The Social, Verbal and Behavior Effects that an Accelerated, Passive, Multi- Sensory Stimulation Therapy Has on Improving the Abilities of Children on the Autism Spectrum and Diagnosed with ADHD

A Clinical Trial

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Professional Presentations

The results of this therapy study have been presented
by Dr. Mary Ann Block to the following professional groups
Autism One
ACA Council on Chiropractic Pediatrics
AAEM Conference
Generation Rescue Autism Education Conference
Integrative Medicine for Mental Health Conference

Study Overview

Children on the Autism Spectrum suffer with sensory issues, either too little input resulting in delayed development and disabilities or too much sensory input that overwhelms them and causes avoidance and withdrawal.[1]

They suffer with symptoms and disabilities, including repetitive behaviors, lack of communication, lack of eye contact, poor motor skills, developmental delays, behavior problems and more.

Various forms of sensory training programs have been one of the main non-medical approaches for improving symptoms.

Physical therapy programs have shown some benefits in training or retraining the sensory system but require participation. Children on the Autism Spectrum are not good candidates for following directions or actively participating in activities needed to develop skills and abilities they need.

In addition, sensory training programs are subject to variability depending on many factors including participant's cognitive and physical abilities and the interaction and ability of the therapist.

The challenge is to provide a passive therapy that engages multiple senses in order to provide the greatest benefit. Research shows that engaging multi-senses results in better outcomes.[2] [3]

A new approach is needed to provide children on the Autism Spectrum the same opportunity to benefit from sensory enhancement but without actively participating. Using technology, a motion chair was developed to test the theory that a passive therapy could be delivered to the participant and gain the same or better results than an active therapy.

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1 A Preliminary Comparison of Multisensory Integration in Boys with Autism Spectrum Disorder and Typically Developing Controls, INTERNATIONAL JOURNAL OF NEUROLOGY RESEARCH, Vol 2, No 1 (2016) Barbara Ann Brett-Green, Sigourney F Rush, Jasmine Shepherd, Nathan Sharpless, William J Gavin, Patricia L Davies

[2] Multisensory integration of cross-modal stimulus combinations yielded responses that were significantly greater than those evoked by the best single component stimulus. J Neurophysiol 97: 3193–3205, 2007. doi:10.1152/jn.00018.2007. Multisensory Versus Unisensory Integration: Contrasting Modes in the Superior Colliculus, Juan Carlos Alvarado, J. William Vaughan, Terrence R. Stanford, and Barry E. Stein

[3] Auditory-somatosensory multisensory processing in auditory cortex: an fMRI study. J Neurophysiol. 2002;88:540-543, Foxe J, Wylie G, Martinez A, et al.

The chair, which is FDA cleared, was carefully designed to move slowly and gently to stimulate the vestibular, proprioception and kinesthetic senses, a computer screen in front of the participant provides the visual stimulation using fading and varied colored lights and the music was filtered within the comfort frequency of Autistic children and introduced through earphones. This not only stimulates five senses but also stimulates them together which is how they work normally. The therapy protocol included 2 hours per day for 5 days.

Theory: The underlying behavior problem for both children on the Autism Spectrum and those considered learning disabled or ADHD, is not a behavior problem but a faulty sensory system sending the brain, flawed information affecting and preventing appropriate behaviors.

This approach does not preclude the medical intervention many of these children need. After 30 years of medically treating children diagnosed with Autism and ADHD without psychiatric drugs, by targeting the underlying health issues, Dr. Mary Ann Block, found these children, although greatly improved, still needed developmental and educational programs to address these sensory issues.

Current Approaches: Current therapies focus on controlling behavior with drugs or using behavior therapy and active equipment, which can comfort but with only temporary benefits. Most methods used for both these populations, Autism and ADHD, target the symptoms but not the underlying problems.

Introduction

Why the study: To help with learning and behavior issues, Dr. Block would refer her patients to auditory therapy, visual therapy or sensory integration with mixed results as these therapies required long periods of time to complete and required active participation from the children. When they could not follow directions or do the active exercises they could not benefit.

In addition, through her research, Dr. Block concluded that these children needed more than one sensory modality to benefit their sensory system. “Human beings in their interactions with the world do not perceive sensory events as singular events. Sound, touch, sight, taste, smell, proprioception and vestibular information interact to form the processes and mechanics by which humans learn and experience. Integration of sensory information provides a foundation on which behavior and cognition develop and mature. (Brain) Centers previously believed to be unisensory, are in fact, multisensory”.[4] After years of research, she developed, with the use of technology, a multi-sensory stimulation and developmental therapy that did not require participation of the child

[4] Synthesis of Information Concerning Somatosensory and Auditory Multisensory Stimulation and Integration, NeuroImage, 2006:30: 1325-1331, Schurmann, M., Caetano, G., Hiushchuk, Y., Jousmaki, V., Hari, R.

and delivered the same optimal multi-sensory therapy consistently to everyone. This protocol takes only five-days and many benefits were observed.

The ADHD Component

Having worked with those diagnosed ADHD and Autism for many years, Dr. Block saw commonalities between them. There are many overlapping symptoms and underlying medical conditions.

Dr. Block's theory is that the two disorders, Autism and ADHD, may actually be on the same spectrum but one on the lower end of functioning (Autism) and the other on the higher end of functioning (ADHD).

This is explained further below under research methods. It is the similarity only differentiated by severity that inspired Dr. Block to add the ADHD population to this Autism study. The goal was to see if the sensory treatment helps the same symptoms regardless of severity or diagnosis.

Methods/Protocol

Dr. Block developed The SAVE Program, a passive sensory therapy delivered by a medical device. SAVE stands for Sensory-Motor Auditory Visual Enhancement, which she provided to her patients.

This was a retrospective cohort study of participants from Dr. Block's own clinical practice and patient base who had previously undergone The SAVE Program.

Another practitioner had previously diagnosed each participant with either Autism or ADHD. For those diagnosed with ADHD, they were given a hearing test to determine ear dominance and a visual field test. These objective measurements were retested at the end of the 5-day program and again 30 days after.

Chair Safety

Staff person sets the program and prepares the participant.
Safety belts are used for comfort and security.
A parent remains in the room at all times with the child.
The parent has a button that stops the motion chair if needed.
The parent has a call button to summon the staff for assistance.

Pre and post testing methods

In addition to the objective testing, detailed intake forms are used to identify behaviors and goals reported by the family before the treatment and to track them throughout the 5-day treatment and again 30-days post therapy.

Autism

Objective tests were not used in this population, as most children on the Autism Spectrum are unable to follow directions or provide any results. Also, the behaviors targeted are seen and evaluated using the same method employed by the psychiatric profession by following the criteria set forth in the Diagnostic and Statistical Manual of Mental Disorders, (DSM) list for diagnosing the disorder. ***Autism Spectrum Disorder 299.00 (F84.0).***
Identifying the most problematic behaviors for each participant noted by researcher and family members individualizes the goals and results to reflect problems and changes unique to each child. But it is common for the individual list of symptoms to be supported by the DMS list of symptoms.

General issues as noted in the DSM for Autism are:
A. Persistent deficits in social communication and social interaction across multiple contexts.
1. Deficits in social-emotional reciprocity, ranging, for example, from abnormal social approach and failure of normal back-and-forth conversation; to reduced sharing of interests, emotions, or affect; to failure to initiate or respond to social interactions.
2. Deficits in nonverbal communicative behaviors used for social interaction, ranging, for example, from poorly integrated verbal and nonverbal communication; to abnormalities in eye contact and body language or deficits in understanding and use of gestures; to a total lack of facial expressions and nonverbal communication.
3. Deficits in developing, maintaining, and understanding relationships, ranging, for example, from difficulties adjusting behavior to suit various social contexts; to difficulties in sharing imaginative play or in making friends; to absence of interest in peers.

Severity is based on social communication impairments and restricted repetitive patterns of behavior**.**

ADHD

Attention-deficit/hyperactivity disorder (ADHD) is a psychiatric diagnosis characterized by severe and impairing levels of inattention, hyperactivity, and impulsivity. As a developmental disorder, it appears in childhood and is associated with lags in the development of sustained attention and behavioral inhibition relative to same-aged peers, contributing to functional impairment across academic, behavioral, and social domains

DMS Attention-Deficit/Hyperactivity Disorder (ADHD) 314.0X (F90.X)
Criteria for ADHD as listed in the DSM are:

A persistent pattern of inattention and/or hyperactivity–impulsivity that interferes with functioning or development:
Often fails to give close attention to details or makes careless mistakes in schoolwork, at work, or with other activities.
Often has trouble holding attention on tasks or play activities.

Often does not seem to listen when spoken to directly.
Often does not follow through on instructions and fails to finish schoolwork, chores, or duties in the workplace (e.g., loses focus, side-tracked).
Often has trouble organizing tasks and activities.
Often avoids, dislikes, or is reluctant to do tasks that require mental effort over a long period of time (such as schoolwork or homework).
Often loses things necessary for tasks and activities (e.g. school materials, pencils, books, tools, wallets, keys, paperwork, eyeglasses, mobile telephones).
Is often easily distracted
Is often forgetful in daily activities.
Often fidgets with or taps hands or feet, or squirms in seat.
Often leaves seat in situations when remaining seated is expected.
Often runs about or climbs in situations where it is not appropriate (adolescents or adults may be limited to feeling restless).
Often unable to play or take part in leisure activities quietly.
Is often “on the go” acting as if “driven by a motor”.
Often talks excessively.
Often blurts out an answer before a question has been completed.
Often has trouble waiting his/her turn.
Often interrupts or intrudes on others (e.g., butts into conversations or games)
In addition, the following conditions must be met:
There is clear evidence that the symptoms interfere with, or reduce the quality of, social, school, or work functioning.
DMS Attention-Deficit/Hyperactivity Disorder (ADHD) 314.0X (F90.X)
Criteria for ADHD as listed in the DSM are:

A persistent pattern of inattention and/or hyperactivity–impulsivity that interferes with functioning or development:
Often fails to give close attention to details or makes careless mistakes in schoolwork, at work, or with other activities.
Often has trouble holding attention on tasks or play activities.
Often does not seem to listen when spoken to directly.
Often does not follow through on instructions and fails to finish schoolwork, chores, or duties in the workplace (e.g., loses focus, side-tracked).
Often has trouble organizing tasks and activities.
Often avoids, dislikes, or is reluctant to do tasks that require mental effort over a long period of time (such as schoolwork or homework).
Often loses things necessary for tasks and activities (e.g. school materials, pencils, books, tools, wallets, keys, paperwork, eyeglasses, mobile telephones).
Is often easily distracted
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Often fidgets with or taps hands or feet, or squirms in seat.
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Often blurts out an answer before a question has been completed.
Often has trouble waiting his/her turn.
Often interrupts or intrudes on others (e.g., butts into conversations or games)
In addition, the following conditions must be met:
There is clear evidence that the symptoms interfere with, or reduce the quality of, social, school, or work functioning.

Testing the ADHD Participant.

Higher functioning children diagnosed with ADHD can be pre and post tested with two objective tests, in addition to the detailed tracking of changes in symptoms that can be observed.

Objective Tests:
Test 1: Visual Field- to determine current range of vision, ability to focus and depth perception. Often these children have a very limited visual field, which broadens with sensory therapy. This can help improve reading skills, proprioception and balance.

Test 2: Auditory Test-Audiometer testing of right or left ear dominance looking for the dominant ear. Dr. Block has found that children with learning and behavior problems appear to listen with their left ear. The therapy is designed to convert this to the right ear, which sends auditory messages directly to the listening center aiding in processing and improve listening and learning skills.

Participants

Diagnosed ADHD-19 (ages 6-46)
Diagnosed Autism-10 (ages 3-17)

Results

All the children in the study showed improvement in a variety of sensory issues.
The treatment caused no adverse affects.

AUTISM RESULTS

Participant 1
Age 16

Self Reported Areas Seeking to Improvement	Areas Improved by 5 Day SAVE Program
No Speech	✓

*After SAVE can now use complete complex sentences

Participant 2
Age 17

Self Reported Areas Seeking to Improvement	Areas Improved by 5 Day SAVE Program
Attitude	✓
Reading	✓
Comprehension	✓
Socialization	✓
Independent	✓

*After SAVE more inquisitive

Participant 3
Age 6

Self Reported Areas Seeking to Improvement	Areas Improved by 5 Day SAVE Program
Mood	✓
Emotional Control	✓
Repetitive Behaviors	✓
Sensitivity to Smell, Taste & Feel	✓
Makes Few gestures	✓

Participant 4
Age 13

Self Reported Areas Seeking to Improvement	Areas Improved by 5 Day SAVE Program
Academic Perfomrance	✓
Socialization	✓
Processing Speed	✓
Eye Contact	✓

*After SAVE makes better grades

Participant 5
Age 12

Self Reported Areas Seeking to Improvement	Areas Improved by 5 Day SAVE Program
Eye Contact	✓
Socialization	
Motor Skills	

Participant 6
Age 3

Self Reported Areas Seeking to Improvement	Areas Improved by 5 Day SAVE Program
No Speech	✓
Coordination	✓
Hyperactivity	✓
Eye Contact	✓

*After SAVE said first word

Participant 7
Age 11

Self Reported Areas Seeking to Improvement	Areas Improved by 5 Day SAVE Program
Socialization	✓
Focus	✓
Eye Contact	✓
Emotional Control	

Participant 8
Age 3

Self Reported Areas Seeking to Improvement	Areas Improved by 5 Day SAVE Program
No Speech	✓

*After SAVE said first words

Participant 9
Age 4

Self Reported Areas Seeking to Improvement	Areas Improved by 5 Day SAVE Program
No Speech	✓

*After SAVE said first words

Participant 10
Age 6

Self Reported Areas Seeking to Improvement	Areas Improved by 5 Day SAVE Program
No Speech	✓

*After SAVE said first words. Prior to SAVE program child had worked with speech therapist for 2 years

ADHD RESULTS

Participant 1
Age 30

Self Reported Areas Seeking to Improvement	Areas Improved by 5 Day SAVE Program
Concentration	✓
Attention	✓
Focus	✓
Eye Contact	✓

Participant 2
Age 15

Self Reported Areas Seeking to Improvement	Areas Improved by 5 Day SAVE Program
Argumentative	
Focus	✓
Attention	✓

Participant 3
Age 7

Self Reported Areas Seeking to Improvement	Areas Improved by 5 Day SAVE Program
Peer Interaction	✓
Hyperactivity	
Listening	✓

Participant 4
Age 12

Self Reported Areas Seeking to Improvement	Areas Improved by 5 Day SAVE Program
Listening	✓
School Participation	
Focus	✓
Attention	✓
Reading	✓
Sleeping	✓
Listening	✓

Participant 5
Age 10

Self Reported Areas Seeking to Improvement	Areas Improved by 5 Day SAVE Program
Following Directions	✓
Eye Contact	✓
Focus	✓
Listening	✓
Sleep	✓

Participant 6
Age 12

Self Reported Areas Seeking to Improvement	Areas Improved by 5 Day SAVE Program
Completing Tasks	✓
Emotional Control	
Focus	✓
Sleeping	✓
Participation in School	✓
Attitude	

Participant 7
Age 8

Self Reported Areas Seeking to Improvement	Areas Improved by 5 Day SAVE Program
Argumentative	✓
Focus	✓
Attention	✓
Sad	✓

Participant 8
Age 29

Self Reported Areas Seeking to Improvement	Areas Improved by 5 Day SAVE Program
Eye Contact	✓
Focus	✓
Sleeping	✓
Attention	✓

Participant 9
Age 13

Self Reported Areas Seeking to Improvement	Areas Improved by 5 Day SAVE Program
Focus	✓
Attention	✓
Organization	
Following Direction	✓
Listening	✓
Remembering	✓

Participant 10
Age 13

Self Reported Areas Seeking to Improvement	Areas Improved by 5 Day SAVE Program
Learning Skills	✓
Remembering	
Focus	✓
Attention	
Reading	✓
Sleeping	✓
Hyperactivity	✓
Listening	✓

Participant 11
Age 8

Self Reported Areas Seeking to Improvement	Areas Improved by 5 Day SAVE Program
Focus	✓
Attention	✓
Behavior	✓
Following Direction	✓
Listening	✓
Academic Performance	✓
Remembering	✓

Participant 12
Age 9

Self Reported Areas Seeking to Improvement	Areas Improved by 5 Day SAVE Program
Focus	✓
Attention	✓
Mood	✓
Communication	✓
Listening	✓
Remembering	
Anger & Negativity	✓
Peer Interaction	

Participant 13
Age 46

Self Reported Areas Seeking to Improvement	Areas Improved by 5 Day SAVE Program
Focus	✓
Forgetful	✓

Participant 14
Age 9

Self Reported Areas Seeking to Improvement	Areas Improved by 5 Day SAVE Program
Attention	✓
Hyperactivity	

Participant 15
Age 6

Self Reported Areas Seeking to Improvement	Areas Improved by 5 Day SAVE Program
Following Direction	✓
Attention	✓
Focus	✓

Participant 16
Age 9

Self Reported Areas Seeking to Improvement	Areas Improved by 5 Day SAVE Program
Hyperactive	✓
Attention	✓
Focus	✓

Participant 17
Age 10

Self Reported Areas Seeking to Improvement	Areas Improved by 5 Day SAVE Program
Focus	✓
Attitude	✓
Eye Contact	✓
Impulsivity	

Participant 18
Age 6

Self Reported Areas Seeking to Improvement	Areas Improved by 5 Day SAVE Program
Focus	✓
Attention	✓
Following Direction	✓

Participant 19
Age 12

Self Reported Areas Seeking to Improvement	Areas Improved by 5 Day SAVE Program
Focus	✓
Attention	✓
Hyperactivity	✓

All participants were "Left Ear Dominant" prior to the program and all were "Right Ear Dominant" after the 5 days.

Discussion/Conclusion

The results indicate these children can undergo sensory therapy passively and benefit from the therapy in many areas of ability. Follow up participant evaluations show the improvements last and can continue to develop.

This new multi sensory therapy shows a consistent level of efficacy in helping improve skills, abilities and quality of life for those on the Autism Spectrum and those diagnosed with ADHD. Based on the limits* of current and past sensory therapy programs and the promising preliminary clinical results, and with no other passive program available for those children unable to do an active sensory training program, these findings merit more studies with a larger population of this group.

* Bodfish posited a fundamental question about the depth of intervention effects: “Do these empirically established forms of behavioral and medication treatment for Autism significantly impact those core features that are most characteristic and disabling for persons with Autism? With respect to the repetitive behavior symptom domain in ASD, it appears the answer, then and now, is most likely “no.”[5]

Video of Dr. Block’s presentation can found at https://youtu.be/DUsXZ6ldUec

[5] Evidence-Based Behavioral Interventions for Repetitive Behaviors in Autism, Journal of Autism and Developmental Disorders, June 2012, Volume 42, Issue 6, pp 1236–1248|, Brian A. Boyd, Stephen G. McDonough, James W. Bodfish

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