapy dog will have less anxiety as measured by less physiological arousal under stressful anxiety-provoking social situations.

Autism Spectrum Disorder (ASD) is a developmental disability that causes social and behavior deficits to a person. Most people diagnosed with ASD do not look any different than a neuro-typical person does. However, the ways they communicate, behave, and learn are much different ("Autism Spectrum Disorder", 2015). A person diagnosed with ASD presents with many different symptoms that affect the way they behave and communicate in social settings. Some of these symptoms include having trouble associating with other people, avoiding eye contact when being spoken to, having difficulties understanding others' feelings and their own, and difficulties expressing their needs or wants ("Autism Spectrum Disorder", 2015).

Diagnosing ASD is tough because there is no medical examination or blood test that can be done to

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determine if a person has ASD. A specialized doctor has to examine the behavior and development of that person in order to create a diagnosis. At the age of two, a professional diagnosis is considered reliable, but most people do not get diagnosed until much later in life (Lord, Risi, DiLavore, Shulman, Thurm, & Pickles, 2006). This delay means that individuals are missing out on opportunities for early intervention (Lord, Risi, DiLavore, Shulman, Thurm, & Pickles, 2006). There are two steps that a doctor will take when diagnosing ASD in an individual at a young age. The first step is a developmental screening. In this step, the doctor will check to make sure the child is learning the skills that they should be for his or her age. The doctor will talk and play with the child to see how they learn, speak, behave, and move. If the doctor notices a delay, the next step is a comprehensive diagnostic evaluation. In this step, the doctor will refer the child to a developmental disabilities specialist. The specialist will run many tests such as: checking vision, hearing, genetics, and neurological testing ("Screening and Diagnosis", 2015). Often doctors will focus on the genetics of the child because this could be a key indicator in showing a child's susceptibility to ASD ("Screening and Diagnosis", 2015).

Certain factors increase the risk of ASD. One factor that increases the risk substantially is having a sibling with ASD. This will put a child at a higher risk themselves of also developing this disorder (Rosenberg, Law, Yenokyan, McGready, Kaufmann, & Law, 2009). Genetics is a substantial factor contributing to ASD. Children that are born to older parents are also at a high risk of developing ASD (Durkin, Maenner, Newschaffer, Lee, Cunniff, Daniels, & Schieve, 2008). As maternal and paternal age for childbirth increases in the developed world, ASD rates are simultaneously increasing. With this increased risk, prevalence has grown substantially.

Globally, ASD has been increased twenty to thirty fold since the 1960's and 1970's when the first studies of it were being conducted. The global prevalence of ASD by the 2000's was estimated to be 1% to 2% of all children (Baio, 2014). Research suggests that the increase in prevalence is due to factors such as changes in diagnostic practice, and the service available to people that are diagnosed with ASD (Blumberg, Bramlett, Kogan, Schieve, Jones, & Lu, 2013). Recent research from a study using 363,704 children, aged eight years old for the year 2010, found that 1 in 68 children of this age will be diagnosed with ASD (Baio, 2014). This sample does not provide a representation of all children eight years old for the entire U.S, it represents only for a small number of sites that would allow access to medical records. Despite this limitation, it is still clear how prevalent autism is in the U.S (Baio, 2014).

Children with ASD deal with social anxieties and environmental discomforts on a regular basis. For example, Arky (2013) presents a case study of a seven year old girl with ASD named Caroline. A routine trip to the dentist became a traumatic event for her. Caroline described that "all of the different sounds and smells, along with the closeness of the people, really threw her over the edge" (p. 1). She was so frightened that she ran out of the dentist and would not come back into the office (Arky, 2013). While this only gives an example of one stressful anxiety-provoking situation, children with autism face many of these situations and often on a daily basis, such as school.

O'Haire, McKenzie, McCune, and Slaughter (2014) indicate that children with ASD who are in inclusion classrooms get rejected and victimized by peers. This can manifest into social isolation, anxiety, and problem behaviors. These stressful experiences will often lead to maladaptive behaviors at home such as unprovoked temper tantrums, and self-injurious behavior. The lack of friends and peer social support can lead a child with ASD to have impaired mental and physical health (O'Haire et al., 2014). In public situations, people with ASD have negative perceptions of social interactions because these situations appear threatening to them. Because the core impairment in ASD is social interaction and communication, children in inclusion classrooms struggle to engage with their peers and therefore experience social isolation, rejection, bullying, and stress, all leading to poor

academic performance and problem behaviors (O'Haire et al., 2014). These problem behaviors are all very typical of a child with ASD and are of specific focus to a therapist during a therapy session.

Sigmund Freud first introduced the use of animals in therapy in the mid-1800s (Arky, 2013). At the beginning of psychoanalysis, he used his two dogs during sessions to provide him with an assessment of his patients' mental status (Arky, 2013). From this point on Animal Assisted Therapy (AAT) has expanded vastly and research still continues to grow. AAT is used for children with a wide range of challenges including Down syndrome, learning disabilities, ADHD, and ASD (Arky, 2013). Common issues for children with ASD are social anxiety and introversion. The therapy animals have been found to improve social anxiety and promote positive behaviors. They provide a sense of comfort for the children when an environment or situation seems threatening. When children with ASD socializes amongst peers, having a therapy animal by their side tends to build confidence (Arky, 2013).

AAT a newfound therapy for autistic children and it is an emerging topic in research that is thought to have many benefits for autistic children, specifically improving social skills. AAT is defined as a goal directed intervention facilitated by trained personnel, in which an animal is an integral part of the treatment process. Human Animal Interaction (HAI) is another term for animal therapy. HAI provides support for beneficial interactions between individuals with ASD and animals. Suggesting that animals can enhance social support, both directly as a source of comfort, and indirectly as a facilitator of human interactions. HAI's theory suggests that animals may provide a source of comfort and safety for children as transitional objects that can alleviate distress and may reduce problem behaviors (O'Haire et al., 2014). As stated previously, children with ASD face many social anxieties and routine environments may even become distressful for them. When faced with these situations, many times they become introverted and their ability to socialize becomes weak. O'Haire et al. (2013) presents a strong theory that may have the answer to improving their social skills. HAI shows the capacity of animals to encourage social interaction among humans (O'Haire et al., 2013). O'Haire et al. (2013) stated that when walking with a dog, people are more likely to receive positive social approaches from strangers than when walking alone (O'Haire et al., 2013).

There are many animals that can be used in AAT such as horses, dogs, and guinea pigs. However, dogs are used most commonly. Dogs tend to be a therapy animal that is found in a household or a classroom setting because they provide great companionship and are domestically trained. Dogs are distinguished therapeutic animals in many aspects. They serve as huge motivators, making therapy both fun and rewarding. For children with weak fine motor skills, a therapist may have the child work on brushing the dog's teeth or coat, or even use tongs to feed

the dog (Arky, 2013). All of these activities exercise bilateral coordination and strengthen wrist and hand muscles. Another fine motor task that increases core strength involves sit-ups with a child reaching back over their head to pick up and hand the dog a treat. This activity also works on improving sensory processing issues because the child will come into contact with the slimy mouth of the dog (Arky, 2013). A favorite activity of many of the dogs is to play hide and seek in the ball pit, which encourages the children to dig around and find them. These therapy dogs help with developmental, learning, and behavioral challenges (Arky, 2013). Without these dogs, these challenges compete with activities of daily living and cause a significant amount of stress.

Individuals with ASD have stress responses to different stimuli. These stress responses come from the sympathetic nervous system, and are observed through eccrine sweat gland activity. To collect data on eccrine sweat gland activity researchers use a wireless wristband that tracks the skin conductance of the individual (O'Haire, McKenzie, Beck, & Slaughter, 2015). There are two components to skin conducted data that show whether a person is experiencing high levels of physiological arousal or low levels of physiological arousal. The first component is skin conductance responses, and this is measured in phases to show each sudden rise in skin conductance. The other component is skin conductance level, and this is measured by tonic activity; showing the changes in the background skin conductance when a stimuli is not present. Higher levels of both of these components indicate higher physiological arousal which interprets into a higher level of anxiety in the child (O'Haire, McKenzie, Beck, & Slaughter, 2015). These wristbands provide a mechanism for measuring anxiety levels in a biological way which will further be used to explore the benefits of the therapy dogs. In previous studies, researchers took a less biological approach and used parental questionnaires as their means for collecting data on the benefits of these therapy dogs.

Burgoyne et al. (2014) had parents and guardians with an assistance dog completed a four-part questionnaire. The questionnaire encompassed many aspects of their lives such as what it is like to care for a child with ASD, to how their lives have changed as a family since a therapy dog has been introduced to the household. Findings indicated that the dogs were very valuable in promoting safety, security, and positive public reception for children with ASD. Researchers may also suggest that the presence of an assistance dog may make parents feel more competent with managing their child (Burgoyne et al., 2014). The use of therapy dogs as a method to reduce social anxiety in children with autism has the potential to be a simple but highly effective therapy option. Ultimately, it is hypothesized that children on the spectrum who receive a therapy dog will have less anxiety as measured by less physiological arousal under stressful anxiety-provoking social situations.

PROPOSED METHOD

Study Design

We will conduct an experimental study, which will evaluate the use of dog-assisted therapy. A wireless wristband will be used to measure physiological arousal and help to best determine the effectiveness of dog-assisted therapy.

Participants

The population will come from Anderson Center for Autism located in the Northeast United States. One hundred eight-year-old children will be recruited initially. Twenty children will be selected for the final sample. The sample will be found by taking the teachers of the 100 eight-year olds and giving them the Social Worries Questionnaire (Spence, 1995). This questionnaire is designed to assess social anxiety in children by having the teacher rate how often the child avoids or worries about certain social situations. From the initial 100 children, 20 students that showed the most social anxiety while attending to classroom activities and with their family willing to participate will be selected to create the sample. The sample will then be divided into two groups of ten children.

Measures

At the start of the study, each participant will be asked to fill out an informed consent, if they are willing to participate in the study. We will then collect demographic information from participants such as sex and exact age. Then the researchers will proceed with the participants that have agreed to be involved in the study. The study will run for a total of two school years starting in September and ending in June. This study is a between-subjects study where participants are randomly assigned to two groups.

Procedure

There will be an experimental group, which will receive a therapy dog both years and a control group, which will receive a therapy dog only in year two. Every child in the experimental group will receive a therapy dog at the beginning of the first school year. Each child and their family will be trained by specialized personnel on how to care for and properly work with the dog prior to receiving the therapy dog. The control group will start the first school year as per usual, without a therapy dog; they will be told they are on a waiting list for the dog. Skin conductance data will be collected through the use of a wireless wristband for both groups. This wristband will measure physiological arousal for the length of the school year. In school year number two, the experimental group

will continue with a dog just as they did in school year one. Each child in the control group will receive a therapy dog at the start of the second school year. Data will be collected again through the use of the wireless wristbands, but this time data collected from the control group in the second year will be compared to the data of the control group in year one, where the participants in this group did not have a therapy dog. (The control group in year one contains the same participants as the control group in year two.)

During the two school years for both groups data will be collected regarding their physiological arousal. This data will be collected when the child goes to the front of the classroom to work with the smart board in front of their peers and teacher, a standard routine at this school. The physiological arousal will be measured through the wristband that tracks sweat gland activity and skin temperature. The band will only be on the child in the first two hours of class when they are working with the smart board at the front of the classroom. The skin conductance data that is collected will be processed using the Ledalab Version 3.4.3 in MATLAB Version 7.13. Tests of statistical significance will be conducted via SPSS Version 21 to analyze the data (O'Haire et al. 2015). The data will be used to determine whether a therapy dog will result in less physiological arousal when the children are working on activities on the smart board in front of the class, compared to when the children do not have the dogs with them in front of the class.

CONCLUDING REMARKS

Significance

With 1 in 68 children a year being diagnosed with ASD in America, it's becoming increasingly prevalent, and because of this we wanted to show families that have children with ASD the benefits of Animal Assisted Therapy. There are benefits that can be obtained from this study that may help children with autism, their families, and the schools they attend. This study will bring more awareness to the social anxiety of children with autism, and how their everyday lives are affected by having this anxiety. In turn, this will make it easier for teachers to understand why a child with autism might have problems with social activities in class. This study will also bring awareness to therapy dogs, and the possible benefits they bring to children with autism, as well as to children with other intellectual and developmental disabilities. This study will help parents in deciding whether or not a therapy dog will benefit their special needs child. In addition this study will show schools that may be doubtful of the idea of a therapy dog in the classroom, the benefits it will have for the children.

Limitations

Throughout the study some limitations were acknowledged that the researchers want to disclose. Our sample size is small, however typically for these studies, samples are small but generalizability does become an issue. This is so because the study only used participants from one school in New York, therefore the results cannot be generalized to the whole population of children with ASD. We also contend there may be difficulty persuading children to wear the wrist band, because for some sensory driven children, it may be uncomfortable. In addition, we are limiting the data to only one stressful anxiety-provoking situation. Depending on the humidity and air temperature, the wristband could give inaccurate readings of skin conductance. The researchers will take all precautions to limit any inaccuracy in data collection while using the wristband.

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ACKNOWLEDGEMENTS

We would like to thank Dr. Yasmine Kalkstein for putting her time and effort into helping us with the development of this research proposal.
