

City University of New York (CUNY)

CUNY Academic Works

Dissertations, Theses, and Capstone Projects

CUNY Graduate Center

6-2020

Analysis of Autism Spectrum Disorder and Attention Deficit/ Hyperactivity Disorder: Pharmacological and Non- Pharmacological Treatment Options

Amanda C. Dominguez

The Graduate Center, City University of New York

[How does access to this work benefit you? Let us know!](#)

More information about this work at: https://academicworks.cuny.edu/gc_etds/3760

Discover additional works at: <https://academicworks.cuny.edu>

This work is made publicly available by the City University of New York (CUNY).

Contact: AcademicWorks@cuny.edu

ANALYSIS OF AUTISM SPECTRUM DISORDER AND ATTENTION
DEFICIT/HYPERACTIVITY DISORDER: PHARMACOLOGICAL AND NON-
PHARMACOLOGICAL TREATMENT OPTIONS

BY

AMANDA DOMINGUEZ

A master's thesis submitted to the Graduate faculty in Liberal Studies in partial fulfillment of the requirements for the degree of Master of Arts, The City University of New York

2020

© 2020
AMANDA
DOMINGUEZ
All Rights Reserved

Analysis of Autism Spectrum Disorder and Attention Deficit/Hyperactivity Disorder:
Pharmacological and Non-Pharmacological Treatment Options

by

Amanda Dominguez

This manuscript has been read and accepted for the Graduate Faculty in Liberal Studies in satisfaction of the thesis requirement for the degree of Master of Arts.

Date

[Susan Dumais]

Thesis Advisor

Date

[Elizabeth Macaulay-Lewis]

Executive Officer

THE CITY UNIVERSITY OF NEW YORK

TABLE OF CONTENTS

<u>Introduction</u>	7
<u>Part 1: Autism and Attention Deficit Disorder/Attention Deficit Hyperactivity Disorder</u>	9
<u>Chapter 1- Autism</u>	9
<i>Definition of Autism</i>	9
<i>Autism: Signs and Symptoms</i>	10
<i>Autism: Causes and Risk Factors</i>	11
<i>Autism Spectrum Disorder Diagnosis</i>	12
<u>Chapter 2- Attention Deficit Disorder/Attention Deficit Hyperactivity Disorder</u>	15
<i>Definition of ADD/ADHD</i>	15
<i>Signs and Symptoms/ ADHD Types</i>	15
<i>Causes and Risk Factors of ADD/ADHD</i>	17
<i>ADD/ ADHD Diagnosis</i>	18
<u>Part 2: Treatment and Therapies for Autism and Attention Deficit Disorder/Attention Deficit Hyperactivity Disorder</u>	22
<u>Chapter 1- Behavioral Therapy</u>	22
<i>Autism Spectrum Disorder</i>	23
<i>Attention Deficit Disorder/Attention Deficit Hyperactivity Disorder</i>	28
<u>Chapter 2- Medication</u>	35
<i>Autism Spectrum Disorder</i>	35
<i>Attention Deficit Disorder/Attention Deficit Hyperactivity Disorder</i>	36
<u>Part 3: Dr. Melillo’s At-Home Brain Balance Program: An Alternative Approach to Treating Autism, Attention Deficit Disorder, and Attention Deficit Hyperactivity Disorder</u>	39
<u>Chapter 1- Dr. Melillo and the Brain Balance Program</u>	39
<i>Dr. Robert Melillo</i>	39
<i>Brain Balance Program</i>	40
<u>Chapter 2- Sensory Motor Exercises: How to Train the Brain through Physical Stimulation</u>	44
<i>Smelling Exercises</i>	46
<i>Vision Exercises</i>	47
<i>Sound and Light Therapy</i>	48
<i>Proprioceptive Exercises</i>	49
<i>Activities that Strengthen Sensory Motor Skills in the Right Brain</i>	52

<i>Activities that Strengthen Sensory Motor Skills in the Left Brain</i>	53
<i>Academic Exercises</i>	53
<i>Activities that Strengthen Cognitive Skills in the Right Brain</i>	54
<u>Chapter 3- Brain Balance Nutrition Plan</u>	55
<u>Chapter 4- Strengths and Weaknesses of Dr. Melillo's at-Home Brain Balance Program</u>	57
<i>Strengths</i>	57
<i>Weaknesses</i>	58
<u>Conclusion</u>	60
<u>References</u>	61

ABSTRACT

Analysis of Autism Spectrum Disorder and Attention Deficit/Hyperactivity Disorder: Pharmacological and Non-Pharmacological Treatment Options

by

Amanda Dominguez

Advisor name: Susan Dumais

There has been an increase in the diagnosis of neurodevelopmental disorders over the past decade, as shown by multiple studies. A particular interest has been on disorders that afflict children at an early age and persist throughout their life, such as Autism, now known as Autism Spectrum Disorder (ASD) and Attention Deficit and Hyperactivity Disorder (ADHD), previously referred to as Attention Deficit Disorder (ADD). The impact of these disorders has instigated extensive research into their signs and symptoms, causes and risk factors, diagnosis in terms of available diagnostic tools and processes, available treatment options, conventional and unconventional, as well as, pharmacological or medication-based and non-pharmacological ones such as behavior therapy and brain balance programs. This thesis examines all these elements, combining information from diverse sources, to provide a comprehensive outlook on ASD and ADHD and the current state of diagnostic and treatment options. The goal is to examine progress

achieved while adding to the literature on prospects in management of ASD and ADHD, whether using medications or alternative therapies.

INTRODUCTION

In the past decade, multiple studies have found an increased prevalence of autism spectrum disorders (ASD) and attention deficit hyperactivity disorder (ADHD) (Leitner, 2014). Identification of these disorders has prompted extensive research on causes and risk factors, signs and symptoms, diagnostic elements, and treatment options. At the same time, researchers have made intensive efforts to find out what distinguishes these disorders from one another. There is widespread scholarly consensus that both ASD and ADHD are neurodevelopmental disorders with overlapping phenotypes and etiologies. The disorders can mirror each other considerably. According to Leitner (2014), ASD and ADHD affect the central nervous system (CNS), which is responsible for language, movement, impulse control, memory, focusing, decision making, time management, organization, and social skills. Consequently, children with either ASD or ADHD can have trouble focusing. They can also be impulsive and/or have communication impediments while struggling with relationships and schoolwork (CDC, 2019).

ASD and ADHD are two distinctive disorders despite having similar signs and symptoms. ASD comprises of a series of correlated developmental disorders that affect behavior, language skills, learning ability, and social interactions. This disorder is, therefore, characterized by fundamental social dysfunction and limiting-repetitive tendencies. On the other hand, Teicher (2016) indicates that ADHD affects growth and development of the brain hence defined by impaired functioning in parts responsible for attention, impulsivity, and hyperactivity. This thesis

examines the two neurodevelopmental disorders in detail in terms of signs and symptoms, causes and risk factors, diagnosis, and treatment options, particularly pharmacological and behavioral therapy. It further examines alternative third party management of the disorders, specifically Dr. Melillo's at-home brain balance program. Based on the notion that proper and timely diagnosis can help individuals, especially children, get appropriate treatment, the thesis is an addition to the literature on ASD and ADHD and their management, ensuring that people diagnosed with these neurodevelopmental disorders can lead happy and productive lives.

Part 1: Autism and Attention Deficit Disorder/Attention Deficit Hyperactivity Disorder

Chapter 1-Autism

Definition of Autism/ASD

According to Leitner et al. (2014), when individuals mention autism in the contemporary environment, they refer to Autism Spectrum Disorders (ASD). The brain-based disorder is typified by social-communication problems and limited repetitive behavioral tendencies, activities, and interests. Centers for Disease Control and Prevention (CDC) define ASD as a developmental disability capable of causing substantive communication, behavioral and social challenges. Brentani et al. (2013) indicate that pervasive developmental disorders (PDDs) are presently known as ASDs. These include autistic disorder, pervasive disorder not otherwise specified (PDD-NOS), Asperger's disorder, and childhood disintegrative disorder (CDD, Heller's Syndrome), among others (Brentani et al., 2013). Individuals with ASD are usually not different from others. However, their behavior, interaction, and communication may distinguish them from those without the disorder. Additionally, children with autism spectrum learn in different ways from what others are accustomed to. The communication, thinking, problem-solving, and learning abilities of persons with ASD could range from being gifted to being acutely challenged. This explains why some individuals with ASD could need significant help in their day to day lives, while others are capable of living independently. Regarding the frequency rate of ASD, the CDC notes that boys are four times as likely as girls to suffer from this

neurodevelopmental disorder. The Autism Science Foundation also emphasizes that there is approximately a 4.5 times higher likelihood of autism affecting boys than girls, hence additional credence to the CDC findings. There are, however, no significant variations on how autism affects individuals from different social, ethnic, and racial groups.

Autism: Signs and Symptoms

Autism Spectrum Disorders, as indicated in the preceding section, are typified by serious deficiencies in social relations and communication capabilities, as well as, by the occurrence of significant challenging behaviors. In a study by Jobs, Bölte & Falck-Ytter (2019), the range of behavior expressed by children with autism include repetitive motor habits, such as body rocking and hand flapping. The challenging behaviors may also include insisting on uniformity of items, resisting change, and in extreme cases turning aggressive or self-harming. As noted by Brentani et al. (2013), many people within the autism spectrum have serious cognitive impairments, even though some have normal or in some cases above average intelligence quotient (IQ). An estimated 30 to 50% of autistic people also experience seizures (Brentani et al., 2013). The signs and symptoms of ASD vary from one person to another and they start manifesting in early childhood and usually last throughout the entire life.

The CDC has outlined several distinctive symptoms present in both autistic children and adults. For example, people with autism may not point at items, which is a fundamental indicator of an individual's interest in something. An example of the latter is failing to point at a plane flying overhead or look at objects shown to them. Besides, people with ASD do not easily forge social relations and express a lack of interest in other people (Jobs et al., 2019). This aversion to social situations could also be apparent from avoiding eye contact and isolation of oneself. Another notable symptom of ASD is the inability to identify or understand other people's

emotions or talking about their personal feelings. Brentani et al. (2013) also observe that autistic adults and children dislike touch and as a result, shy away from being held or hugged. The CDC further indicates that people with autism may appear unhappy or unaware of their environment when people speak to them but tend to respond to other sounds. Some may exhibit immense interest in other people, but they do not know how to act when with them, how to play, talk to, or even relate with them.

A study by Ecker et al. (2012) identifies several other behaviors exhibited by people with autism. For instance, autistic individuals have the propensity to echo or repeat words and statements made by others, instead of typical language (Ecker et al., 2012). This is further evident from the trouble they suffer trying to express their needs using normal words or gestures. Occasionally, people with autism take things literally and cannot, as a result, play make-believe games such as feeding a doll or singing them lullabies. Besides, people with this disorder repeat actions over and over (Ecker et al., 2012). The latter also means immense trouble adapting in the event of an altered routine. Autistic individuals have strange reactions to the feel, sound, smell, or taste of things. Finally, in some cases, they lose skills they had at one point, such as ceasing usage of already acquired words. Many other ASD symptoms can be used in the diagnosis process to definitively identify the disorder.

Autism: Causes and Risk Factors

Presently, causative factors for autism remain unknown even though the best scientific research points to crucial genetic components. As noted by the CDC, several studies on twins identify autism as a genetically based disorder. If one twin in an identical pair (monozygotic twins) has autism, there is a 36 to 95% chance that the other one will also be diagnosed with an ASD. In the case of non-identical (dizygotic) twins, the probability of both developing ASD is 0

to 31%, while that of siblings is an estimated 2 to 18%. Scientists are, however, not sure what environmental triggers may result in ASDs. A theory prevalent in the late 20th to early 21st centuries that vaccines are a risk factor for autism has been disproven by multiple studies globally. Although the CDC concedes that ASD causes are not known, it highlights some potential causes categorized into genetic, biological, or environmental. With genes being one of the risk factors for developing ASD, scientists have found that the risk of developing ASD is high in children who have siblings with a similar disorder (Hall, Lightbody & Reiss, 2013). At the same time, ASD occurs more often in individuals with certain chromosomal or genetic conditions such as tuberous sclerosis or fragile X syndrome (Cohen et al., 2005; Hall, Lightbody & Reiss, 2013). Some medications, when taken during pregnancy, are also risk factors for ASD. These medications may include prescription drugs thalidomide and valproic acid. Knowing this is especially important because the critical duration for developing ASD occurs before, during and soon after birth. Also notable is the finding that children born to older parents have a higher risk for ASD (Christensen et al., 2013).

Autism Spectrum Disorder Diagnosis

The diagnostic criteria for autism spectrum disorder are drawn from the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5), a fifth edition of the American Psychiatric Association's diagnostic tool (American Psychiatric Association, 2013). This kit outlines the standardized criteria for ASD diagnosis. In addition to expanding on the outlined criteria for autistic disorder, Asperger's condition, and PDD-NOS, American Psychiatric Association (2013) specifies that individuals with striking social communication impairments, yet their symptoms do not meet criteria for ASD should be assessed for social (pragmatic) communication condition. DSM-5 specifies three categories for ASD diagnosis criteria. Posar, Resca & Visconti (2015)

identify the category as impaired or deficient social interaction characterized by noticeable impairment in utilization of non-verbal communicative actions such as maintaining eye contact, responsive facial expressions, body posture, and gestures; inability to develop age-suitable peer relations; lack of unstructured sharing of affection and interests with other people; and lack of emotional or social reciprocity, as shown by limited emotive interest in others or awareness of other people's reactions, feelings or interests. The second criteria comprise of qualitative deficiencies in communication skills that include delayed or complete lack of language acquisition instead opting for babbling, sounds play, and thereafter lack of phrase speech; incapability to start-off or hold a coherent conversation; repetitive or stereotyped use of language or idiosyncratic speech (strangely formal speech, echolalia/ meaningless repetition of other people's words); and underdevelopment or lack thereof of age-appropriate social imitation or make-believe play (Posar et al., 2015). The third diagnostic criteria entail incidence of restricted and repetitive behavioral patterns, actions, and interests such as marked fixation with one or more uncommon and limited interests; uncompromising devotion to certain rituals or routines; repetitive motor behaviors such as pacing, jumping, flapping hands, or flicking fingers; and obsession with parts of objects instead of the objects themselves (Posar et al., 2015).

For a person to fulfill the criteria for diagnosing an autistic disorder, they must display proof of at least six items from the three aforementioned domains, two or more items from the first and one each from the second and third. Persons with Asperger's disorder on the autism spectrum do not have language delays. They must, however, manifest at least two criteria from category one and one or more from the third domain characterized by repetitive and restricted interests. Diagnosis of the other ASD, PDD-NOS, occurs when individuals show traits such as ubiquitous social communication deficiency and/or impairment in form of repetitive and limited

interests, but where requisite criteria for autistic disorder and Asperger's disorder is not fulfilled. CDD, on the other hand, exhibits a distinctive profile, with a severe decline of development and behavior after seemingly normal growth for two or more years after birth.

In their research, Grzadzinski, Huerta & Lord (2013) state that ASD diagnostic criteria leads to recognition of delays or abnormal child functioning in language, imaginative play, or social interaction within the first three years of life. Such abnormalities lead to deviation from normal developmental patterns projected for their age. Therefore, the priority is to pinpoint early ASD signs and commence interventions immediately. Wüstner et al. (2019), citing longitudinal studies of babies at high-risk for ASD by having older affected sibling(s) and backdated analysis of first-birthday videos of children later diagnosed with ASD, stress that in some children the signs and symptoms of the disorder (s) can be identified at the age of six to twelve months. The diagnoses stabilize more after eighteen months and by two years there are chances of complete stability. For this reason, Jobs et al. (2019) argue that healthcare providers should keenly note early concern expressed by parents about their children's developmental progress, while making intent observations of the same. Early diagnosis leads to effective interventions and a better prognosis for affected individuals.

Chapter 2- Attention Deficit Disorder/Attention Deficit Hyperactivity Disorder

Definition of ADD/ADHD

Attention Deficit Hyperactivity Disorder (ADHD) refers to a neurodevelopmental disorder characterized by symptoms such as inattention, impulsiveness, and hyperactivity (Hamed, Kauer, and Stevens, 2015). Previously referred to as Attention Deficit Disorder (ADD), it is one of the most prevalent neurodevelopmental conditions in childhood. ADHD has long been plagued with controversies not just within the medical field, but also among educational authorities and parents. For this reason, ADHD diagnosis and treatment continue to fuel debate. According to Hamed et al (2015), ADD/ADHD is often over-diagnosed or over-treated, as the parent-reported diagnosis has been on an upward trajectory; rising from 6.9% in 1997 to 7.8% in 2003. The parental diagnosis of this disorder further rose to 9.5% in 2007 and 11% in 2011. In the US, ADHD affects 5-11% of children (6.4 million children) (Hamed et al., 2015). Hindrances to assessment have been associated with under-diagnosis, misdiagnosis, and/or under-treatment. According to the CDC (2019), ADHD is typically diagnosed in childhood first and lasts into adulthood.

Signs and Symptoms/ADHD Types

The CDC recommends that if a guardian is concerned about the possibility of their child having ADHD, they should take initiative to talk to a healthcare provider and find out whether the symptoms meet the criteria for diagnosis. According to the American Academy of Pediatrics, the healthcare providers should, in turn, ask guardians and teachers, among other adults that care for the child about their behavioral habits in different environments, such as at home, school, and

in social settings where they interact with others. Concurrently, healthcare providers should establish whether the child suspected to have ADHD has other conditions that could explain the identified signs better. In most cases, children with ADHD find it difficult to focus besides having behavioral challenges at different times (Wüstner et al., 2019). These children do not outgrow the ADHD behaviors and if symptoms persist, severity can increase, resulting in difficult relationships at home, school, or with friends. Wüstner et al. (2019) identify some of the symptoms of ADHD to include excessive daydreaming, forgetting or losing items repeatedly, fidgeting or squirming when seated, and taking unwarranted risks. A child with ADHD may also talk excessively and make thoughtless mistakes. Those with high levels of impulsiveness have a difficult time resisting temptation and exhibit the inability to patiently take turns. Also notable is the hard time they undergo, attempting to get along with other people.

There are three key types of ADHD, depending on the degree of inattention or hyperactivity. First, there is the Predominantly Inattentive Presentation, in which the affected individual finds it difficult to organize or execute a task (American Psychiatric Association, 2013). A person with this type of ADHD also finds it hard to pay the required attention to details, engage in congruent conversations, or follow instructions. He/she also gets distracted easily or forgets the details integral to daily routines. Overall, a person with this presentation of ADHD is truly inattentive hence the attention deficit disorder designation. The second type of ADHD is Predominantly Hyperactive-Impulsive Presentation where affected individuals constantly fidgety and talks much (American Psychiatric Association, 2013). It is difficult for such an individual to sit still for a prolonged period, for example doing homework or for a meal. In smaller children, this second type of ADHD manifests through constant jumping, climbing, or running. Generally, individuals feel restless and have trouble controlling their impulses. As a result, they may

interrupt ordinary conversations, speak at unsuitable times, or grab things from others. Such persons cannot manage to wait for their turn to speak or listen. Given the heightened impulsivity and activity (hyperactivity), individuals with this ADHD presentation are prone to more accidents and harm than other people. The third ADHD type is combined presentation, characterized by symptoms of predominantly inattentive and predominantly hyperactive-impulsive presentations (American Psychiatric Association, 2013). Since symptoms of ADHD can change progressively, presentation of the disorder can also change.

Causes and Risk Factors of ADD/ADHD

According to the CDC, scientific studies of the causes and risk factors of ADHD are still ongoing, in the effort to find improved ways of managing symptoms and reducing the chances of individuals having the disorder. According to studies in twins, genetics plays a critical role in the onset of ADHD. Scientists have also identified other factors responsible for ADHD. For example, as denoted by Wüstner et al. (2019), parental mental health challenges have shown to be a well-researched risk factor for psychopathological issues in children including the onset of ADHD. Particularly, maternal depressive signs and symptoms, as well as, ADHD symptoms in parents have been linked to the development of ADHD in childhood. Furthermore, Wüstner et al. (2019) state that other familial risk factors for ADHD include conflicts and detrimental parenting conditions, characterized by the absence of warmth and a caring attitude towards children. In addition to these psychosocial risk factors, other studies have reported issues such as pre and post-natal challenges as contributive to ADHD. These factors include premature birth, low weight at birth, and maternal alcohol, tobacco, and/or substance abuse during pregnancy. Brain injury and exposure to adverse environmental elements such as lead also increase the risk for ADHD (CDC, 2019).

Wüstner et al. (2019), further highlight cross-sectional studies that have shown links between socioeconomic factors and ADHD in children and teenagers. Some of these elements include low parental education and financial difficulties. Such issues also worsen ADHD prognosis, since they impede early and appropriate interventions. Research fails to support popular notions that ADHD is caused by excessive television watching, consumption of too much sugar, or parenting style. Undoubtedly, these socio-environmental factors may exacerbate symptoms of ADHD, but the evidence is not adequately strong to conclude that they are key causes of the disorder.

ADD/ADHD Diagnosis

As stipulated in the previous section, there are multiple persons, settings, symptoms, and assessments necessary to conclusively diagnose ADHD. According to the CDC (2019), there is no single test to decisively diagnose ADHD and other psychosocial problems including depression, anxiety, sleep conditions and some types of learning disabilities. Lack of the test makes the multifaceted, multistep approach to ADHD diagnosis highly important. One phase of the process entails conducting a medical examination including audio and vision tests, to rule out other conditions with symptoms similar to ADHD (American Psychiatric Association, 2013). At the same time, the diagnosis of ADHD requires the use of a checklist for rating symptoms and taking a child's history from guardians, teachers, caregivers, and occasionally, the affected child.

The American Psychiatric Association diagnostic tool, DSM-5, outlines suitable criteria for diagnosis of ADHD as described further herein. According to the DSM-5 criteria for ADHD, persons with the disorder usually depict an obstinate pattern of inattention and/or hyperactivity-impulsiveness that interferes with normal development or functionality (American Psychiatric Association, 2013). Regarding the first diagnostic factor of inattention, individuals must exhibit

six or more associated symptoms for children up to 16 years of age or five or more for adolescents at the age of 17 years or more, to meet ADHD criteria. Concurrently, symptoms of inattention must have been present for six months or more and they must be improper for the child's or adolescent's level of development. These symptoms may include:

- The individual failing to pay close attention to detail or making careless mistakes in school assignments, at work, or in other productive activities.
- Continually experiencing trouble holding attention in play activities or other tasks.
- Often appearing distracted or not seemingly listening when addressed directly.
- Often failing to follow instructions and not completing schoolwork, allotted chores or duties in a work environment. This could mean losing focus or getting inexplicably side-tracked.
- Continuously finding it difficult to organize activities and tasks that would typically be unproblematic to plan.
- A tendency to avoid tasks, disliking some or being reluctant to complete ones that need sustained mental effort over some time such as school or homework.
- Losing items critical to the execution of important tasks and activities. These may include books, pencils, pens, and other stationery. Other objects may also be crucial for day to day functioning such as eyeglasses and cellphones.
- Reoccurring distraction and
- Chronic forgetfulness in daily activities.

On the hyperactivity and impulsiveness symptom, the DSM-5 also specifies that a person must have at least six symptoms of hyperactivity-impulsivity for kids aged 16 years old or younger or at least five for adolescents at the age of 17 years to adulthood (American Psychiatric Association, 2013). Additionally, these signs of hyperactivity-impulsivity must have afflicted such persons for six or more months, to the degree of being disruptive and improper for the individual's level of development. Symptoms of hyperactivity-impulsivity include:

- Being fidgety and squirming in the seat as well as repeatedly tapping feet or hands.
- Often leaving one's seat in circumstances where remaining seated is required.
- Often running about or climbing in situations where these activities are inappropriate. For adults and adolescents, this could be limited to overall restlessness.
- Inability to play or participate in leisurely undertakings quietly.
- Typically "on the go" as if driven by an unstoppable force or "motor".
- Talking excessively.
- Blurting out an answer even before a question is completed.
- Often finding it hard to wait for one's turn.
- A tendency to interrupt or intrude on others, as exemplified by butting into games or conversations uninvited.

Other than outlining the symptoms necessary to diagnose ADHD, the DSM-5 tools specify conditions that must be met. For instance, several of the specified inattentive and/or hyperactive-impulsive symptoms must have been present before the age of 12 years. Secondly, the individual under scrutiny must exhibit the symptoms in at least two settings, for example at

home, school, or in social areas. Thirdly, there ought to be clear proof that the symptoms disrupt, or reduce the affected person's quality of life at school, work, or in terms of social functioning. Moreover, the symptoms suspected to indicate that a person has ADHD are not better explicated by other mental conditions such as anxiety disorder, mood disorder, personality disorder, or dissociative disorder (American Psychiatric Association, 2013). Finally, the symptoms must not happen only in the course of another psychotic disorder such as schizophrenia, among others.

Part 2: Treatment and Therapies for Autism and Attention Deficit Disorder/Attention Deficit Hyperactivity Disorder

Chapter 1- Behavioral Therapy

Anderson (2017) notes that behavioral therapies are scientifically sound methods used by healthcare providers alone or in combination with other treatment modalities, for individuals with mental disorders, especially with psychosocial implications. Behavioral therapies for young children, adolescents, and even young adults vary extensively. However, Anderson (2017) states that all the aim of the therapies is to establish how negative behaviors or problematic thought processes may be unintentionally “rewarded” in the said individual’s environment. Such rewards reinforce unwanted behaviors thereby increasing their frequency. Behavior therapies can be applied to an assortment of psychological symptoms among children and youths. Despite the differences between these therapies, they all encourage patients to try new behaviors, by rewarding desired ones and ignoring unwanted ones, thereby allowing them to gradually wane and possibly extinguish in the long run. For example, an adolescent may find it difficult to complete an assigned task. As a result, the guardians put in place a reward mechanism that involves earning points every day that the assignment is successfully executed, in exchange for the teenager’s desired reward in a certain period say two weeks, for example using the family car to go out with friends. The reward should be something the teenager genuinely wants and it must be linked to a precise goal, in this case, completion of the assigned task. Initially, the youth is motivated to work for the extrinsic reward, but with time, the task becomes easier and the reward can be gradually phased out and new goals developed. The ensuing sub-sections examine application of behavior therapy in Autism and ADD/ADHD, for better insight into how this

treatment option can be used to manage symptoms characteristic of these disorders while improving individuals' outcomes.

Autism Spectrum Disorder

Reports published by the American Academy of Pediatrics (AAP) and the National Research Council (NRC) suggest that behavior and communication methods, which help children with ASD the most, are those that provide them with direction, organization, and structure while facilitating familial participation. Bilbili (2013) identifies behavior management therapy, as a key treatment that reinforces desired behavior while reducing undesired ones. In addition, autism-specific behavior therapy proposes what care providers can do prior to, in the course of, after, and in-between episodes of noteworthy problem behaviors (CDC, 2019).

According to Bilbili (2013), autistic children require help with social interaction, language, and an array of challenging behaviors highlighted under the signs and symptoms sub-section. The brain structure, chemistry, and function are the same in such children. Since lack of social motivation underscores many of the deficits in children with ASD, many avoid eye contact and human voices or faces. Anderson (2017) indicates that social impairment paves for numerous problems since the brain waits for critical input stemming from early interaction and imitation that accompanies learning. When the brain of an autistic child fails to get this social input, it may fail to gain language; learn how to pick up on emotions; learn how to read gestures, or even understand the back and forth of typical social relations. Although seemingly dire, the fortunate aspect is that medical researchers have started to explore the possibilities in brain recovery despite impairment in development or injury. The restructuring of connections inside the brain, which takes place in the course of learning, is a crucial part of this process. As a result,

behavioral interventions used in the treatment of autism may not only alter outward behavioral elements but could also help reorganize the brain for positive outcomes (Anderson, 2017).

Behavioral therapy for autism is usually founded on Applied Behavior Analysis (ABA). ABA is a widely recognized and accepted approach that helps in tracking autistic children's progress in improving their skills. ABA has high popularity in hospitals and schools as a result of recommended by healthcare professionals on its extensive use for treating children with autism. ABA works by encouraging positive behaviors, while discouraging negative behaviors, in pursuit of enhancing different skills. Involved parties then track and measure the involved child's progress. As an umbrella behavioral therapy, ABA features several types of therapies specifically used in ASD treatment. These include Positive Behavioral and Support (PBS), Pivotal Response Training (PRT), Discrete Trial Teaching (DTT), Early Intensive Behavioral Intervention (EIBI), and Verbal Behavior Intervention (VBI). PBS attempts to establish why a child with Autism engages in specific problem behavior. It then works to transform the environment, teach the child certain skills, and institute other alterations within the child's environment that make appropriate behavior positive for the child. As a result, PBS encourages an autistic child to embrace correct behavior.

Pivotal Response Training (PRT) occurs in the environment of the affected children. PRT's primary objective is to enhance a few critical skills such as motivation and making a move to communicate. These fundamental skills help the child in treatment to learn multiple other skills, as they acquire the basic skills necessary to deal with different situations. At the same time, the motivation made possible by PRT pushes a child to learn new things; to monitor their behavior, and commence communication with others. The positive changes in these basic aspects should extend to other behaviors. EIBI, on the other hand, provides customized

behavioral instruction to exceedingly young autistic children. Those that benefit from this behavioral therapy are typically below the age of five and/or even three. This type of ABA is time-consuming; requires substantial devotion, and provides individualized instruction or at the very least, targets a small group of participants. DTT teaches autistic children critical skills in a controlled way, following distinctive steps. At the same time, the caregiver makes use of positive feedback to encourage the child's use of new skills. Given the step by step approach of DTT, facilitators use a series of trials to instill every phase of a desired response or behavior. Lessons in DTT are, therefore, broken down into the simplest possible parts and positive reinforcement applied to reward correct behaviors and responses. Facilitators ignore incorrect responses or behavioral tendencies, thus allowing them to incrementally extinguish or fade away. The final type of ABA, that is, VBI focuses entirely on imparting verbal skills.

Autism can also be treated through different other therapies that do not fall under the ABA collection. These include Relationship Development Intervention (RDI), Sensory Integration Therapy (SIT), Communication Interventions, and Treatment and Education of Autistic and Related Communication Handicapped Children (TEACCH) (CDC, 2019). RDI is a fairly new type of behavior therapy and as the name suggests, it aims at enhancing the social behaviors of the child with Autism. In this therapy type, the parents or principal caregivers are more involved in the treatment process than therapists. Following initial evaluations by a healthcare professional, goals are delineated for the child. Subsequently, parents attend an intensive training workshop or watch an informative video that is five-hours long, to help learn how to conduct therapy. At the same time, parents must take videos of themselves helping the child for submission to the professionals, to get feedback and additional advice on further

treatment. RDI seems to yield the best outcomes for young children, although trials are still ongoing for older ones too (ABA Program Guide, 2019).

Through sensory integration behavioral therapy, it is possible to enhance an autistic child's responses to overwhelming sensory stimuli such as bright lights, touches, and loud noises, among others. Therapists using SIT introduce the child undergoing treatment to incrementally higher levels of the target stimuli. Therapists have to push a child's stimuli limits without using force. This type of behavioral therapy does not need long sessions and positive outcomes take place fairly quickly if the prognosis is positive. Communication interventions are yet another potent behavioral therapy for individuals with autism. Closely related to VBI, several diverse models are available for use, but all aim at dealing with a core deficiency in many people with autism, that is, the lack of communication skills. This behavioral therapy is highly important because, without the ability to communicate effectively, autistic children tend to exhibit undesirable behaviors due to misunderstanding or frustration from certain situations. Communication interventions, whether technology-based, as characterized by the use of devices such as iPads, or verbal help autistic individuals express their needs or desires more effectively (ABA Program Guide, 2019). Aiding such communication in social settings could even be more significant to persons with autism, since social learning often happens through modeling others' behaviors, through peer tutoring, social play, and many other means.

The final type of behavior therapy, the TEACCH model, aims at helping children on the autism spectrum to accomplish positive outcomes with their social and other problem behaviors. This model uses an organized and structured setting throughout. Additionally, the activities are sequenced predictably and visually arranged to enhance the surroundings of the child. Autistic children using the TEACCH model practice the target actions and skills in a clear technique.

Like in other behavioral therapies, results are more outstanding when the guardians are involved and trained to use a similar approach at home (CDC, 2019). Generally, behavior therapy for autistic individuals may vary substantively among therapists. Different types of therapies also work better for one child than the other, depending on the symptoms and response capacity, among other distinguishing factors. Therefore, healthcare professionals must liaise with all parties involved in the child's care, including parents and teachers, to come up with the right protocol for every child, which is key to optimal success.

Other therapies that are closely linked to behavior therapy and could also go a long way towards helping improve treatment outcomes for autistic individuals include Developmental, Individual Differences, Relationship-Based Approach (DIR) also referred to as Floortime; Speech Therapy; Occupational Therapy; and the Picture Exchange Communication System (PECS). DIR focuses primarily on relational and emotional development in autistic children. This means shaping feelings and interactions with caregivers, thus laying the foundation for growth of relationship-forming capabilities. This type of therapy also helps children on the autism spectrum to deal with stimuli such as smells, sounds, and sights. Speech therapy alternatively, helps in improving individuals' communication skills. This may be highly beneficial for autistic children who showcase a greater affinity for verbal communication than for other ways. PECS also teaches communication skills, but unlike speech therapy, it instills the ability for autistic individuals to use picture symbols instead of verbal language, to convey messages, ask questions, provide responses, and essentially converse with others. Finally, there is occupational therapy, which seeks to teach persons with autism skills that can enable them to lead independent lives as much as possible. Some of these skills may include eating, dressing, bathing, and generally interacting with others productively. Although these therapies may not be

as exclusive to autism as those previously such as ABA and TEACCH, they are equally important in ensuring that autistic persons effectively manage their symptoms and gain positive outcomes from treatment.

ADD/ADHD

The American Academy of Pediatrics proposes guardian training in behavior management as the foremost treatment option for children with ADHD below the age of six, before trying medication. For children the age of six or more years, a combination of behavior therapy and medication is allowable. Lines of treatment for children up to 12 years of age chiefly revolve around parent training in behavior control and other forms of behavior training and therapy for adolescents. Schools are also considered an integral part of behavioral therapy, with AAP recommending addition of classroom-based behavioral interventions among other school supports. As emphasized by Anderson (2017), appropriate treatment plans involve close assessment of whether the chosen options help and to what extent they improve behavior of children with ADHD, in addition to making necessary changes as treatment progresses. Just like in the behavior therapy-based treatment for autism, parents in the ADHD context must also be proactively involved. Notably, ADHD impedes not just a child's capacity to pay attention or remain still when required to do so in school, but it affects relations with other children and family as well. With ADHD children exhibiting behaviors that could prove highly disruptive for others, behavior therapy serves as a potent treatment option. It can help ameliorate these behaviors while allowing for a positive prognosis if provided early enough. The main goals of behavior therapy in ADHD treatment are to enable persons with ADHD to learn or reinforce positive behaviors and to get rid of problematic or unwanted behaviors.

The CDC (2019) sums up behavior therapy for ADHD into three key categories including “parent training in behavior management or behavioral parent training; behavior therapy with children; and behavioral interventions in the classroom.” Regarding the first category, the rationale behind parents training in behavior supervision is that they are the ones in direct contact with ADHD children and therefore, they wield the greatest power to influence the children’s performance at home, school, and in establishing other relationships. When parents get the necessary expertise in behavior therapy, they internalize the strategies and skills pivotal to helping their children in different life dimensions. Parent-led behavior supervision is also likely to have a sustained impact on the child with ADHD and the rest of the family. The CDC (2019) indicates that behavioral parent training was put in place to teach guardians how to reinforce desired behavior in children with ADHD, counter poor behaviors, and enhance parent-child relations. In this type of behavioral therapy, parents play a crucial role by proactively contributing to the treatment of behavior problems. In the course of therapy sessions, they learn how to intently observe their children demeanors at home. They are also taught reward management skills, thus gaining the expertise to formulate and implement reward systems feature positive attention, praise, and tangible rewards. Parents also learn when to set rules, to call for a time-out when children deviate from desired behavior, and to ignore negative reactionary tendencies to discourage poor behavior. Behavioral parent training therapy is backed by significant experimental evidence, which shows that it is effective in minimizing behavior problems, particularly for kids with ADHD.

In pursuit of behavioral parent training, the CDC (2019) recommends that guardians and families with ADHD children look for therapists that specialize in parent training. Such therapists are certified in parent training programs that have been proven feasible when working

with children that have ADHD. Parents can adopt specific criteria to find therapists that use proven parent training techniques (CDC, 2019). For example, they can establish whether the therapist teaches parent skills and approaches that are structured; make use of positive reinforcement; and maintain consistency in a disciplinary tactic to control children's behavior. A parent can also find out whether the selected therapist teaches guardians positive ways to communicate and interact with their ADHD child. A good parent-training therapist must also strive to allot activities that parents practice with their children. They must further arrange regular meetings to monitor the child's progress while providing necessary advice and support. Finally, a capable therapist must reassess treatment plans to make worthwhile adjustments. Such flexibility is crucial for adjustment of treatment strategies as needed, especially because ADHD symptoms do not remain constant and presentation may vary over time. In turn, healthcare providers specializing in parent training should adhere to clinical practice protocol for ADHD diagnosis and treatment in young children. They should also engage the parents in critical dialogue on behavior therapy benefits; why they should seriously consider getting recommended training; and feasible expectations, to avoid rushing the process or losing motivation midway. Finally, healthcare providers should help parents with ADHD children to identify training providers in their localities and refer them there, before prescribing any medication.

Concerning the second key consideration of behavior therapy with ADHD children, the primary aim of behavior therapy is to enhance the affected individuals' mental health. This is in recognition of the fact that mental, emotional, and behavior-related challenges brought about by ADHD and other mental disorders can result in long-term problems that are adverse to the health and overall welfare of the children, their families, and surrounding communities. Therefore, treating children's mental issues at the earliest possible time can help reduce challenges at home,

school, and in social environments where they form relationships capable of lasting their lifespan. Behavior therapy for mental health can further aid with healthy progress into adulthood. The CDC (2019) underlines that a public health outlook on children's mental health encompasses promotion of mental health for every child; provision of preventive interventions to those at risk; and providing appropriate treatment for identified disorders. Taking these provisions into consideration, behavior therapy (child behavior therapy and cognitive-behavior therapy) aiming at treating ADHD children, is crucial to their health. This is because behavior therapy helps address disruptive behaviors and other challenges arising from the disorder such as stress and anxiety. For greater specificity, cognitive behavior therapy (CBT) focuses on altering the emotions and thoughts capable of impacting negatively the child's behavior. Therapists using CBT help children with ADHD to gain awareness of their thoughts and emotions. They also help children assess whether their thoughts or feelings may be irrational or distorted, before guiding them through the process of altering these thoughts and the accompanying emotional reactions. Although CBT typically involves working directly with the child, parents may be included especially in the case of young children or youths with ADHD.

On the matter of behavioral interventions in school settings, there are multiple available options. One is behavioral classroom management, which is a form of evidence-based behavior therapy designed to support positive behaviors in class for students with ADHD, while simultaneously preventing negative behaviors. This type of class-oriented therapy also aims at elevating students' engagement in academic activities and processes. Behavioral classroom management is widely used and supported by experiential data as an effective type of therapy in the treatment of ADHD. The other type of behavioral therapy that can be implemented in class settings is behavioral peer interventions. This may involve at least one of a student's peers

providing help to the child with ADHD and associated behavioral problems. Teachers can train children's peers to bolster the affected child's academic performance and positive habits with both academic and social support strategies. Behavioral peer interventions as a type of therapy are often used within school environments and have been proven to provide numerous advantages in terms of social, interpersonal, and academic development. Engaging in this type of therapy has also proven beneficial for peer assistants. This is because it nurtures and strengthens a sense of responsibility, as the peers feel that they are in a position to help and encourage constructive behavioral transformation. Just like the other behavioral interventions, peer interventions have scientific backing; which underlines their effectiveness in treating children with ADHD. There are different peer-based behavioral therapies including peer modeling, classroom-wide tutoring, and peer initiation training. Peer modeling is where the peer assistant demonstrates an appropriate response to a negative situation, to encourage imitation in the target child or teenager. It has been scientifically proven effective in treating fear or anxiety in children. Finally, healthcare providers, parents, and teachers, among other parties involved in the life of a child with ADHD can opt for combined behavioral management therapies. As the name implies, such therapies combine the aforementioned interventions depending on the child's needs and healthcare provider recommendations. Combining behavioral parent training, behavioral peer interventions and/or behavioral classroom management, is a well-established approach to ADHD treatment and has been proven effective by scientific evidence.

Behavioral interventions in the treatment of ADHD may achieve even greater outcomes with several basic considerations. For example, it is necessary to create a routine, where a child's caregivers try to adhere to the same schedule daily from the moment the child wakes up until bedtime. Secondly, it is important to ensure that the environment in which a child with ADHD is

living is well organized. With such a foundation and encouraging the child to put toys, clothes, and schoolbags, in designated areas daily, there is a chance of sustained self-organization in future and reduced frustrations or acting out related to misplaced items. The third fundamental aspect to account for involves the management of distractions that affect children with ADHD. This could mean turning off the television, limiting noise, and providing clean workspaces when the child is doing homework. However, there are children with ADHD who find it easier to learn when moving or with music in the background. This ties into behavioral parent training, as one should keenly observe their child and determine what works best for them. Steven, Julie, and Nora (2013) further recommend limiting choices for the child, to help them avoid feelings of being overstimulated or overwhelmed. Other than providing them with few options in situations where they have to choose, parents must be clear and precise when talking with their children. Clear and concise directions and general communication ensure that children with ADHD feel listened to and in turn, they fully understand what is expected of them.

When implementing any type of behavioral intervention for a child with ADHD, it is important to break down complex tasks into shorter hence simpler steps. For tasks taking long durations, early starts and in-between breaks could help minimize stress. The use of goals and positive reinforcement measures such as praise and other rewards should be well planned and organized, to facilitate tracking of positive behaviors. It is vital that the set goals are realistic, to avoid imposing unnecessary pressure on the child undergoing treatment. Disciplinary measures should be considerate, yet effective. Rather than scold, yell, or spank a child with ADHD, parents and other caregivers would be better suited to use time-outs, effective directions, and denial of rewards or removal of freedoms, as consequences for negative behavior. Parents should strive to form positive opportunities for affected children. This would involve discussing tastes

and preferences with the child and assessing what activities they seem to enjoy more than others (Steven et al., 2013). For example, some children with ADHD may prefer music to sports or vice versa, while others may have an interest in art or games, among other aspects. Establishing what children with ADHD like and creating opportunities for them to experience these activities, may improve behavioral treatment outcomes. All these behavioral interventions would, however, be in vain, if the caregivers fail to provide healthy lifestyles for children with ADHD in their respective settings.

Chapter 2- Medication

Autism Spectrum Disorder

The CDC (2019) points out that there are currently no medications to cure autism or even comprehensively treat the disorder's main symptoms. However, some medications help some ASD patients manage specific symptoms such as high levels of energy, depression, seizures, irritability and aggression, and lack of the ability to focus. LeClerc and Easley (2015), in their analysis of pharmacological treatments for ASD, indicate that risperidone, consisting of a formulation of Risperdal, Janssen, and generics, was the first Food and Drug Administration (FDA) approved antipsychotic drug for the treatment of autism-linked irritability. Citing various studies, these researchers note that risperidone has been proven fairly effective in managing aggression-related behavioral symptoms and problems in autistic children. The most reported adverse effect of the drug is weight gain.

The other FDA approved psychotropic drug is aripiprazole; a composition of Ability, Bristol-Myers Squibb, and generics. It is also used to treat bad temper in children with ASD between the ages of six and seventeen. Aripiprazole is also indicated for treatment of other mental disorders such as Tourette's syndrome, schizophrenia, major depressive disorder, and bipolar I disorder. The most prevalent after-effects associated with aripiprazole include vomiting, weight gain, and anomalous increase in appetite. Another counterproductive after effect that has even led to treatment discontinuation in children with ASD is aggression. Other drugs that have been used to treat ASD-related aggression with significant results include clozapine and haloperidol, while selective serotonin reuptake inhibitors (SSRIs) such as sertraline although used to treat adults with ASD, are yet to be tested via large well-designed trials for children. Risperidone and haloperidol have also been used to treat aberrant social behavior in persons with

ASD, with the former proving more effective than the latter (LeClerc& Easley, 2015). On the whole, pharmacological treatments for autism spectrum disorders are limited and not highly recommended, especially for young children.

ADD/ADHD

Pharmacological treatments of ADD/ADHD can help individuals with various presentations of the disorder to manage their symptoms in daily life. Medication can also help persons with ADHD regulate behaviors that instigate difficulties at home, school, and with peers. There are two categories of FDA approved ADHD pharmaceuticals, that is, stimulants and non-stimulants. These medications help reduce ADHD symptoms and enhance functioning in children that are as young as six years. Stimulants are the most widely known and used ADHD medicines. They contain different forms of amphetamine and methylphenidate, which have a soothing effect on children with ADHD that manifest hyperactivity. Stimulants work by increasing levels of dopamine in the brain. This is a neurotransmitter linked to attention, motivation, and motor skills. According to the CDC (2019), between 70 and 80% of children with ADHD show fewer symptoms of inattention and hyperactivity-impulsiveness when taking stimulants.

Non-stimulants, on the other hand, were approved by the FDA for ADHD treatment in 2003. Thus far the FDA has sanctioned three non-stimulants to treat ADHD symptoms including Kapvay (clonidine), Intuniv (guanfacine), and Strattera (atomoxetine). These non-stimulants are an important alternative for treatment of children with ADHD that do not tolerate stimulants. Although non-stimulants are not as fast-acting as stimulants, their effect can last for up to 24 hours (CDC, 2019). Brown, Samuel, and Patel (2018) note that there is a clinical approach to the pharmacological management of ADHD, which follows several steps. The first involves

administration of extended-release stimulants, which make up the first line of treatment involving medication use. Generally, stimulants address key ADHD symptoms equally, although a child or teenager may respond more positively to one type of medication over another. The second step involves increasing dosage of the selected stimulant medication, either amphetamine or methylphenidate until the maximum possible symptom benefit is attained without substantive after or side effects. Alternatively, increased titration of the dose should continue up to the point where the person undergoing treatment can tolerate side effects and the benefit of increased dosage outweighs possible risks. Thirdly, if one stimulant does not have a positive impact at the highest suitable dose, a healthcare provider should contemplate trying another stimulant. The same administration process should take place, with increased dosage up to the maximum benefit without risking the patient's wellbeing. Finally, if both stimulants have been administered without showing improvement in ADHD symptoms or if the patient cannot tolerate either because of side effects, medical practitioners should move to try non-stimulants (Brown et al., 2018).

In general, medications have varying effects on different children with ADHD and can have equally variant side effects. This explains the need for medical practitioners to try different ADHD medications and doses; making the necessary adjustments to find the balance between advantages and side effects. Parents must also be proactively involved in the process, to bring all medication effects to physicians' attention, thereby helping find the best possible pharmacological treatment plan. Even though FDA-approved medicines currently in the market have been tried and tested for safety and efficacy in clinical trials of children at the age of six and older, there is still a need for clinical trials with participating children between four and five years old. Continued trials will help provide safety and effectiveness data for children with

ADHD in this age bracket while creating room for further development of pharmacological treatments for the disorder. All the same, medications remain a contested issue, especially for young children hence the exploration of alternative treatments for neurodevelopmental disorders such as autism and ADD/ADHD. An example is Doctor Melillo's brain balance program, examined in detail in the subsequent section.

Part 3: Dr. Melillo's At-Home Brain Balance Program: An Alternative Approach to Treating Autism, Attention Deficit Disorder, and Attention Deficit Hyperactivity Disorder

Chapter 1- Dr. Melillo & the Brain Balance Program

Dr. Melillo

In the media, Robert Melillo is casually known as "Dr. Melillo". In America, he stands out as one of the most experienced experts in the neurological field related to childhood disorders. Dr. Melillo also holds a doctorate in chiropractic neurology. This means that he is not only licensed but also holds a tremendous amount of knowledge in the field. Additionally, he possesses expertise in nutrition for kids with neurological disorders. Dr. Melillo is also responsible for developing the Brain Balance Program and has established numerous centers in the U.S. These centers play a huge role in supplemental learning for kids with neurological disorders, especially those with learning disabilities. The centers utilize a different curriculum, which mainly focuses on behavior and learning disabilities by using a process known as functional disconnection. Since Dr. Melillo introduced the theory, of functional disconnection, it has become a worldwide theory about dyslexia, autism, as well as ADD and ADHD, among others. Dr. Melillo has therefore enabled individuals in this field to comprehend the fundamental character of the disorders as well as their root causes.

Although Dr. Melillo holds master's degrees in neuroscience, as well as clinical rehabilitation neuropsychology, it is not clear which learning institution accredited him. However, some findings show that Carrick Institute, an institution that is not accredited by the Department of Education, is responsible for his master's degree in neuroscience. Additionally, he holds another master's degree from Touro College, a private university in New York City. Despite many scholars trying to discredit his findings and expertise in Brain Balance Programs, he has proven to be a force to reckon with in the neurological disorders field.

Brain Balance Program

The Brain Balance Program is a cutting-edge incorporated approach that utilizes a drug-free, as well as, a non-medical approach to address challenges related to cognitive, sensory-motor, academic, immune and emotions brought about by neurological disorders. Additionally, the program also focuses on dietary and digestive issues extremely and holistically. The primary focus of the program is stimulating growth in the brain by utilizing simple and physical approaches.

According to Dr. Melillo (2009), the Brain Balance Program focuses on the stimulation of the immature brain side without the involvement of the other side by using different aspects. For instance, different exercises are utilized to stimulate the brain sensory that deals with movement, as well, as academic sensory coupled with a nutritional routine. After utilizing these exercises for a while, the right and the left sides of the brain integrate and start working as a unit. Additionally, the program administrators set both short and long term achievable goals that help enhance brain integration of the two parts. Coordinated activities are also developed to assist in monitoring the progress compared to the set goals of the children with neurological disorders.

Dr. Melillo (2009) also states that the Brain Balance Program deals with taking care of a kid's needs in a holistic manner and a global aspect. When taking into consideration a child's needs, this non-medical plan utilizes an approach that efficiently tries to correct essential issues being experienced. This is a common aspect that deals with the whole spectrum of apparently incongruent childhood neurological disorders (Melillo, 2009). The Brain Balance Program is precise to a kid's issue warranting the assessment is comprehensively personal. This means that the challenges of every child are dealt with in a customized manner. Therefore, a strategic plan is set to favor the needs of the child, as well as, taking into consideration the problem affecting them behavioral or otherwise. The program gives a resolution that elevates not only the life of the child but also builds up the family's life.

It is imperative to note that when a child is suffering from a neurological disorder, the brain did not adopt the natural way of development as required. Therefore, the Brain Balance Program utilizes a tough principal based on ensuring each child utilizes a sequence that suits their underlying issue. The brain must develop in the right stages and a definite progression. This clearly shows that having a kid that has curtailed brain development automatically leads to academic and behavioral derailment. The underdeveloped brain has been identified as a consistent thread among kids suffering from neurological disorders. This shows that the kid's brain has not developed following the stages it should have or the set sequences.

The program follows a sequence that is designed towards rebuilding a kid's brain development starting from the first to the subsequent stages accordingly. With a mixed series of cognitive and physical exercise, a child starts to show progress in development after a short while. The exercises are followed with a healthy and clean eating plan based on the needs of every child. Every kid's program is vigilantly constructed with clearly laid out instructions on

how it will be conducted. Additionally, the intensity, as well as, frequency under which the program will be undertaken is laid out to fit the child. The instructions one receives for administering the program components are also explicit to a particular child. The program, therefore, utilizes the characters learned about a particular child to properly optimize and address the needs that assist them the most.

Childhood neurological disorders have the same kind of characteristics especially when it comes to both learning and behavioral dysfunctions. People usually assume that such problems manifest by only affecting personal behavior while proper brain development goes on effortlessly. However, this is not the case because every issue involves a different body system. Conventionally, solutions to issues focus more on one issue without taking into consideration the other. For instance, when a child is suffering from ADHD, people say that the child is lacking proper attention; dyslexia is a reading issue and autism is a communication and social issue. However, with the Brain Balance Program, every system of the body is taken into consideration. Instead of focusing on a single symptom or issue, the program focuses on the root cause of the issue to resolve the problem. This means that it makes sure that the right and left side of the brain develops in an equal and harmonious way.

The program is extremely specific but most importantly effective. Therefore, it has to follow a specific course to witness a significant transformation. This can only be achieved when partial or full recalibration of brain development takes place. At this time, kids start to show significant alteration. Most children start exuding significant levels of self-confidence and awareness. They start depicting positive changes, communicate better, have a positive superiority complex and start initiating optimistic behaviors that are extremely encouraging to the guardian responsible. At long last, the brain starts to get more responsive to the surroundings.

Improvement is usually seen in different aspects of the child especially in social and academic skills. Growth starts to be seen in terms of coordination and self-awareness. This is shown in the example provided herein.

Example

Dr. Melillo provides a comprehensive illustration that features a young boy that took part in the Brain Balance Program. Before participating in the program, the boy was not in a position to ride a bicycle. After taking part in the Brain Balance Program, the boy finally learned riding. It is clear to not that the program did not teach the boy how to ride the bike, but it provided him with the tools necessary to boost his confidence and capability to learn how to ride a bicycle. Consequently, the boy will manage to retain the skill for the rest of his life shunning way any form of embarrassment. At last, the boy managed to advance his skills where he was unable before taking part in the program.

Based on the example given above, it is evident that the Brain Balance Program, when conducted according to a child's specific needs, does work. When done comprehensively, the program can correct the brain imbalances with symptoms diminishing and ultimately going away.

The Brain Balance Program had components that fall into other key areas:

1. Sensory Motor exercises
2. Healthy nutrition plan

These major areas extensively discussed herein;

Chapter 2- Sensory Motor Exercises: How to Train the Brain through Physical Stimulation

In almost all cases regarding kid's brain developmental issues, there is a struggle in behavioral or academic aspects. This means that such children have inadequately developed motor and sensory systems. People that don't understand neurological dysfunctions usually equate them to awkwardness or clumsiness. However, Sensory Motor Exercise is grounded on the ideology of neuroplasticity, and this means that that the brain can adapt, as well as, create new pathways that are responsive to the environment and any other form of stimuli. Motor skills are activities involving coordination, strength and muscle reaction time. Sensory skills, on the other hand, involve hearing, touch, balance, and touch among others.

Imbalances in the sensory-motor systems are usually associated with numerous learning disorders, as well as, neurobehavioral problems. Nevertheless, these dysfunctions can be corrected with the right type of motor or sensory stimulation. It is crucial to note that the brain and body are reciprocal response systems. Therefore, the growth of one depends largely on the other, and vice versa. This growth is created by stimulation from the environment. The identified deficiencies in any kid result from improper stimulation of the brain during development. During the process of sensory-motor rejuvenation, different activities take place via physical, as well as, sensory stimulation. This is achieved by combining and integrating exercises with mental actions coupled with other forms of stimulation.

The sensory-motor system utilizes activities that push kids' limits to enhance their sensory systems but never going beyond limit. However, it is advocated that the administrator takes time when dealing with the issue to be as decisive as possible. When combining both mental and physical challenges, the ultimate goal is to make sure that there is smooth integration between the two as well, as good coordination. It is also imperative to make sure that the correct

activity is selected to match the problem or mental disorder being faced by the child. In addition to a good choice of activity, an administrator should also have a high level of competency to have priorities when administering the exercise. The exercises to be focused on first as well as those to be integrated when making progress are given priorities.

According to Dr. Melillo (Melillo, 2016), it is important to give an extensive explanation to a child before kicking off with the program to know what to expect. By explaining what you will be doing, its frequency, and expected results, the child will be able to have a better understanding of the program. Additionally, it is important to explain the benefits of the exercise and how it will change his life for the better, without making them feel as if they are being controlled. For instance, one should tell the kid that they will get better in school work as well as their social life and sports. Explain to them that they will improve in all aspects of the classwork and enjoy attending class. Besides, their mind should be eased by telling them that other children also participate in the exercise and be careful to note how it has improved their lives. However, it is crucial to explain to them that they are unique and when they feel uncomfortable they have the right to say so. For instance, one should try and get feedback on the progress to determine if the exercise is simple or complex for them. If the child is having any form of reaction either emotional or physical, it is important to make sure they communicate to you.

It is also important to note that the exercises are tedious and in many cases, a kid can complain of fatigue. This means that the best way to deal with the child's issue is turning the exercise into a game. By incorporating humor and jokes, a parent or an administrator can help the child to familiarize themselves better with the exercises. Additionally, one should continually give relevant feedback. Always follow a correction with praise and this will encourage the child to look forward to taking part in the activities set (Melillo, 2014).

Based on research conducted by Melillo (2009), progress in the program is a huge relief to any parent or administrator. One can detect unusual things that were not there before and were not visible until the process was started. The assessment might show positive or negative results. If the results are negative, then one should go back to the drawing board and begin from the first level with a high level of caution. However, it is crucial to note that the movements being administered might stir up diverse but not unexpected emotions. One should allow the emotions to be manifested and get the appropriate reaction. Another major issue is when a person noted progress in a child and then a regression starts to be noticed. These are characteristics that are very common in such exercises thus should not be taken as a failure. One should, therefore, put extra effort and not depict any form of negativity towards such a setback. One should also continue to utilize methods that are humorous and acceptable to the individual's problem.

Some of the Sensory-Motor Exercises are discussed hereunder;

Smelling Exercises (Olfactory)

The sense of smell is one of the neurological disorders that have been identified in people that suffer from the right hemisphere deficit. However, by applying diverse exercises that are associated with the defect, people improve efficiently and the issue is automatically rectified.

According to (Melillo, 2014), ninety percent of cases where smell exercises are performed show a momentous improvement, if not a full return of the sense of smell. The success of smell exercises leads to a significant change seen in eating habits. This is because kids stop judging food merely by appearance or texture. They become more open-minded and also to different types of foods. This usually leads to more kids taking healthier meals that in turn provide the brain with the necessary energy and nutrients for development. As previously

explained, other aspects are also affected positively thus proper brain development is experienced.

Vision Exercises

Vision is one of the hardest senses to test due to different factors. For instance, vision is dependent on muscle movements as the eyes have to detect both movement and light. Additionally, the eyes have to move perfectly especially when tracking something. Nevertheless, the eyes sometimes move in the opposite direction, especially when looking at two things at the same time. While some eye movements are voluntary, most of the time they are involuntary. Eyes also need to contract and relax especially when focusing to see far or small letters and also while looking far away. Two different visual systems are dealing with the ‘where’ and the ‘what’. The one that is not sensitive to color, but it is swift and most of the time interested in the big picture is the ‘where’ and it is composed of the right brain structure. The one that is sensitive to color is slow and on the left side of the brain system.

According to Melillo (2009), changing the color of an image improves the brain areas that are responsible for emotional, behavioral, immune, and cognitive functions. The two hemispheres situated in the brain respond differently towards color shades. For instance, the red color enhances activities on the left side of the brain while inhibiting the right hemisphere.

Vision exercises work effectively is because receptors usually send light to the brain. Additionally, the large visual receptors are located in the retina, as well as, the outer eye periphery which is more sensitive to lightwave frequencies thus reacting faster. In the visual color spectrum, the color with the lowest frequency is usually red. Low-frequency colors are aligned to the left hemisphere since the receptors sending information to it are extremely

sensitive compared to slow-moving light waves. This means that any aspect that increases speed in the left hemisphere as well as inhibits the right hemisphere usually enhances the left side of the brain and its ability to read as well as hear words.

According to Dr. Melillo (2014), utilizing an eye patch improves reading ability. The eye patch assists in strengthening eye muscles, especially in children suffering from FDS that have weak eye muscles in the affected part of the brain. Additionally, wearing an eye patch assists in reading skills improvement in kids that do not possess weak eye muscles since covering one eye increases the stimulation of the single reading eye. Vision exercises usually utilize both methods for improving eyesight in stimulating light, tracking the speed of light as well as divergence.

Sound and Light Therapy

In early civilizations, common methods of therapy used were sound and light in the form of music and color respectively. Currently, sound and music therapy is being used in western medicine and has shown positive results. Color and music radiate authentic energy frequencies which are commonly used during therapy in a controlled manner. Visual and auditory stimulation, via utilization of the light and sound, is therapeutic due to the effect of diverse frequencies used. However, color is a more powerful stimulus because human beings are more susceptible to light. For instance, wearing and looking at bright colors elicits emotions and motor responses. Just like light, sound also elicits different emotions according to the frequencies and wavelengths used. The two aspects are each broken into seven categories of frequencies and wavelengths. Nevertheless, brain hemispheres can diversely process light and sound. Most of the time, it is based on the frequency of the stimulus until it gets limited to a certain point. The two aspects follow parallel paths up to a certain place and then separate according to the level of

frequency it has. Despite light being the fastest, it carries fewer details and moves to the right hemisphere. Sound, on the other hand, is slow and utilizes high frequencies carrying more information. This is usually taken to the left hemisphere. The diverse frequencies of both sound and light cause the brain cells to react differently when done at diverse speeds.

Proprioceptive Exercise

Proprioception, also known as Functional Disconnection Syndrome, occurs whereby most kids with FDS are not capable of feeling their bodies effectively. This disorder occurs due to low muscle tone, particularly the large, interior muscles which are responsible for stability and subconscious stimulation of the brain. All exercises for the kids are designed towards improving balance as well as stability while at the same time increasing muscle to enhance swift reactions. Some of the exercises are described here below;

Aerobic Exercise

Towards the end of the millennium, the California scientists demonstrated that running at one point exudes brain effects. For instance, an experiment where a rat runs on a treadmill for several days showed that it doubled the number of brain cells. This finding was astonishing and just like adults, humans can reproduce brain cells by taking part in aerobics. The same exercises should be applied to children and become extremely successful.

Aerobic Exercises for Children

Brain development is linked to aerobics because of oxygen intake. When exercising, oxygen is pumped into the body which is of utmost significance to the balancing of the brain. When reviewing kids' activities, it is paramount to look at what they like especially when playing with other children. childhood activities like jogging, rope jumping, running, have

clearly shown that an increase in oxygen in one's brain effectively decreasing hyperactivity and at the same time increases concentration and focus in kids that have been diagnosed with ADHD. Additionally, it assists in building effective cardiovascular and systems vital for body functions. Therefore, a child should be encouraged to undertake aerobics at least three times a week.

After identifying the most effective activities being undertaken by the kid, it is proper to switch them to keep them open-minded and more interested. The principal goal is to ensure that the kid is taking aerobics for increased time to improve endurance as well as oxygen flow in the brain. The brain can only have balance when functional integration is included in the exercise. For instance, rope jumping includes aerobic activities with timing, coordination, and rhythm. The exercises promote mental focus extremely imperative for kids suffering from neurological dysfunction. Therefore, integrating mental exercises with aerobics plays a huge role in improving coordination.

Running in Place

In this exercise, mark an area on the floor for the child or somewhere outside. It is imperative to demonstrate the kind of activity you want the child to take but each at a time. in this case, running at one point is the major activity and most importantly it should be in a controlled environment where the child is not feeling overwhelmed. Demonstrate to the kid how to run in one place, how to place the legs and arms. It is crucial to guide the children properly and at the same time ensure to take appropriate breaks. One can only the time for running when the child masters the art of moving the arms and legs rhythmically. If the child has shown improvement, always encourage them to take the action when closing the eyes. This increases mental concentration and at this point one can event introduce numbers or alphabets in the routine.

Jumping

This is a crucial exercise for a child that is suffering from a neurological disorder. Have the child jump up and down on one spot for about half a minute and alternate it with a rest of the same duration. If the child shows improvement, then one can increase the duration but ensure the child is not struggling. Mental exercise can also be introduced to increase concentration.

Minitrampoline

Trampling is one of the most interesting activities that kids find very interesting and fun. Additionally, it protects the floors from tear and wears on the floor. One can mark the most central part for the kid to jump up and down in an accurate manner. However, it is imperative to be cautious especially when in a public area. That is why the activities should be supervised and monitored closely and in a fashionable manner

Jumping Rope

Rope jumping is another exercise crucial for a child with neurological disorders. For sixty seconds, have a child jump the rope but ensure they are taking breaks of the same duration of time. The time duration should be increased when the kid is comfortable and has mastered the art of coordinating his/her arms legs and vision. This is a very improved level of exercise because the person is utilizing different muscles at the same time.

Running

Kids love to run, especially when one makes it a game, thereby making it a very interactive activity. They feel free to express themselves freely and at the same time exercise more muscles. By setting up a running strip at the backyard, or placing obstacles that the child can run around, one can help them have s more comprehensive exercise time use many

imagination in this exercise by making it difficult or simple as per the child's concentration and brain disorder. Running is interesting because one can incorporate other aspects like small hurdles to jump or make it a relay where a kid can carry one object from one point to the other. One can also record the time taken using a stopwatch and incorporate a game whereby they are trying to beat their previous score. Where friends are concerned, one can make it competitive and this will improve the child's self-confidence.

Jumping Jacks

This exercise, show how it is done by positioning feet together as well as keeping the arms on the side. While jumping up and down and at the same time moving the arms up and spreading legs and simultaneously is the best example. Doing this three times and taking breaks is the right way to properly exercise the muscles and at the same time exercising the mind.

Activities that Strengthen Sensory Motor Skills in the Right Brain

According to Melillo (2009), the smell game stimulates the sense of smell differently. Blindfold the child and have them guess the scent using strong detergents and scents. By doing so, one strengthens the right side of the brain. The right side of the brain becomes open to more scents and a variety of foods.

Musical Brain Balance is achieved by having the kid listen to music accentuates frequencies that are processed on the right hemisphere of the brain. For instance, one can play a harmonious piece and use an earplug to cover the right ear when taking the exercise.

One foot in front of the other is another exercise that is extremely helpful to a child with neurological dysfunction. Have the kid wear a sock on the right foot while standing straight with

their eyes open. After that, one should move one foot in front of the other and then Stand still for thirty seconds without falling.

Activities that Strengthen Sensory Motor Skills in the Left Brain

The smell game for the left side of the brain is usually tested with mild and pleasant scents. For instance, one can use banana, chocolate, and lavender thus helping the child to develop the left side of the brain.

Musical exercise for the left brain hemisphere is done using music which accentuates qualities that enhance the left side of the brain. Music that is processed on the left hemisphere of the brain is usually rhythmical. Covering the left ear is crucial in this exercise (Melillo, 2009).

The one foot in front of the other exercise is done with a kid wearing a sock on the left foot and then standing straight for half a minute. The kid should not fall and should have at least four sessions without falling.

Academic Exercises

Improving Cognitive Skills

Most of the children suffering from neurological disorders encounter challenges in manifesting their cognitive skills. After taking the WIAT a parent or administrator should be able to pinpoint whether a child is having issues with his or her academics. Following the exercises given will show if the child is having issues in his or her learning capabilities. Brain disorders are in many cases the main cause of learning inability and poor grades. To correct these issues, one is supposed to give the kid frequent drills geared towards correcting his precise area of

weakness. The exercises can be learned from books or the internet. The available drills are aimed at grad four kids unless one is advised otherwise.

Activities that Strengthen Cognitive Skills in the Right Brain

Cognitive skills contain very difficult exercises geared towards enhancing a child's learning ability. The exercise includes using some of the books read by a child at a particular grade, reading a passage loudly and then asking questions while providing multiple answers. These activities will help to determine whether the child has retained information read or heard and determine if it is true or false. Additionally, they should manage to identify the inference leading to any particular answer. This exercise usually strengthens the right hemisphere and sharpens the child's learning ability.

Eye movement exercise is also used in determining the cognitive skills of a child. In this exercise, one is supposed to have a face to face encounter with the kid. After that, one should hold up their arms and act as a visual field for the child's eyes. The child should be instructed to look at the parent's or administrator's eyes and observe the other hand with a wiggling finger. The right-hand fingers should be wiggled more to make the kid look on the left side. The activity should be done a couple of times. To test the left side of the brain for cognitive skills, one should do the opposite and results will be expected to show improvement on the left side.

Chapter 3- Brain Balance Nutrition Plan

Diet has become one of the major issues in the world today. It has not only affected adults but is also taking a toll on the children's health especially those that suffer from neurological dysfunctions. There is a rising level of obesity among children and this has become a major threat especially among children with neurological issues. However, it has not been elaborated on how unhealthy eating is affecting brain development of kids all over the world. Unhealthy eating has become a major issue to be taken care of when taking into consideration development of neurological cells in the brain. However, the main issue is not the food that one is eating but rather the substances that are in the food. The composition of the foods that people are taking presently has changed from the typical fruits and vegetables to the modified and frozen foods. Farm foods lack some of the required nutrients for growth and development of the brain.

According to Dr. Melillo (2014), an average of two hundred and fifty million tons of pesticides and herbicides are utilized in the world of farming annually on grains, fruits, and vegetables consumed children. Besides, some of the non-organic farmers lace their products with hormones and antibiotics. Suboptimal feeds are being given to the cattle and livestock which are consuming as our proteins today. Not to mention, the increasing pollution of water, soil, and air affect children.

In the last three decades, food processing has become a major issue with an increase in sugars, fats, and refined carbohydrates. People are no longer cooking but ordering for processed food to save time and embark on other issues. Prepackaged foods, with high levels of fat and artificial preservatives, are being utilized daily especially in big homes. Children nowadays are increasingly consuming detrimental soft drinks. Fast food joints have increased and are

considered as a substitute for healthy home-cooked meals. Fast foods only offer excessive nutrition depletion which is common in many regions and children are the first to consider it. These are low-quality foods because they are highly processed. French fries is one of the most common foods that is taken by children. To parents, these are supplemental foods that are used when they do not want to cook or in a hurry. Without necessarily noting the detrimental effects they have on their children's developing brains they continue to poison the kids over time. These types of foods are especially detrimental to kids with neurological dysfunctions. The foods affect not only the changes expected in a child but also academic, cognitive and behavioral aspects. The normal functionalities of the body are also affected and people are unable to coordinate their kids' brain imbalances.

Nevertheless, addressing the issue of kids' nutrition and brain imbalance involves consideration of two components. The first one is addressing discovery and elimination of sensitive unhealthy foods which further enhances neurological disorders and restoring the already depleted vitamins in the child. Dr. Melillo (2016) provides good nutritional strategies for both the parents and the kids suffering from neurological disorders. In most cases, people view this as a marketing strategy for the book but the author has provided a comprehensive nutrition program parents can use to improve the health of children with neurological disorders.

The most important thing is identifying the major brain boosters in foods. Foods with a huge array of glucose and those that enhance oxygen generation in the brain should be encouraged. A brain with limited levels of stimulation will not manage to fuel the brain to its full capacity and will not also manage to take the necessary advantage of the stimulation. Poor nutrition is, therefore, a huge issue and a major threat to brain development in children that eat poorly.

Chapter 4- Strengths and Weaknesses of Dr. Melillo's at-Home Brain Balance Program

Strengths

Several aspects make Dr. Melillo's at home Brain Balance Program stand out from the other types of treatments. These aspects form the basic foundation of the program thus its uniqueness. The Brain Balance Program is a holistic type of treatment that is used for children with neurological dysfunctions. The reason for its uniqueness being that it addressed numerous issues for kids with development disorders. In many cases, when a parent takes a child suffering from neurological dysfunctions to the hospital, one is either allocated a psychiatrist, a physiologist, or any other professional. However, this does not deal with the issue of the child in a holistic manner because these individuals can only focus on one thing at a time. Despite it being tedious and unrealistic for the child, it does not help them to adjust to new aspects of life as they should be because the doctors only provide them with medication. However, with the Brain Balance Program, the child can interact and accommodate different exercises that enhance different brain activities thus improvement is based on a holistic manner.

Another major advantage is that the program is drug-free and nonmedical assisting kids struggling with autism spectrum disorders, learning inability and processing disorders, as well as, ADHD. By utilizing the challenges faced by the kids, nutritional management, physical workout, and academic guidance. This means that a child's treatment program is customized to fit their age, challenge and most of all nutritional issues. With drugs, it is not possible to tell the improvements of the child because there are no physical exercises that can clearly show improvements in mobility. Additionally, there is no nutritional value added which is not a good value addition to the child's way of life.

Another strength is based on time, interaction and bonding. The Brain Balance Program allows kids to spend more time with their parents who ensure that they feel loved and can gain confidence under their guidance. The program is home-based making it possible to implement all recommendations provided by Dr. Melillo. The exercises act as an interaction and bonding platform. Parents can learn and appreciate their kids' problems and get to see them improve along the way. On the other hand, kids start to feel more appreciated by their loved ones instead of spending time with psychologists and other professionals whose main goal is to show improvement without taking into consideration the child's feelings.

Weaknesses

Despite the numerous strengths portrayed by the Brain Balance Program, some weaknesses are associated with it. For instance, the approach is still unknown to many people. Despite being covered in books written by Dr. Melillo, many experts in childhood development have not had a chance to vet its efficiency. Professionals must analyze and vet such an open-minded program that assists kids with neurological dysfunctions to determine if it is the right way to deal with a certain issue. Additionally, the exercise should be vetted to also determine if they are fit for kids and the duration of time it should be conducted. Therefore, the program has the potential to face discrediting by professionals who have not seen its value and assessed results.

The basic idea of the Brain Balance Program is based on brain hemisphere imbalances. This is very simple compared to the neurological disorders that are experienced by different kids out there. By building upon this popular idea of brain hemispheres, the program is not clear or has concrete evidence on how the hemispheres grow to balance and enhance functionality. Neurological experts claim that the inference is wrong because for an individual to take a certain action, both sides of the brain must be active and function accordingly. Therefore, the claim that

one side of the brain is active than the other in people with a brain disorder, is just a typical myth and that means nothing is as simple as left and right hemispheres. The discrediting leaves a huge gap in the program thus a huge weakness.

Dr. Melillo has given a nutritional aspect that has been adopted in the program for kids with neurological dysfunctions. However, many nutrition experts clearly state that no verification suggests sugar or gluten consumption affects individuals with neurological disorders. This is a huge blow to the program because individuals tend to shun away from something that is discredited by experts especially with an issue that concerns food. Food is a basic need and people treat it with a very different concept compared to other things. Therefore, Dr. Melillo must provide proof without a reasonable doubt showing how the issue is connected to the foods that kids take.

Dr. Melillo also describes different exercises for the program's success. However, these physical exercises might have an unpretentious impact on the child and not necessarily the expected outcome. Some of the exercises especially for cognitive growth can be done in schools and that relieves parents from financial burdens that may occur while trying to deal with their child's issue. Additionally, the discussed issues have not been accredited by experts as remedies for neurological disorders.

Experts have also questioned the diagnostic metrics that are utilized by the Brain Balance Program. The tests done on children do not hold a comprehensive backing with scientific inferences showing its effectiveness. For instance, primitive reflexes that drive infants to do certain things like instinctively suckle are associated with behavioral problems. However, numerous pediatricians indicated that it is rare for kids older than four years to retain primitive reflexes. This is also a huge flaw in the success of the program.

Conclusion

Children have been affected immensely by brain disorders throughout the world. This means that extensive research into the signs and symptoms, causes and risk factors, diagnosis and treatment have been done. The Brain Balance Program is an effective treatment method for individuals suffering from neurological dysfunctions. The program includes exercises, activities coupled with confidence manifestation, academic ability training, confidence and an easy dietary regime to follow. By incorporating all those aspects, one can deal with the issue head-on and at the same time improve timing and rhythm. The methods uniquely integrate, a holistic approach for the kids to help them achieve their optimum body, as well as, mental stability. The effect is an improvement in learning ability, social aspects, and emotional growth. However, it is crucial to note that the Brain Balance Program has been discredited by many experts in the field thus extensive research and inferences should be done to make sure the program is legit.

With the right kind of research and appropriate intervention, there will be a positive outcome in the treatment of neurological dysfunctions. The growing investment, as well as valid evidence supporting treatment options, are discussed. Early detection, as well as intervention, fundamentally plays a huge role in reducing the burden of disorder for the kids and the parents. The efficacy and safety of the different approaches dealing with the issue are usually short term remedies and therefore, long term treatment approaches should be researched. Further knowledge should be incorporated and tested to show whether they are workable and reliable in dealing with the issue. Finally, people should seek professional advice on how to deal with the issue of mental disorders and shun away from mythical beliefs.

References

- Anderson, C. (2017). Behavioral Therapies: Key Interventions in ASD. Retrieved from https://iancommunity.org/cs/simons_simplex_community/behavioral_therapies
- Applied Behavioral Analysis Program Guide. (2019). 5 Types of Behavior Therapy for Individuals with Autism. Retrieved from <https://www.appliedbehavioranalysisprograms.com/lists/5-types-of-behavior-therapy-for-individuals-with-autism/>
- Autism Science Foundation. What Is Autism?
- Benderev, C. (18 June, 2018). ‘Cutting Edge’ Program For Children With Autism and ADHD Rests on Razor-Thin Evidence.
- Bilibili, S. (2013). Treatment of Children with Autism Spectrum Disorder in Vlora. *Mediterranean Journal of Social Sciences*, 4(6), 183.
- Boulton, G. (2010). Doctors Skeptical of Center’s Claims. *Milwaukee Journal Sentinel*,
- Brentani, H., Silvestre de Paula, C., Bordini, D., Rolim, D., Sato, F., Portolese, J. ... & McCracken, J. (2013). Autism spectrum disorders: an overview on diagnosis and treatment. *Revista Brasileira de Psiquiatria*, 35, S62-S72.
- Brown, K. A., Samuel, S., & Patel, D. R. (2018). Pharmacologic management of attention deficit hyperactivity disorder in children and adolescents: a review for practitioners. *Translational pediatrics*, 7(1), 36–47. doi:10.21037/tp.2017.08.02
- Centers for Disease Control and Prevention. Autism Spectrum Disorder (ASD).
- Centers for Disease Control and Prevention. Learn about Attention Deficit/Hyperactivity Disorder (ADHD).

- Christensen, J., Grønberg, T., Sørensen, M., Schendel, D., Parner, E.T., Pedersen, L.H., & Vestergaard, M. (2013) Prenatal valproate exposure and risk of autism spectrum disorders and childhood autism. *JAMA*, 309(16), 1696-1703.
- Cohen, D., Pichard, N., Tordjman, S., Baumann, C., Burglen, L., Excoffier, E., Lazar, G., Mazet, P., Pinquier, C., Verloes, A., & Heron, D. (2005). Specific genetic disorders and autism: Clinical contribution towards their identification. *Journal of Autism and Developmental Disorders*, 35(1), 103-116.
- Hall, H. (2010). Brain Balance. Science-Based Medicine.
- Hall, S., Lightbody, A., & Reiss, A. (2008). Compulsive, self-injurious, and autistic behavior in children and adolescents with fragile X syndrome. *American Journal of Mental Retardation*, 113(1), 44-53.
- Hamed, A. M., Kauer, A. J., & Stevens, H. E. (2015). Why the Diagnosis of Attention Deficit Hyperactivity Disorder Matters. *Frontiers in psychiatry*, 6, 168.
doi:10.3389/fpsy.2015.00168
- Lawrence, D. (2018). How Much Would You Pay to Cure Your Kid's Learning Disability? Bloomberg Business Week.
- LeClerc, S., & Easley, D. (2015). Pharmacological therapies for autism spectrum disorder: a review. *P & T: A peer-reviewed journal for formulary management*, 40(6), 389–397.
- Leitner Y. (2014). The co-occurrence of autism and attention deficit hyperactivity disorder in children - what do we know? *Frontiers in human neuroscience*, 8, 268.
doi:10.3389/fnhum.2014.00268
- Melillo, R. (2009). *Disconnected Kids*. USA: Penguin Group.

Melillo, R. (2016). *The Disconnected Kids Nutrition Plan: Proven Strategies to Enhance Learning and Focus for Children with Autism, ADHD, Dyslexia, and other Neurological Disorders*. USA: Penguin Group.

Melillo, R. *Autism: The Scientific Truth about Preventing, Diagnosing, and Treating Autism Spectrum Disorders-and What Parents Can Do Now*. USA: Viking; 2014.

National Institute of Child Health and Human Development (NICHD). (2017). What are the Treatments for Autism. Retrieved from <https://www.nichd.nih.gov/health/topics/autism/conditioninfo/treatments>

Ozonoff, S., Goodlin-Jones, B. L., & Solomon, M. (2007). *Autism Spectrum Disorders. Assessment of Childhood Disorders*. 4th Edition (Mash E, Barkley R, eds). Guilford Press, New York, NY, USA, 487-525.

Philipsen, A. (2017). Non-Pharmacological Treatment of ADHD across the Lifespan. *European Psychiatry, 41*, S33. doi: 10.1016/j.eurpsy.2017.01.157.

Phillip, A. (2015). Company Pushes Brain-Balancing Program for Learning Disabilities; Evidence Lacking. *Milwaukee Journal Sentinel* (September 5, 2015). Retrieved from <http://archive.jsonline.com/business/company-pushes-brain-balancing-program-for-learning-disabilities-evidence-lacking-b99551698z1-324854621.html>

Pilotti, M. Review- Disconnected Kids. June 22, 2010. [Metapsychology.mentalhelp.net](http://metapsychology.mentalhelp.net)

Reddy, B. A., & Roche, D. *Chiropractic Management of a Child with Vertebral Subluxations and Right Brain Processing Delay: A Case Study* Cynthia Horner BS DC Beth A. Reddy BS Student Clinician, Life University College of Chiropractic Office of Dr. Cynthia Horner, DC, Greenville, SC.

Evans, S.W., Owens, J.S., Wymbs, B.T., & Ray, R.A. (2013). *Evidence-Based Psychosocial Treatments for Children and Adolescents with Attention-Deficit/Hyperactivity Disorder. Journal of Clinical Child & Adolescent Psychology, 43(4), 527-551.* <http://dx.doi.org/10.1080/15374416.2013.850700>

Teicher, M. H. (2016). Archive for the ‘Attention Deficit Hyperactivity Disorder (ADHD, ADD)’ Category. Wisconsin Institute of Nutrition, LLP. Brain Balance- Thumbs Down. January 16, 2016.

Wüstner A, Otto C, Schlack R, Hölling H, Klasen F, & Ravens-Sieberer U (2019). Risk and protective factors for the development of ADHD symptoms in children and adolescents: Results of the longitudinal BELLA study. *PLoS ONE 14(3)*, e0214412. <https://doi.org/10.1371/journal.pone.0214412>

Zecavati, N, & Spence, S.J. (2009). Neurometabolic disorders and dysfunction in autism spectrum disorders. *Current Neurology and Neuroscience Reports, 9(2)*, 129-136.