

INVESTIGATING OCCUPATIONAL THERAPY TREATMENT OF AUTISM SPECTRUM
DISORDER IN CHILDREN

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Abstract

Autism spectrum disorder (ASD) is a developmental disability highlighted by a series of diagnostic criteria including social communication and social interaction deficiency, and the presence of repetitive behavioral and interest patterns that have the potential of continuing throughout life. Although autism spectrum disorder has always been on the radar of health professionals everywhere, it has garnered much attention and prevalence over the past few decades. There is no known cure for autism spectrum disorder at this time, and it is not clearly known as to why the number of children affected by it continues to rise exponentially. Over the years, research surrounding treatment for those with autism spectrum disorder has revolutionized, bringing to light new therapy treatment techniques, focusing on sensory-motor adaptation, balance, nutrition, and sensory integration. Occupational therapists help children individually with autism spectrum disorder in school settings, in clinical settings, and even in home settings. However, an occupational therapist is just one title on a list of health professionals who work together to improve the lives of those with autism spectrum disorder and their families. By working with a team of well-equipped doctors, occupational therapists, educational psychologists, clinical psychologists, and other qualified professionals, the person with autism spectrum disorder is set up for a lifetime of growth and success, despite the challenges ASD brings. The purpose of this research is to explore the treatment options for autism spectrum disorder in children, evaluating what works best across each age group. In order to complete this thesis, a plethora of literature surrounding the realm of occupational therapy treatment as well as autism spectrum disorder was studied, and interviews with professionals

were conducted. Once all the information had been collected, conclusions were drawn and comparisons were made.

Chapter I: Introduction

Autism spectrum disorder will affect most everyone at some point in their lifetime. The growing numbers of cases indicate that each and every person will know someone with autism spectrum disorder, whether it is their son, their daughter, their neighbor, their nephew, or their granddaughter. Today, around one in every sixty children has some form of autism spectrum disorder, compared to the one in every two-hundred children statistic that stood firm in the twentieth century (Baio et al. 2018). While this is a bleak realization to come to, there are a plethora of treatment techniques available, from traditional ones to modern ones. Occupational therapy, although a relatively new profession, is a practice involving much assistance to those affected by ASD, with most autistic children working with an occupational therapist on a regular basis.

The purpose of this analysis is to evaluate the varying treatment options of autism spectrum disorder across childhood, leading those affected to a potential successful and fairly independent adulthood. Upon understanding the incredibly unfortunate prevalence of autism spectrum disorder, a question is presented: for children with autism spectrum disorder, what kind of different treatment techniques will allow a child the greatest potential for living a full adult life? To dive deeper into this, an abundance of literature on the topic was analyzed, studying all facets of autism spectrum disorder from the past forty to fifty years. It was then essential to speak to the health professionals, people who work firsthand with children with autism spectrum disorder on a daily basis. In order to gain knowledge on their perspectives, thoughts, and

experiences, then comparing what they shared with what was obtained through research in an effort to answer the formulated research question. In order to effectively treat children with ASD, all areas of the disorder must be so emphasized in that career today: autism spectrum disorder.

Chapter II: Literature Review

The Growing Realm of Autism Spectrum Disorder

Autism spectrum disorder (ASD) is defined as a developmental disability highlighted by a series of diagnostic criteria including social communication and social interaction deficiency, and the presence of repetitive behavioral and interest patterns that has the potential of continuing throughout life (Baio *et al.* 2018). One major aspect of treatment for children with autism is ensuring that the relevant professionals, such as healthcare, social care, educational, and voluntary ones, are completely aware of the local autism pathway and how exactly to access diagnostic services in order to provide the most effective methods of care. Within each multidisciplinary group is a pediatrician and a speech and language therapist. However, a variety of other professionals are also key to care for someone with autism, including an educational psychologist, a clinical psychologist, and an occupational therapist. Occupational therapists work with affected children to develop skills for handwriting, fine motor skills, and daily living skills as a whole (NICE Clinical Guidelines, 2011). In addition, more and more research is emerging involving the improvement of sensory integration in children through occupational therapy practices. An autistic child's occupational therapist truly has an opportunity and a duty to make a significant difference in their life, especially in a behavioral aspect.

According to the Autism Society (2015), there is no known single cause for autism spectrum disorder, but generally, it has to do with abnormalities in brain structure and function. Brain scans have shown that there are differences in the shape and structure of the brain in children with autism compared to in neurotypical children. In terms of genetics and heredity, in many families, there appears to be a pattern of autism/related disabilities, which further supports that the disorder has a genetic basis. There is no one gene that has been identified as causing autism necessarily, but researchers are currently in search of irregular segments of genetic code that children with autism may have inherited. In addition, autism seems to happen more frequently in individuals suffering from specific medical conditions such as fragile X syndrome, tuberous sclerosis, congenital rubella syndrome, and untreated phenylketonuria (PKU). Certain harmful substances ingested during pregnancy may also play a role in an increased risk of autism.

A 2018 study done by Baio *et al.* found that since it was first tracked in 2000, the prevalence of autism in the United States has been rising steadily, and this is largely due to the growing awareness of the disorder and its ever changing diagnostic criteria. The Autism and Developmental Disabilities Monitoring (ADDM) Network is an active surveillance system that estimates the prevalence of autism spectrum disorder among 8-year-old children whose parents or guardians live within eleven different sites in the United States in 2014. These ADDM sites were located among all corners of the country, including Arizona, Arkansas, Colorado, Georgia, Maryland, Minnesota, Missouri, New Jersey, North Carolina, Tennessee, and Wisconsin. The ADDM's study involves two phases. The first phase consists of reviewing evaluations completed by professional service providers in the child's community, in a variety of data sources such as

general pediatric health clinics and even specialized programs for children with developmental disabilities. The second phase consists of the abstracted information from the evaluations being systematically reviewed by qualified clinicians. From there, they are able to determine ASD case status. A child is considered to meet the surveillance case definition for ASD if they exhibit behaviors described on one or more comprehensive evaluations done by community-based professional providers, remaining consistent with the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision* (DSM-IV-TR) diagnostic criteria for autistic disorder, pervasive developmental disorder, or Asperger disorder. It is important to note that in 2013, the American Psychiatric Association published the *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition* (DSM-5), which includes significant changes to the diagnostic criteria for autism spectrum disorder. However, regarding the targeted comparison of DSM-IV-TR and DSM-5 results, the number & characteristics of children that meet the newly operationalized DSM-5 case definition for ASD were quite similar to those meeting the DSM-IV-TR case definition. There was an approximate 86% overlap between the two case definitions. The study involved a total population of 325,483 children aged 8 years, representing 8% of the total United States population for this particular demographic. For 2014, the overall prevalence of ASD among the 11 noted ADDM sites was 16.8 per 1,000 8-year-old children, which equates out to around one in 59 kids. Diving deeper into this study, in terms of the nine sites with sufficient data on intellectual ability, 31% of children with ASD were classified in the range of intellectual disability, meaning their intelligence quotient was less than 70, 25% of children with ASD were in the borderline range, meaning their intelligence quotient was between 71 and 85, and 44% were in the average to above average IQ range, scoring above an 85. For this

large group of children studied, the median age of earliest known ASD diagnosis was 52 months. Some factors that were heavily considered in the ADDM's 2014 study were gender and race.

In recent years, a wide range of studies have been conducted in regard to autism spectrum disorder in children, in the categories of gender differences, racial and ethnic differences, brain sizes, and much more. Looking at the latter, a study was conducted by a series of autism spectrum disorder specialists in partnership with the American Academy of Neurology in 2002. Sparks *et al.* found that brain morphometric features in a large sample of 3- to 4-year-old children carefully diagnosed with autism spectrum disorder (ASD) in comparison with age-matched control groups of typically developing (TD) children as well as developmentally delayed (DD) children were examined in order to examine the specific gross neuroanatomical substrates of the brain. The specific brain morphometric features studied were the cerebrum, cerebellum, amygdala, and hippocampus via three-dimensional coronal MR images collected from 45 children with autism spectrum disorder, 26 typically developing children, and 14 developmentally delayed children. All volumes analyzed took age, sex, volume of the cerebrum, and clinical status into consideration. The autism spectrum disorder specialists discovered that children with ASD have significantly larger cerebral volumes in comparison to the TD and DD children. In addition, measurements of the amygdalae and hippocampi in the group of children with ASD showed bilateral enlargement contributing to overall increases in total cerebral volume, and this was the case with both girls and boys. All in all, one major conclusion can be drawn: in the clinical course of autism, abnormal brain developmental processes are present early. From a racial/ethnic standpoint, a group of medical professionals for the American Public Health Association sought to determine racial and ethnic disparities in the recognition of autism

spectrum disorders. Mandell *et al.* (2011), a group of medical doctors and psychiatrists, created a multisite network including 2568 8-year-old children. Abstracting of evaluation records from multiple sources allowed them to determine whether or not these children met the surveillance criteria for autism spectrum disorder. By looking closely at the estimates of ethnic and racial differences in identifying ASD, professionals are made more aware of the development of interventions to improve them. That is, if professionals continuously misread the diagnosis of ASD in particular groups, programs can be developed to allow more advanced access to screening, referral, and education regarding developmental milestones.

The History of Treatment of Autism Spectrum Disorder

By researching the history of beliefs and practices in the health professions, a basis for understanding can be accomplished. Looking from an occupational therapy perspective, a need for deeper critical understanding of the profession has been identified, and historical research is quite beneficial in facilitating this process. By exploring the history of occupational therapy, new insight may be provided on how to face new clinical challenges and even reshape the profession (Dunne et al. 2015). The 100th anniversary of the profession recently passed, so looking at the trends of the last few decades is extremely beneficial in order to determine how the profession has evolved over time. In the 1980s, the term “autism” first appeared in the titles of two occupational therapy publications within the DSM-III. Both of the studies referenced placed an emphasis on sensory integration as well as highlighted the variability of responses to intervention in children with autism. Smaller studies at the time focused on behavior and vocalizations. It was in this time period that the content of these publications looked at occupational therapy’s emerging role in evaluation and later intervention with children with autism spectrum disorder.

There was still a lack of clarity at this point, and also an absence of a solid theoretical basis for occupational therapy intervention. There was even a question as to whether occupational therapists should be generalists or specialists (Paterson, 2008).

In the 1990s, intervention was focused on sensory strategies in order to reduce autism symptoms, for studies confirmed that sensory processing patterns in children with ASD were significantly different than typically developing children. Bagatell and Mason (2015) discovered that at this point, attention, arousal, social skills, and play skills were focused on and examined along with aberrant behavioral outcomes. By the 2000s, they found that there was a large increase in the number of publications devoted to autism. Studies began exploring the experiences of the families as well as individuals with ASD. Rather than single-subject designs that had been previously used for decades, new study methods emerged, including the first randomized-controlled study with children with ASD. Even alternative interventions were brought to light, one of them being animals in intervention. That is, including animals such as dogs in therapeutic activities; this became known as animal-assisted intervention, or AAI. A similar intervention to AAI is hippotherapy, in which a child with autism interacts with and rides horses. They benefit from equine therapy due to the motor, emotional, and sensory sensations that come with riding a horse. In the year 2005, the American Occupational Therapy Association (AOTA) published *The Scope of Occupational Therapy Services for Individuals With Autism Spectrum Disorders Across the Life Span*, which depicted the evaluation and intervention process for individuals with ASD. This document focused on needs in self-care, education, leisure and play, social participation, and work. The document also included the first evidence-based review of ASD interventions, in which the authors came to the conclusion that

there was strong evidence for environmental modifications, and sensory integration and social participation results.

Moving into the most recent decade, Bagatell and Mason (2015) established that the 2010s brought a proliferation of articles published. Rather than focusing on behavior/symptom reduction, there was a much clearer commitment to client-centered and occupation-focused outcomes. The studies of this time looked at using sensory strategies and environmental modification in order to enhance classroom performance. The utilization of yoga and motor-based role-play was also a factor in the occupational therapy treatment of autism spectrum disorder. It was in this decade that publications first acknowledged ASD as a life-long developmental disability. Research began in the area of ASD in infants, and interventions for “at risk” infants. As a whole, this past decade has allowed occupational therapists to move many steps forward to address a wider range of occupational needs, or the activities of daily life for individuals with ASD in terms of their entire life span.

Thinking forward and based on the results obtained over the past few decades, Bagatell and Mason (2015) identified three major areas that must be considered: evidence-based practice, occupation-based practice, and the occupational needs of children with autism spectrum disorder in order to prepare them for the rest of their lives. Autism spectrum disorder can be described as heterogeneous, due to the vast diversity in those diagnosed with it. However, not all interventions are appropriate for all individuals with ASD. When it comes to evidence-based interventions, careful consideration of for whom interventions are effective are an important next step in the future of occupational therapy intervention in autism spectrum disorder. Through recent studies, it is clear that for individuals with autism spectrum disorder and their families,

activities of daily living (ADLs), instrumental activities of daily living (IADLs), and everything in between such as sleep, leisure, and work, are difficult. In order to make intervention for these families occupation-based, it is crucial to have outcome measures that coincide with the values and practice of occupational therapy as a whole. ASD is obviously a lifelong condition that will continue to impact the lives of those affected throughout the entire lifespan. For occupational therapy moving forward, this means that it is important to develop appropriate assessments and interventions for those with autism spectrum disorder and their families across the life span, not just in their elementary school years.

Autism in the Childhood Years

Occupational therapy practitioners are just one of the professionals who provide services to those with autism spectrum disorder. Children with autism spectrum disorder tend to live with a range of occupational and performance problems that interfere with their participation in school, home, and other activities in their lives. The most common characteristics of a child with autism include but are not restricted to limited social interaction, delayed language, behavioral problems, and difficulties with sensory-processing. Autism can be detected in children as early as 18 to 24 months of age (Case-Smith and Arbesman, 2008).

According to the Autism Society (2015), the first few years of life are absolutely crucial to a child's development. In recent years, the American Academy of Pediatrics has begun to recommend that a developmental screening for autism spectrum disorders are conducted at the 18- and 24-month well check-ups for all children. Early identification of ASD is essential, for early intervention services beginning at a young age can have a huge impact on a child's behavior, functioning, and overall future well-being. At this time, the average age of diagnosis in

the United States is around 3 and 6 years of age, with some children being diagnosed as young as 1 and a half.

Laurie (2018) established that challenges for children with autism spectrum disorder truly begin in the school years. These years are certainly challenging, but also a massive opportunity for growth. The success of school-aged children with autism aligns with the support of parents as well as having a team of professionals. This reduces stress on the family while simultaneously improving outcomes for the child affected by autism. In the case of autism, occupational therapists work to develop skills for handwriting, fine motor skills, and daily living skills. Overall, however, the more essential role an occupational therapist plays is assessing and targeting the specific child's sensory processing disorders. By doing this, barriers to learning are broken down, and students become calmer and more focused. Sensory integration therapy relies on the assumption that the autistic child is either "over-stimulated" or "under-stimulated" by his/her environment. Therefore, the aim of sensory integration therapy is to overall improve the ability of the brain so that it can more effectively process sensory information. Through this, the child will function better in his/her daily activities.

A group of medical professionals from the University of Washington, Seattle, conducted a study in late 1999, towards the beginning of the century. Watling *et al.* titled their study "Current Practice of Occupational Therapy for Children With Autism", and their objective was to examine the current practice patterns of occupational therapists experienced in working with children with autism spectrum disorder" (Watling et al. 1999). A mail questionnaire describing practice patterns, theoretical approaches, intervention techniques, and preferred methods of preparation for work with children with autism was sent out to occupational therapists

experienced in providing services to children aged 2-12 years of age. In order to be considered experienced, the therapist has to have worked at least 10 hours per week in a program providing services to 2-12 year old children with autism, they had to have been working as an occupational therapist at the time of the survey, and the therapist has to have considered him or herself to be competent in providing services to children with autism. The survey questionnaire was sent to 158 programs identified by the Autism Research Institute within the United States. Of the individual occupational therapists contacted, 72 of them met the study criteria and returned completed questionnaires. This study provided clarification regarding the nature of current practice patterns for providing occupational therapy services to 2-12-year-old children with autism.

In terms of current practice patterns, the discovery that a direct 1:1 format of intervention was the most obvious and present service model for practicing occupational therapy services, particularly in the early stages of intervention, and also when working on attention skills, toy play, and imitation. In addition, through the 1999 study by Watling *et al.*, a high level of collaboration between occupational therapists and other professionals was found. When serving children with autism, it is imperative to have a team of therapeutic professionals involved. Looking at assessment and intervention techniques, a fairly consistent pattern of measuring fine motor skills, coordination, attention, behavior, and sensory processing was found. This particular finding is consistent with the occupational therapy notion that occupational therapists evaluate sensory, motor, perceptual, cognitive, emotional, social, and behavioral performance in their autistic clients. This scope of skill areas addressed during the intervention phase suggests that occupational therapists provide comprehensive services that target many of the areas commonly

identified as deficits for children with autism. As a whole, responses depicted a strong emphasis on sensory processing issues.

Modernized Occupational Therapy Techniques for ASD

The view of electronic assistive technology was examined in a 2008 study performed by a group of Irish occupational therapists. Verdonck and Ryan described electronic assistive technology (EAT) as computers, environmental control systems, and information technology systems widely considered to be an essential part of present-day life. Within this study, fifty-six Irish community occupational therapists completed a questionnaire regarding EAT, and all were vastly able to explain the benefits of EAT. In conclusion, based on the results of the questionnaire, it is vital for occupational therapists to have up-to-date knowledge as well as training regarding assistive and computer technologies, so that they are able to respond to the varying occupational needs of their clients. Living in a world of technological advancements, occupational therapy is no different. Occupational therapists are being encouraged to embrace the use of mainstream technology and all of the benefits it holds, for it contributes highly to the quest of ensuring that therapy remains current and meaningful to their clients. Technology can be used in a multitude of ways, including improving both functional independence and occupational performance.

An article released by the Department of Veterans Affairs, specifically by Dijkers *et al.* in 1991 discussed the views of patients and staff on robotic technology in occupational therapy. Electronic assistive technology, including the use of robotic technology, is a fresh and exciting advancement that has been gaining notice in the realm of occupational therapy in the past couple of decades. This pilot study looks at the potential for the robot as a therapy “aide”. Prior to this

study, robots had always been utilized as personal care attendants, or PCAs, but in this study, the robot was looked at as an occupational therapy aide. Pilot-tested hardware and software that utilized a robot to provide muscle reeducation movement patterns following a stroke was used on a field trial. Within this field trial, 11 occupational therapists tested out the system with 22 patients, each patient averaging 2.2 sessions. Information was collected through a system database, patient interviews, and therapist questionnaires. Overall, the purpose of the study was to discover whether or not this robot system was safe for both patient and therapist use, and also deemed acceptable to the both of them. Not one safety incident was experienced. The patients, though elderly, did not express fear of accidents either, but instead expressed intrigue by the system. While the occupational therapists indicated interest regarding this innovative addition to potential future practices in therapy, they largely maintained a critical stance on the topic. The therapists' reservations largely stood in two sets of factors: equipment issues and the shortcomings of the system as a therapy aide. While the system tested in this study was quite basic, the Department of Veterans Affairs is working on new versions that will provide more choices for the occupational therapist. All in all, at this time, there is no evidence that supports jumping headfirst into therapeutic robotics for a number of reasons. For one, it is not yet known whether or not a robot can deliver therapy semi-independently, which would free the therapist to work in other areas. In addition, there is not yet information available regarding the outcomes of robot-assisted therapy. That is, it is not proven whether or not it is necessarily more effective in comparison to traditional methods of occupational therapy. To add another survey to this study, one surveying 51 hospital-based occupational therapists lacking hands-on robotics experience uncovered that they considered robots to be valuable, obedient, fun, and intelligent, but remained

leery of them as a whole due to the mysterious, difficult, and unfriendly nature of robots. However, data suggests that occupational therapists can in fact adjust rapidly to working efficiently with the type of sophisticated equipment that robotic engineering entails.

In discussion of technological occupational therapy techniques for autism spectrum disorder specifically, Western Michigan University, two occupational therapists, Tina R. Goldsmith and Linda A. LeBlanc (2004), published a literature review regarding the use of technology in interventions for children with autism. This review looked at five examples of technology in particular: tactile and auditory prompting devices, video-based instruction and feedback, computer-aided instruction, virtual reality, and finally, robotics. Each of these five subheadings were introduced as a temporary instructional aid, and was removed once the goal (behavior change) had been met. Those with autism frequently require external stimulus prompts to “initiate, maintain, or terminate a behavior”, and the two most commonly used mechanical prompts are auditory and tactile prompts.

Goldsmith and LeBlanc (2004) review the literature to study how auditory prompts are used to cue in-class self-monitoring for children with autism in order to decrease off-task behavior in a classroom setting. For three children with autism, aged 9-11, an auditory timer was implemented every 30 s of a 5 min work interval. Interval time increased to 1 min for 1 of the participants. Through this study, researchers were able to prove that off-task behavior dropped significantly using this intervention during classroom work time. A major benefit of auditory prompting devices is that they often require significantly less manpower to end in a positive change, a large benefit regarding the increasing number of children with autism assisted in local school settings, especially when teacher resources may be scarce. In terms of tactile stimulation,

manual gestural and physical prompts have often been used successfully for children with autism. An incredibly interesting study aimed to promote an increase in social initiation in children with autism introduces the “Gentle Reminder” device. The vibrating function of this device was used to prompt children to initiate during play sessions; that is, the device was set to vibrate after a preset elapsed interval for several seconds. In comparing this intervention to two other conditions, no prompt, or a verbal prompt, tactile prompting resulted in great increases in verbal initiations. Goldsmith and LeBlanc (2004) concluded that video technology is an important tool in many areas of occupational therapy intervention for children with autism.

Video technology is considered to be widely-used technology by occupational therapists, simply because it is most readily available. An advantage of it is that many children are able to operate video equipment even lacking instruction. It has been found that video technology is highly useful as a tool for modeling appropriate behavior, providing feedback, and creating discrimination opportunities for the child’s own behavior. One particular study that Goldsmith and LeBlanc (2004) reference in their literature review directly compares the use of video modeling to live modeling, specifically discussing the effectiveness of these differing tools for teaching developmental skills to children with autism. It was found that video modeling generally led to faster play acquisition, language acquisition, and also self-help skills. This is likely because video modeling utilizes a relatively easy format to show concepts in a systematic way, and quite effectively keeps the child’s attention. Video is a popular intervention technique, but so is computer-based intervention.

Computer-based intervention is certainly the most studied technology-based intervention when it comes to children with autism. It has been found that computer-based intervention leads

to benefits like increased motivation, decreased inappropriate behavior, and increased attention/learning. This is due to the conditioned reinforcing nature of computers for many children with autism. Research-wise, this specific type of intervention is key, for computer programming allows limitless control of stimulus presentation, allowing researchers and clinicians to use repeated learning trials in identical or systematically different formats. A single computer can also benefit more than one student at a time, encouraging teamwork and cooperation in pairs or even triplets. Linked to computers, virtual reality is relatively similar to computer-based intervention for children with autism, but also quite new (Goldsmith and LeBlanc, 2004).

Virtual reality technology allows people to experience a three-dimensional, computer-generated world. This technology has already been highly researched among non-autistic populations, and its research among autistic populations has only just begun. For a while, it was questioned whether or not children with autism are even able to tolerate reality environments, and this literature review from Western Michigan University cites a few studies proving they can. In one study referenced by Goldsmith and LeBlanc (2004), two participants, a 7-year-old female and a 9-year-old male, were asked to venture within the virtual environment. They were then prompted to identify cars and the color of the cars appearing in various street scenes, and then to locate and move towards the specific object. Both of the children were successful with the task, showing that these children with autism were willing and able to interact within and venture into virtually created worlds in a positive, beneficial manner. Although this study and a number of other studies prove the effectiveness of virtual reality

technology in treatment for children with autism, there is still substantial room for further studies. The world of robotics goes hand-in-hand with virtual reality technology.

The field of robotics is considered to be a relatively new approach in terms of using it as a therapy intervention. However, Goldsmith and LeBlanc (2004) found that robotics has much potential in benefiting children with autism. For example, robotics can enable presentation of a simplified social environment as well as gradual increase in the complexity of social interactions. That is, robots can be utilized to teach basic social interaction skills involving turn-taking and imitation games. Interaction with peers and adults for children with autism can also be encouraged using robotics. Although there is not much literature available quite yet on the subject, robotics has a promising future in the world of occupational therapy, having the potential to benefit many.

With technology being implemented into more and more areas of our world, using technological interventions for children with autism is looking more and more promising. This will allow a child with autism to blend into our more technologically advanced society quite easily. Monetarily, some technologies are reasonably priced, but the more cutting-edge technologies, such as virtual reality and robotics, remain unobtainable for many. In conclusion, it was found that technology based interventions can be quite useful for and appealing to children with autism spectrum disorder. The growing groups of literature surrounding this topic increases the general effectiveness of the tools, but additional comparative research is essential (Goldsmith and LeBlanc, 2004).

“The Brain Balance Program is a non-medical and drug-free approach to overcoming the challenges of ADHD, learning disabilities, processing disorders, Asperger Syndrome (now considered a part of ASD), and a host of other related childhood learning and developmental issues” (*Brain Balance Centers*, 2020). Taken directly from Brain Balance’s website, this statement provides a brief overview of what exactly Brain Balance is. The program uses an integrated approach that focuses on the whole child, combining physical and sensory-motor exercises along with academic skill training, healthy nutrition, and confidence building, all of which are essential to the success and progress of a child with autism spectrum disorder and the like. The program was created and co-founded by Dr. Robert Melillo, an internationally recognized chiropractic neurologist, professor, researcher, and expert in childhood neurological disorders. He is also the author of a series of books related to his expertise, *Disconnected Kids*, *Reconnected Kids*, and *Autism*, to name a few.

Disconnected Kids by Dr. Robert Melillo is specifically about the Brain Balance program, and is actually fully titled *Disconnected Kids: The Groundbreaking Brain Balance Program for Children with Autism, ADHD, Dyslexia, and Other Neurological Disorders*. In this book, Dr. Melillo references autism spectrum disorder as “worst childhood epidemic of our time”, and “an unprecedented phenomenon and the most important health issue of our time” (Melillo, 2015). Not long ago, autism was considered to be a rare disorder only diagnosed in around 1 in every 10,000 children born in the United States, but today, an autism spectrum disorder diagnosis is found in 1 in 68 children. He goes on to explain that many of these childhood neurological disorders, such as ADHD and autism spectrum disorder, although manifest with different symptoms, they are really one and the same problem, and that is an

imbalance within the brain. There is actually a name for this phenomenon: Functional Disconnection Syndrome, which means that the two hemispheres of the brain cannot function as a whole, for they are not synchronized. In an imbalanced child, they may have normal or even unusually strong skills programmed with the higher-functioning side of the brain, and unusually weak skills programmed with the lower-functioning side of the brain. Typically, this is due to one side of the brain maturing more quickly than the other. Dr. Melillo believes that by fixing the dysfunction of the weaker side of the brain, the symptoms, and eventually the disorder, can go away. He believes that his Brain Balance program is revolutionary in helping “disconnected kids” lead a normal and high-functioning lifestyle.

The *Brain Balance Centers* website (2020) discusses the program overall, Brain Balance placing an emphasis on sensory-motor skills, for the foundation of growth, development, and learning in a child begins with sensory and motor interaction with the world. Sensory-motor activities are at the core of everything the Brain Balance Achievement Centers do. Children who struggle with learning/behavioral issues typically are the ones with inadequately developed sensory and motor systems, resulting in their uncoordinated, clumsy, and awkward gait. Therefore, at Brain Balance, the following motor skills are addressed: muscle tone, strength, bilateral coordination, primitive and postural reflexes, eye-muscle balance and coordination, and vestibular balance and posture, to name a handful. When it comes to underdeveloped sensory skills, no sensory function works in isolation. This means that each sensory function relies on other sensory functions. Brain Balance sensory activities assess each sense: hearing, vision, smell, taste, touch, vestibular, proprioception, and balance/spatial perception. Each of the skills listed above are assessed with standardized testing, and the child is then sorted by grade, age, or

functional level. The program then works to integrate sensory input and therefore strengthen motor skills through frequent activities designed to improve balance and stability while also enhancing muscle tone. This allows the child to react quicker in all facets of life. Some of the sensory-motor exercises implemented include vision exercises, vestibular activities, balance exercises, gait training, and primitive reflex training.

There is also an academic component of the Brain Balance program, so students with disabilities are not only receiving educational input at school, but also briefly at the achievement centers. The *Brain Balance Centers* website (2020) establishes that the Brain Balance program takes on a differentiated and supplemental approach to teaching. By changing how the brain takes in and integrates information, therefore targeting specific areas of the brain, the groundwork is laid to help students maximize their academic success. The highest standard of academic subject material is used. Academic achievement in literacy curriculum includes foundational reading components, looking at details and sequencing, recognizing the main idea and inferencing, and identifying socially- and emotionally-themed curriculum.

The Brain Balance program also implements an at-home component with at-home exercises, which are essentially the foundation that is built upon during sessions at the Center. There are three types: primitive (infant) reflex exercises, core exercises, and eye exercises. The at-home exercises complement the work done in the Center, making the program as productive as possible. These specific exercises are required to be done daily (*Brain Balance Centers*, 2020).

The *Brain Balance Centers* website (2020) also describes the *Balance 360 Nutrition System*. This nutritional program was created by Brain Balance to improve brain and body

development through addressing a child's physical, academic, and nutritional needs. The nutritional program is designed to assist parents in customizing a nutrition plan that fits a child's lifestyle and needs. Included with Balance 360 are tips for new ways of food-shopping, cooking techniques, along with hundreds of tasty nutritious recipes that children actually eat. It is not considered to be a weight loss program, but instead a logical and structured system putting nutrition on the right track at five distinct levels.

One aspect of the Brain Balance program, as established on the *Brain Balance Centers* website (2020), that proves to be extremely unique is the immense amount of support extended to families by the staff. Each staff member has immense experience working with a variety of challenges and behaviors, free of judgment, and are always willing to help. There are two distinct parts to the Brain Balance program: scheduled activities at the Center, where children typically attend for one hour a day three times a week, and at-home activities that are considered equally important to Center time. The Brain Balance team provides the child and their family with everything they need to succeed in the program, including hands-on tools to effectively administer the program, including an online Program Guide, access to the Balance 360 Clean Eating Nutrition System, exercise videos, the exercise companion, and musical compositions specially composed for Brain Balance.

Although the Brain Balance program is for children with a variety of issues, including academic issues, social issues, behavioral issues, trouble making friends, and even problems with family/social relationships, autism is a diagnosis that Brain Balance sees often, and can truly make a difference in a child's/family's life. To be clear, Brain Balance does not diagnose children, but instead provides assistance to them to increase life functioning. Because of the

nature of the program, Brain Balance is most helpful to children with Asperger Syndrome, which is considered to be a mild form of autism spectrum disorder (*Brain Balance Centers, 2020*).

The *Brain Balance Centers* website (2020) describes Asperger syndrome as a pervasive developmental disorder on the autism spectrum that is often described as the mildest form of autism. It is largely characterized by social impairments, communication difficulties, motor coordination issues, and restrictive, repetitive, and stereotyped patterns of behavior. Children with Asperger syndrome may have trouble understanding other people's feelings or talking about their own feelings, they may have a hard time understanding body language, they may avoid eye contact, they may want to be alone much of the time, they may have narrow and sometimes obsessive interests, they may only choose to talk about themselves and their interests, they may seem nervous in large social groups, and may speak in unusual ways, or with an odd tone of voice. Because the right hemisphere of the brain regulates creativity, non-verbal learning, attention, and socially appropriate behavior, a child with low right brain activity (such as a child with Asperger's syndrome), may have difficulty reading body language, maintaining eye contact, attention, and mood, as well as regulating repetitive behaviors. Through combining individually customized sensory motor and academic activities that directly address right brain connectivity and associated behavioral issues, the Brain Balance program can make a significant difference in the lives of children with autism spectrum disorder.

The Future of Occupational Therapy Interventions in Autism Spectrum Disorder

Over the years of its recognition and existence, occupational science has achieved noteworthy success. It is crucial, however, that this particular discipline remains responsive and innovative in the ever-changing society and world we live in. Looking forward to the future of

the profession, there is much to be optimistic about, from the future of autism treatment, to the future of occupational science in general.

A study conducted by Laura Schreibman and Aimee Anderson (2001) of the University of California-San Diego examines the future of the behavioral treatment of autism. They believe that integration at a global level and also at local levels is the key to the progressive treatment of autism's future. That is, cooperating with researchers and professionals in other disciplines, such as developmental psychology and neuroscience, allows occupational therapists to examine unique perspectives, prevent excessive research replication, and develops a beneficial level of competition. Another trend that has tremendous potential in the world of occupational therapy behavioral treatment of autism is individualization. Because autism hinges on such a wide spectrum, treatment outcomes vary wildly, and this is why it is crucial to individualize treatment approaches. No child is the same as another. Encompassing integration and individualization, particularly at the levels of treatment type and skill domain, will assist providers in effectively choosing comprehensive treatment packages that are based largely on each individual child's characteristics and therapeutic needs. At this point in time, the world of occupational therapy has over 50 years of behavioral research, which has significantly opened the door to successful autism treatment.

To further discuss the future of occupational therapy as a whole, Ellen S. Cohn, an occupational therapist from Boston University, shares her excitement regarding the years to come for the profession. She is the winner of the 2019 Eleanor Clarke Slagle Lectureship Award, the American Occupational Therapy Association's highest honor. Although she began her career working in clinical practice at Franciscan Children's hospital working to help children with

developmental disabilities, Cohn now focuses on qualitative research. She is currently working on developing a new intervention tool in order to facilitate friendship in adolescents with autism spectrum disorder. Regarding the future of occupational therapy, Cohn gives three insights. The first is quality over quantity. Rather than increasing the number of hours, minutes, or days clients receive intervention, “...what matters to patients is now valued and viewed as both an outcome and an important means to improve health” (Freeman, 2019). The practice must shift to value-based care and quality care, rather than time-based care. Next, Cohn suggests research advancement. Cohn calls occupational therapy a “relatively young profession”, but is excited about the “practitioners and researchers who are prepared to conduct sophisticated, scientifically rigorous research to communicate and document the distinct value of the profession”. Finally, Cohn shares the exciting growth of the profession that is sure to come. At this point in time, the infrastructure and the capacity to demonstrate to all that the benefits of occupational therapy can be tremendous. Cohn states passionately, “...it’s a great time to be an occupational therapist...the profession is just going to continue to flourish...”.

In this day and age, technology governs much of our lives. The same is the case in the world of medicine and therapy as a whole. Research findings indicate that as the development of new technology progresses at an increasing rate each year, children’s competency and awareness of such technology also inevitably increases. In the evaluation and treatment of individuals with ASD, OT professionals tend to address activities of daily living (ADLs), instrumental activities of daily living (IADLs), adaptive behavior, rest and sleep, employment/pre-employment, and social participation. Underlying these issues, therapists seek to improve performance with gross motor, fine motor, and visual-motor integration skills; visual perception; sensory processing; and

behavior regulation (Gee, Nwora, & Peterson 2018). Occupational therapists, working with individuals with autism spectrum disorder throughout the lifespan, use (traditional and modern) technology, as a means to accomplish a wide variety of meaningful and functional activities. This includes the use of technology as a communication device, as an assistive device, as an adaptation and modification for motor skill difficulties, for academics and work skill acquisition, to teach and assist in organizational skills, and in pursuit of leisure activities. Therefore, if there is a better understanding of the various types of modern technological treatments in helping those with autism spectrum disorder, more children can be reached and given a better quality of life. But in order to give those with autism spectrum disorder a better quality of life, we first need to determine which types of treatments are the most effective. Therefore, the purpose of this research is to evaluate the different types of treatment approaches and the factors that make them effective or ineffective. The following main questions are addressed in this research: What types of treatments have been used in the past to treat autism spectrum disorder?; What types of treatments are currently being used to treat autism spectrum disorder?; What types of treatments work best/are most effective in treating and helping those with autism spectrum disorder?.

Chapter III: Methods

This study investigates the experiences of health professionals working one-on-one with children with autism spectrum disorder. Focusing on the therapists' personal perspectives, semi-structured interviews were conducted and the interview transcripts were studied to analyze their recollections. It was not assumed that the recollections reflected events exactly as they occurred at the time. It was recognized that the recollections and understanding of each of the

participants were subjective due to their varied educational background and experience level. Permission for the study was granted by Saint Peter's University's Institutional Review Board (Appendix A). The CITI online certification was then completed, and a certificate was received once done (Appendix B). The Informed Consent letter (Appendix C) stated what exactly the project entails, the reason behind it, and the type of questions that each of the participants would be asked.

Recruitment

The participants were recruited for the study from the PI's choosing, based on experience level in the area relative to this study: experience with children with autism spectrum disorder. In order to obtain a better understanding of the occupational therapy profession as well as autism spectrum disorder, a qualitative research design pointed to interviewing two individuals who work one-on-one with children with autism spectrum disorder on a regular basis. To provide confidentiality, the participants are given pseudonyms in their responses. Participant 1 is referred to as Mr. Smith, and Participant 2 is referred to as Mrs. Mack. The PI contacted Mr. Smith, program director at a Brain Balance Center, and Mrs. Mack, lead occupational therapist in a school district to inquire as to whether or not they would be willing to participate in an interview conducted solely by the PI. The PI informed both potential participants about the nature and purpose of her research and the type of questions the interview will consist of. The PI requested that the interview be done in-person at the Brain Balance Center with Mr. Smith. The PI requested that the interview be done over the phone with Mrs. Mack. Upon agreement and signed consent, the PI scheduled a specific date and time for each of the interviews to be conducted. The PI notified the participants that they will each be known by a pseudonym. Once

at the location of the interview with Mr. Smith, the PI went over the nature of the questions, had him choose a pseudonym that he will be referred to, and assure the utmost of confidentiality in his responses. Once on the phone with Mrs. Mack, the PI went over the nature of the questions, had her choose a pseudonym that she will be referred to, and assure the utmost of confidentiality in her responses.

Data Collection

The material reported here consists of two semi-structured interviews of around ten minutes each, conducted at Mr. Smith's Brain Balance Center, and held by telephone with Mrs. Mack. Mr. Smith's interview was conducted on an afternoon in February 2020; Mrs. Mack's interview was conducted on an evening in February 2020. The semi-structured interview guide invited the participants to speak openly about their experiences and probed for more detail and reflection on their time spent treating/helping children with autism spectrum disorder.

Data Analysis

Due to both of the interviews being recorded, they each were transcribed verbatim, and after an initial readthrough, the material was thematically coded in-vivo. From the studying of the interview transcript, the PI was able to establish varying themes and ideas common between not only Mr. Smith and Mrs. Mack, but also connections between the literature reviewed and their personal experiences at work.

Chapter IV: Results

Part 1: Addressing the Participants' Expertise

Mr. Smith and Mrs. Mack both have substantial experience working with children with autism spectrum disorder. Mr. Smith has been working at a Brain Balance Center for the past ten years, starting as a sensory-motor coaching intern, and now holds the position of Program Director. Mrs. Mack holds the position of Lead Occupational Therapist within a school district, and has held this position for 23 years. Prior to that, she worked for a company specializing in home health care for those in need of occupational therapy, traveling to people's homes and working with them individually. The two both have experience working with children aged 3-21.

For some further background on the Brain Balance program, in his own words, Mr. Smith describes Brain Balance as “a developmental program that is designed to identify and address the differing causes of a child's challenges and struggles. By identifying the specific immature areas of the brain, we are able to target those areas. The kids engage in a range of sensory-motor and cognitive activities at the center, paired with home exercises for additional support, nutrition and lifestyle guidelines, all combined to kickstart those immature areas of the brain”. He claims that a quarter of the children enrolled in Brain Balance lie somewhere on the autism spectrum, but the most common diagnosis seen at Brain Balance is ADHD. When it comes to autism, he believes that the program is most effective for children with higher-functioning autism, for they are able to engage more in the exercises, thereby receiving more of the aimed stimulation. With lower-functioning children with autism, the program is typically not as effective simply because it is more difficult for them to engage in the specific activities the Brain Balance program utilizes. As previously mentioned, there are various aspects to the program, and specifically

different “stations” of sorts. Mr. Smith believes it is the combination of each of these stations that truly gets to the root of autism spectrum disorder treatment, for at Brain Balance, autism spectrum disorder is seen as a right-brain weakness 100% of the time. “By improving the right brain function, we have the ability to potentially improve the life of a child on the spectrum in all areas, socially, academically, and everything in between”. He then goes on to address that because body awareness is at the root of our social skills, he believes that the different physical exercises conducted are something that significantly make a difference in the autistic child’s life.

The two participants had different answers when asked what their greatest challenge is when it comes to working with children with autism spectrum disorder, but both of their answers revealed a common theme: the individual child’s motivation and resulting behavior. Upon asking Mrs. Mack what her greatest challenge is when it comes to working with children with autism spectrum disorder, she answers that it is addressing behaviors, for much of the time, “It is hard to convey to them that their behavior is wrong, or to explain to them why”. When it comes to intervention for children with autism spectrum disorder, Mrs. Mack says she has found that using “first, then” statements is quite effective. That is, telling the child that if they first complete a designated task, they then can receive the desired reward. Reflecting on all of his experience, Mr. Smith says that when it comes to working with a child with autism spectrum disorder, the greatest challenge is their lack of social motivation. That is, they are not socially motivated, so they do not always care to engage in these exercises, for they do not necessarily see the value or the benefit of doing so. They don’t usually care about potential praise from the adults in their

life, or making friends on the playground, etc. This makes the goals for children on the spectrum a bit different than that of a child who does not have autism.

Part 2: Discussing the Future of Treatment for Autism Spectrum Disorder

Both Mr. Smith and Mrs. Mack believe that the treatment of autism spectrum disorder has a bright future. When I asked Mr. Smith about what he sees as the future of the Brain Balance program, he thinks that “It goes without saying that our protocols will only progress, and the program will only expand to working with larger populations of people, older and younger. It will likely become even more individualized, more specific to each child’s and each family’s case. We can take it even further to reach more and more people and change more and more lives”. Looking toward the future of the occupational therapy treatment techniques, Mrs. Mack believes that there will be more advanced and more utilized sensory processing techniques implemented in the practice. Dr. Melillo, as mentioned previously, addresses autism spectrum disorder as a childhood epidemic, but Mrs. Mack believes this is largely due to overdiagnosis of the disorder. She feels that often times, psychologists, doctors, and school systems misdiagnose many children by providing the autism spectrum disorder diagnosis even though the child may not necessarily meet all the criteria based on the fifth edition of the Diagnostic Statistical Manual. Technologically-speaking, Mrs. Mack says the future of occupational therapy lies largely in technological intervention methods, and the school district she currently works in is no exception. iPads are used for intervention purposes such as typing, tracing, and communication applications, as well as for rewards such as games, music, or videos. However, Mrs. Mack says

she is sometimes skeptical about the frequent iPad/computer usage for these children, for “some students use technology for stimulation rather than for learning purposes”.

Chapter V: Discussion

Through conducting extensive research as well as in-depth interviews, the PI was able to gather multiple different perspectives on the treatment of autism spectrum disorder. Many similarities were identified between the information within the literature studied and the interviews conducted, but the interviews also allowed the PI to consider things that the literature could not have provided her with: first-hand experience.

The Prevalence of Autism Spectrum Disorder

The literature studied presented that autism spectrum disorder is rising in prevalence across the world, and has been for years. Many different reasons were presented as to why this is happening, such as a rise in autism spectrum disorder awareness. In his book *Disconnected Kids*, Dr. Melillo describes autism as the “worst childhood epidemic of our time” (Melillo 2015). However, Mrs. Mack indicated that she feels many children are simply being misdiagnosed. She went on to point out that if a child does not meet the majority of the standards listed in the DSM-V for autism spectrum disorder, then that child should not receive an ASD diagnosis. She believes that this is the reason for the rise in ASD. Melillo also presented that an autism spectrum disorder diagnosis is found in 1 in 68 children (Melillo 2015), but Mrs. Mack disputes this. She claims that 25% of the children she works with in her school district have ASD, which adds up to

about 15 children in the entire school district. Understanding those numbers, it is clear that they do not line up to Dr. Melillo's statistic. Mr. Smith believes that health professionals are in fact properly diagnosing autism spectrum disorder, but the disorder lies on a spectrum as its name indicates. There is low-functioning autism, and there is high-functioning autism. It is evident that there is some discrepancy when it comes to the diagnosis of ASD.

Treatment Techniques

Just as the literature established the varying differences in children with autism spectrum disorder throughout their childhood, Mrs. Mack also described that the treatment she chooses for the autistic children she works with has much to do with their age range and developmental level. In Watling's 1999 study, it was discovered that a direct one-on-one format of intervention was most effective in working with children with autism spectrum disorder, especially for the younger children. As children with autism spectrum disorder grow older, they are often placed in a group setting during times of intervention. Mrs. Mack's school district implements the same strategy; for children aged 5-10, the intervention is typically individualized, and for children above the age of 10, intervention is often completed in group settings, working on group activities.

Computer-based intervention is the most studied technology-based intervention when it comes to children with autism spectrum disorder, and Brain Balance implements the use of computers throughout a child's session. Mr. Smith references the conditioned reinforcing nature of computers - when a child is completing an activity on the computer, the child is rewarded

when he/she completes a given task with a clapping noise, and when he/she fails to complete a given task, it is accompanied with no noise. The relevance of computers in ASD intervention was continuously presented by Goldsmith and LeBlanc in their literature review, which parallels Mr. Smith's findings through his experience. He also likes having access to computers in treatment because it allows him to work with more than one student at a time.

The Future of ASD in Occupational Therapy

Brain Balance very much pushes technology in treatment techniques, and Mr. Smith believes the future of the program, as well as the future of helping children with autism spectrum disorder, lies in technology. He shared that Brain Balance may begin implementing virtual reality exercises during sessions, as well as more advanced computer-based intervention. Goldsmith and LeBlanc's 2004 literature review theorizes that by including more technological treatment interventions for children with ASD, the child will be able to better blend into our technologically advanced society. Mr. Smith feels that all children can benefit from the exposure to new technologies, for that is where the future lies. Mrs. Mack, on the other hand, believes that many traditional treatment techniques will be utilized by occupational therapists for years to come, for these are the techniques that have been proven successful in the past. Mrs. Mack describes a shoe-tying practice board that allows children to work on tying their shoes, and adds that this practice simply cannot be done through a computer screen. Although Mrs. Mack generally welcomes new technology, she is also wary about it, stating that many times it is difficult for children to focus and use the technology for what it is used for: a treatment aid. That

being said, it will be essential to establish a method to utilize technology in treatment while ensuring said technology is being used for educational/productive purposes.

Limitations/Future Research

There were certainly a few limitations along the way, however, and when conducting future research, these primary limitations will be taken into consideration. If this research were to be conducted further, an interview with an occupational therapist that works with children with autism spectrum disorder in a clinical setting would be included, in hopes to garner more ideas. In addition, in the future, interviewing a parent of a child with autism spectrum disorder may also be included, and their views on which treatments work best would be considered as well. In addition, the process of how autism spectrum disorder is diagnosed would also be reevaluated and studied further.

Conclusions

In conclusion, there is no one correct or best way to treat autism spectrum disorder. It all comes down to the child, and the child's motivation, and the child's desires. For some children, the more traditional treatment techniques, such as sensory integration tasks, are what work best. For other children, the more modern treatment techniques, such as virtual reality simulations, are what work best. For even others, it is a combination of a few different things. It is the job of not only the occupational therapist, but of the team of professionals working with the child to determine the plan of treatment, and thus the pathway of success for the child.

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Appendices

Appendix A: Interview Questions

Questions for Mrs. Mack:

1. How long have you been working in the occupational therapy profession?
2. What age range of children do you have experience working with?
3. What is your greatest challenge when it comes to working with children with autism spectrum disorder?
4. What have you found to be the greatest/most effective treatment technique for those with autism spectrum disorder?
5. How do you feel about the current treatments you have to work with at your job?
6. Have you ever felt that the resources you have to help your students are limited?
7. Would you be interested in more technologically-focused treatment techniques?
8. Do you think more technologically-focused treatment techniques would better engage your students?
9. What are some potential downfalls/problems you see in terms of newly developed occupational therapy treatment techniques?
10. What do you see when you think of the future of occupational therapy treatment techniques?

Questions for Mr. Smith:

1. How long have you been working for Brain Balance?
2. In your own words, please explain what the Brain Balance program consists of.
3. What age range of children do you have experience working with?
4. How often are children with autism spectrum disorder enrolled in the program?
5. Do you believe that the Brain Balance program is effective for children with autism spectrum disorder?
6. Have you ever felt that the resources you have to help your students are limited?

7. What have you found to be the greatest/most effective aspect of the Brain Balance program specifically for those with autism spectrum disorder?
8. What is your greatest challenge when it comes to working with children with autism spectrum disorder?
9. What do you see when you think of the future of the Brain Balance program? Do you see it altering at all?
10. What draws you to the Brain Balance program?

Appendix B: CITI Program Completion Certificate

		<p>Completion Date 13-Nov-2019 Expiration Date 12-Nov-2022 Record ID 34219316</p>
<p>This is to certify that:</p>		
<p>Alison Makinen</p>		
<p>Has completed the following CITI Program course:</p>		
<p>Human Subjects Research Undergraduate Students - Human Subjects Research 1 - Basic</p>	<p>(Curriculum Group) (Course Learner Group) (Stage)</p>	<p>Not valid for renewal of certification through CME. Do not use for TransCelerate mutual recognition (see Completion Report).</p>
<p>Under requirements set by:</p>		
<p>Saint Peter's University</p>		
		
<p>Verify at www.citiprogram.org/verify/?w90fb209f-d85e-42ad-bbbe-1a5d6de50463-34219316</p>		

Appendix C: Informed Consent Form



Saint Peter's
UNIVERSITY

Department of Biology

**INFORMED CONSENT FORM
FOR PARTICIPATION IN A RESEARCH PROJECT**

PROJECT TITLE: Investigating the Occupational Therapy Treatment of Autism Spectrum Disorder in Children

PRINCIPAL INVESTIGATOR: Alison Makinen

MENTOR: Dr. Christina Mortellaro

INTRODUCTION

You are invited to consider participating in this research project. Please take as much time as you need to make your decision. Feel free to discuss your decision with whomever you wish, but remember that the decision to participate, or not to participate, is yours. If you decide to participate, please sign and date where indicated at the end of this form.

PURPOSE

The purpose of this research is to explore the utilization of modern-day occupational therapy technology in the treatment of those with autism spectrum disorder .

PROJECT PLAN

You are being asked to take part in this research because you are a professional in the field of occupational therapy who routinely works with and assists/treats children with autism spectrum disorder. About 3 subjects will take part in this research.

If you decide to participate in this research, you will be interviewed by the principal investigator, Alison Makinen, asked a series of questions regarding your varied experiences with treating children with autism spectrum disorder.

The research will be looking at the various forms of technology used to help treat children with autism spectrum disorder. The questions will range from your personal observations of children with autism spectrum disorder and your experiences with their treatment and outcomes.

The interviews will take place through a phone call interview or in person in a private office at Brain Balance Center - Waldwick.

You will be in the project for about 15-20 minutes.

This research will involve audio recording.

RISKS

There are no risks associated with participating in this research.

BENEFITS

If you agree to take part in this research, there will be no direct benefit to you. However, information gathered in this research may provide insight into modern-day treatment of children with autism spectrum disorders and help therapists everywhere to understand the evolution of occupational therapy treatment in treating those with autism spectrum disorders.

CONFIDENTIALITY

Please revise this entire section to make it applicable to your project.

Every effort will be made to keep any information collected about you confidential. However, it is impossible to guarantee absolute confidentiality.

In order to keep information about you safe, data will be kept in a password-protected file on the researcher's personal computer which only the researcher can access. The questions for the interview along with the answers given in the interview will be hidden in this way. The audio recording of the interview will be kept locked in the researcher's personal cellular device. A pseudonym will be provided for participants and the location of their employment will not be disclosed. The names of those interviewed will not be included in the research, and thus, in the actual thesis. The research will be shared with those who attend my thesis defense in the spring, as well as with the students and faculty of Saint Peter's University in general. Once the research has been completed and the thesis has been written, the data will be destroyed.

We would like to include a pseudonym in place of your name in the thesis and defense that result from this research project. We want to identify and describe you for attribution and explanatory purposes. Please note that, even if your name is not used in publication, the researcher will still be able to connect you to the information gathered about you in this research.

YOUR RIGHTS AS A RESEARCH PARTICIPANT

Participation in this research is entirely voluntary. You can choose not to participate at all, or to withdraw at any point. If you decide not to participate, or to withdraw, there will be no penalty or loss of benefits to which you are otherwise entitled, or any effect on your relationship with the researcher, or any other negative consequences. Your participation or refusal to participate will have no effect on the grade you receive in any course or your standing at Saint Peter's University.

If you decide that you no longer want to take part in this research, you are encouraged to inform the researcher of your decision. The information already obtained through your participation will be included in the data analysis and final report for this research.

QUESTIONS OR CONCERNS

If you have questions about this research project, you may contact Alison Makenen at (414)430-5053 or amakenen15@saintpeters.edu. You may also contact the researcher's faculty mentor, Dr. Christina Mortellaro at cpoli@saintpeters.edu. Please contact the Saint Peter's University IRB at 201 761-6137 or pcvek@saintpeters.edu if you have any questions about your rights as a research participant.

STATEMENT OF PERSON OBTAINING INFORMED CONSENT

I have fully explained this research to the participant. I have discussed the purpose and procedures, the possible risks and benefits, and that participation in this research is completely voluntary. I have invited the participant to ask questions and I have given complete answers to all of the participant's questions.

Signature of Person Obtaining Informed Consent

Date

STATEMENT OF CONSENT

I understand all of the information in this Consent Form. I have gotten complete answers for all of my questions. I freely and voluntarily agree to participate in this research project. I understand that I can withdraw at any time. My signature also indicates that I am 18 years of age or older and that I have received a copy of this consent form.

Participant Signature

Date

Printed Name of Participant

Once you sign this form, you will receive a copy of it to keep and the researcher will keep another copy.

I understand that I will be audio recorded as a part of this research.

Please indicate whether you agree to be audio recorded as a part of this research.

YES *(If you change your mind about this at any point, please let the researcher know)*

NO