Attention & Regulation

When David first came to Brain Harmony he was anxious, easily distracted and awkward. He was treated with conventional occupational therapy at a large health system for over two years but had not seen any improvement in handwriting, academics nor his nervous energy.

"He used to be my problem child who struggled in school especially reading and writing. Now he is my A/B honor-roll child who unexpectedly became the quarterback of his flag football team. My son is the self-confident child I always wanted him to be. Thank you, Brain Harmony!" - David's Mother

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Brain Harmony...proven results

Why Brain Harmony?

With over 20 years' experience, Brain Harmony has created unique protocols when combined with Integrated Listening Systems' products, which produces accelerated results. This combined approach is based on changing our brain – we can essentially rewire it through specific and repeated stimulation, a concept known as neuroplasticity. As in building strength and endurance with physical exercise, we can also build neurological pathways and synaptic activity at any age or in any condition.

It's All About the Results

At Brain Harmony we pride ourselves on delivering results and we will work very hard to help your family. Our programs are customized to fit your unique needs in the convenience of your own home. Traveling to a clinic is not required.

Generally, we see positive results for our friends with most neurodevelopmental needs with two modalities:

The Safe and Sound Protocol (SSP) is a 5 day therapeutic modality that reduces auditory sensitivity but, more importantly, calms the parasympathetic nervous system. Often we find our friends with any type of neurodevelopmental issue, large or small, are in a constant state of fight or flight. They are constantly on edge or anxious. By starting with SSP, we calm the social and emotional state, thereby allowing our friends to be receptive to therapeutic modalities. Interestingly, when we "calm the nerves" we can see many gains after SSP. Gross motor and fine motor skills, eye contact, engagement and reduction of auditory sensitivities may all be exhibited, after listening for one hour a day for 5 days consectually. The total cost of SSP is $395 and includes a selfadministered pre test, post test, shipping to and from, and video conference support with a licensed therapist.

Focus System – *this is the real brain changer.* iLs retrains areas of the brain involved in learning, communication and movement. With this system, a listening program is crafted specific to you. The Focus System comes with over 240 hours of therapy. We will support your family listening through video conferencing with a licensed therapist. Typically, the cost of this program is $260 a month administered as a month to month lease that you may opt out of at any time.

Proven Results and Satisfied Families

Our web site contains a knowledge library which includes research, case studies and family success stories. Our program, when combined with these tools, changes standardized scores. We receive family reports of success on a daily basis. We have found no other modality that produces outcomes as quickly and efficiently as iLs' products.

Process

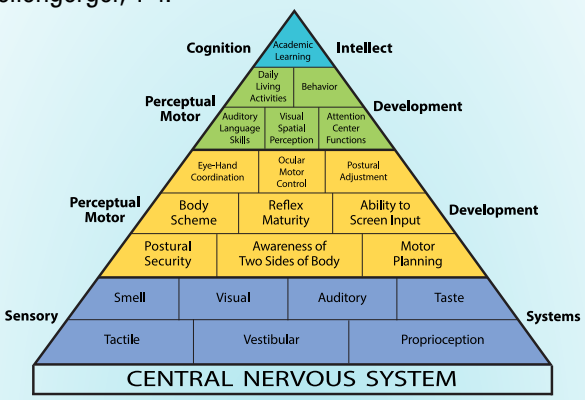
We ship your equipment and assign a licensed therapist. Included in your purchase is 6 hours of coaching via video or telephone conferencing. Your therapist will also be available to you via text and email for any questions or concerns throughout your listening program. The therapist will guide you step by step through using the equipment and finding the program that will best suit your needs.

How do I get started?

Call **Brain Harmony** at **888-272-4650**, to speak with a trained specialist today!

Attention and Regulation

When explaining the reason for inattention, Brain Harmony therapists reference the Pyramid of Learning by Wiliam and Shellengerger, 1-4.



Adapted from Pyramind of Learning (William & Schellenberger, 1-4)

Our programs focus on the maturation of the lower levels of the central nervous system as they provide the foundation for an individual's attention center. We will also assess an individual with attention issues for vestibular and reflex maturity along with functional eye movements.

Families are thrilled to learn they no longer need to be dependent upon external factors such as stimulant pharmaceuticals to compensate for a disorganized brain. Our programs rewire the brain and organize the neurological system with many families working with their prescribing physicians to no longer need pharmaceuticals.

"I am thrilled with my son's progress! He is more calm, more comfortable in his own skin and more focused. Brain Harmony was a real game changer for him. He participated in IQ, cognitive and neurological testing done a few weeks ago. The therapist reported that he no longer meets the diagnostic criteria for an ADHD. Brain Harmony has been life-changing. I am forever grateful." – Mom of Brain Harmony client for 6 months

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ADHD is typically defined as a problem with inattentiveness, lack of concentration, hyper-activity, impulsivity or a combination thereof. Most current strategies for addressing these symptoms are behavioral or pharmaceutical. The behavioral approach is a good start but it relies on the cognitive processes of the cortex, our "thinking brain," which are often ineffective when it comes to self-regulation and impulse control. Pharmaceuticals are commonly prescribed to children to improve ADHD symptoms, which does not fix underlying problems-which is a disorganized neurological system.

A multi-sensorial approach is the most effective in working at the physiological level. Our modalities and programs require the "thinking brain" to attend while simultaneously 'exercising' areas of the lower brain (sub-cortical) and body involved in regulation and information processing. With a customized programs defined by your Occupational Therapist, family's report improvements the following symptoms:

- concentration: staying on task for longer periods of time
- communication: paying attention during conversation; improved listening
- organization: planning and following through on tasks; less procrastination
- physical regulation: calmer demeanor, less fidgety
- anxiety: reducing nervousness and improving sleeping patterns

ATTENDING & FOCUSING

Brain scans of ADHD individuals show the cortical (higher brain) function in ADHD individuals is often normal. In many cases, the problem is insufficient input reaching the cortex. Higher brain functions such as reading are dependent upon adequate input from the brain stem and cerebellum. Our programs combine sound/movement that stimulates subcortical activity, while improving the ability of the brain stem and cerebellum to process sensory information leading to the cortex.

Targeted Skills: regulation, attention, focus, learning ability

PROCESSING INFORMATION, LEARNING NEW TASKS

The cerebellum has 10% of the volume of the brain, but it has 50% of the brain's neurons. In computer terms, it's our processor, receiving input from sensory systems and various parts of the brain, and integrating these inputs to fine tune motor activity. Most neuroscientists agree it is involved in motor functions, cognitive functions such as attention and emotional functions such as regulating fear and pleasure responses. Your customized treatment plan will include repetitive activities which stimulate cerebellar function. Input from the visual, vestibular and auditory systems, session after session, will train the cerebellum to become efficient at processing multi-sensory information which is where the direct improvement in function is clearly seen in the classroom, home and social settings.

Targeted Skills: motor control, "automaticity" (motor activities becoming automatic), processing

EMOTIONAL REGULATION, BODY AWARENESS

Directly connected to the cochlea of the inner ear, the vestibular system is primarily responsible for balance and coordination, but also has a strong impact on sensory modulation and emotional regulation. Once the vestibular system is functioning well, children are better able to participate in higher brain functions such as reading, writing and expressive language. Our programs and modialities provides specific and comprehensive stimulation to the vestibular system through bone conduction delivered via headphones, balance board activities and body movement exercises.

Targeted Skills: coordination, balance, focus, self-regulation

MOTOR PLANNING, REGULATION, AWARENESS OF PERSONAL SPACE

By improving the sense of one's own body - where it is, how to control it, how to move it – to the point where we don't need to think about it, we are freeing up the brain to focus on higher order activities. Children and adults who improve their proprioceptive abilities are able to approach learning and communication tasks in a more relaxed and regulated manner. Your customized movement program defined by your Occupational Therapist focuses on building proprioceptive abilities with specific exercises in each session.

Targeted Skills: attention, calm, athletics, coordination, daily movement, confidence

SENSE OF CALM, “GROUNDED”

The Autonomic Nervous System (ANS) controls many organs and muscles that work in an involuntary, reflexive manner. The ANS is important in two situations: emergencies that require us to “fight” or take “flight” and non-emergencies that allow us to “rest and digest”. The part of the ANS which governs the latter is the Parasympathetic Nervous System (PNS). The auditory programs stimulate the PNS through the Vagus nerve (auricular branch). Many children and adults beginning our programs are in a state of hyper-arousal, not far from “fight or flight”. The gentle stimulation of the PNS brings about a balance of the ANS which is reflected by increased calm and self-regulation.

Targeted Skills: behavior, ability to focus, the calm state which allows one to better focus on higher cognitive functions

HEMISPHERIC INTEGRATION

Receptors in the body deliver sensory information to the brain (and vice versa). If these receptors and the pathways leading up to the brain are not working because they were damaged or did not develop properly, the activity level of the brain decreases and different areas of the brain may not communicate with each other properly. In addition, connections between the right and left sides of the brain must be robust in order to allow for proper communication to take place between the different areas involved in higher brain function. The combination of listening and cross-lateral activities defined by your Occupational Terapist require the almost constant transfer of information from one hemisphere to the other, “exercising” the bridge that transfers information, the corpus callosum.

Targeted Skills: processing speed, cognitive functions, emotional health

ALERTNESS, ATTENTION, AND A GOOD NIGHT’S SLEEP

The Reticular Activating System (RAS) is a network of neurons deep in the brainstem that receives input from all sensory systems. It sends nonspecific information to the brain to “wake it up”. It is involved with regulating arousal, sleep-wake transitions, alertness, appropriate arousal to attend to the task at hand and even prepares the motor system for action. The RAS is engaged through both the auditory and movement components of our multi-sensory training.

Targeted Skills: ability to attend and focus, behavior

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Case Study Alex

Clinicians: Elizabeth Printz, OTR/L, iLs Associate
Carol Garner-Houston, OTR/L, iLs Advanced Practioner

Clinician's Discipline: Pediatric Occupational Therapy

Name of Organization: Brain Harmony

Diagnosis: ADHD

Abstract:
Alex and his family recently moved from out of the country to the Panhandle of Florida. He was transitioning to a new school for the 4th grade and mom was not happy with his progress. Mom stated, "Alex is moody, does not pay attention and does not make eye contact. He is very shy and takes a while to warm up to others. Alex has difficulty transitioning from one activity or environment to another. He also has tantrums when he is either bored or doesn't want to do something."

At the time of the initial evaluation, Alex was awkward and made poor eye contact. He refused to do his homework, had poor grades, and poor attention at school. Alex had a difficult time organizing his thoughts in order to clearly and precisely speak and write.

Alex was brought to Brain Harmony for an initial Occupational Therapy evaluation in the summer before his 4th grade year.

Therapeutic Goals:
The goals for therapy focused on:

1) Improving behavior
2) Improving attention span
3) Improving transitions from one activity to another
4) Improving academic success

iLs Program
The treatment plan included occupational therapy treatment once a week for 1 hour at home with therapist. Alex completed Sensory & Motor sessions, 1-19 odd only, then 20-26.

Pre & post-testing:
The tests used for both pre and post testing were the Beery-Buktenica visual-motor integration (VMI) and the Bruininks-Oseretsky Test of Motor Proficiency, 2nd edition (BOT-2). Also given throughout his school year was the Discovery Education Assessment. When the original scores were taken, Alex was 9 years and 4 months of age. When he was re-evaluated 7 months later, he was 9 years and 11 months of age. Bar graphs are included with pre & post scores.

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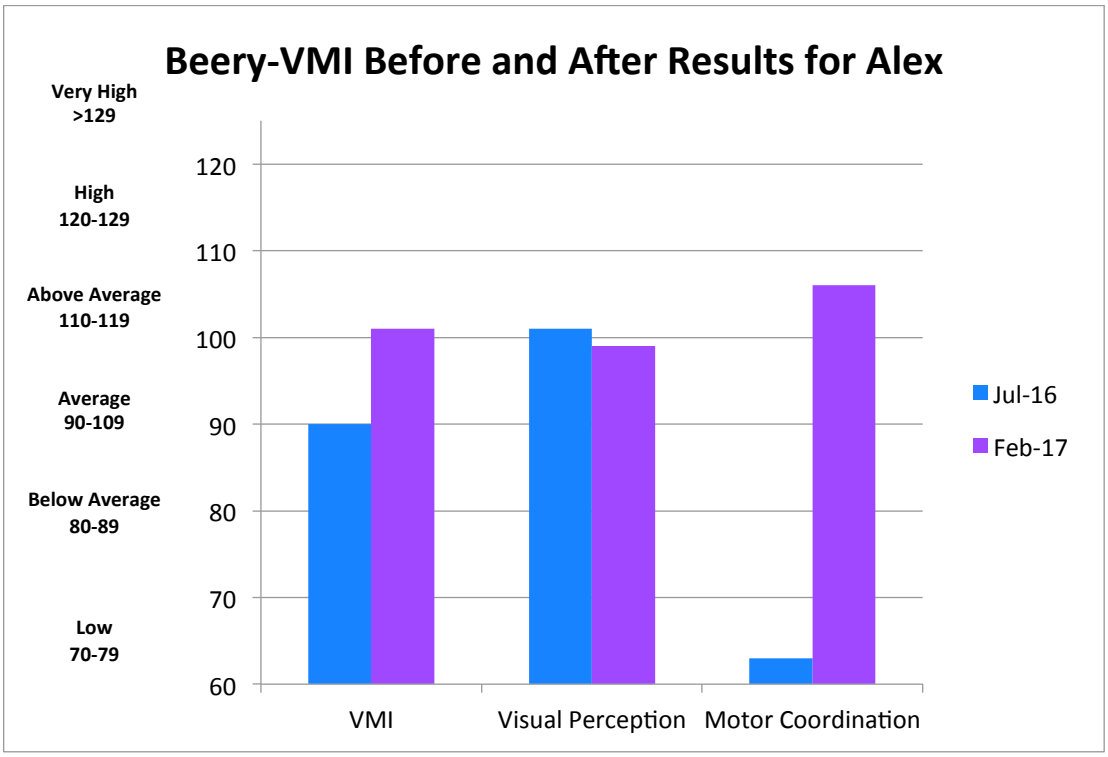
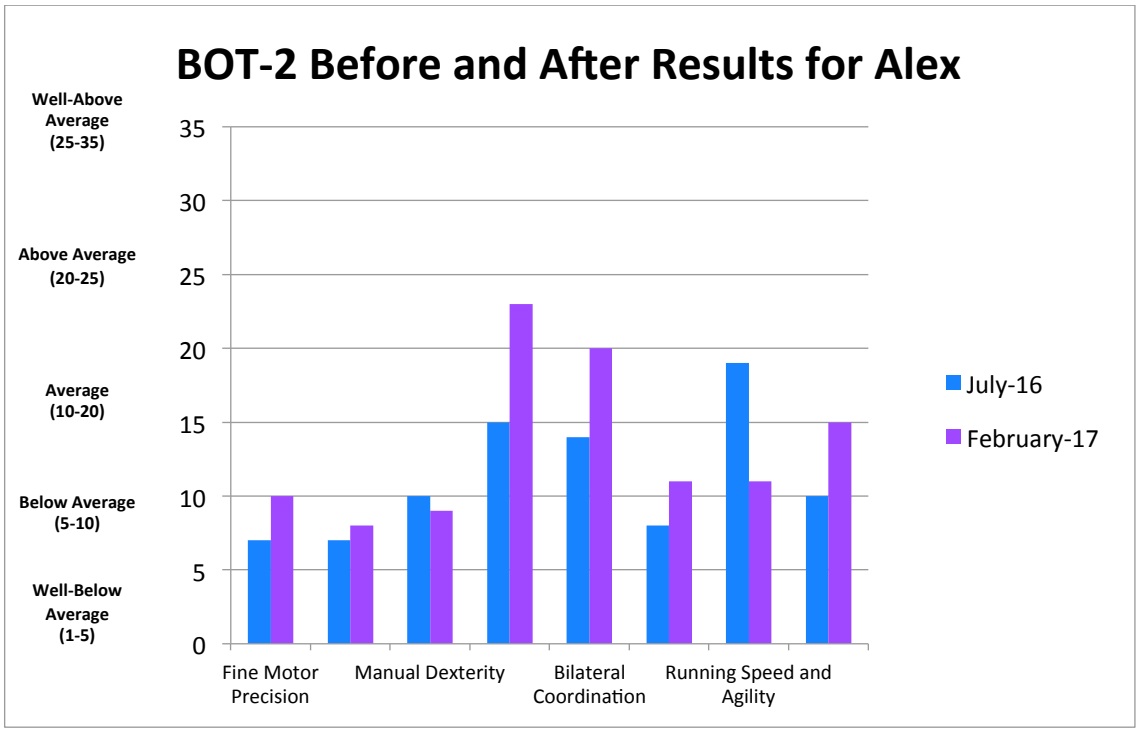
Beery –VMI

The Beery-VMI test is a neuropsychological test that analyzes visual construction skills. It identifies problems with visual perception, motor coordination, and visual-motor integration. In the initial evaluation, Alex's scores ranged between very low average to average. At the reassessment, Alex's scores increased to above average in almost all categories.



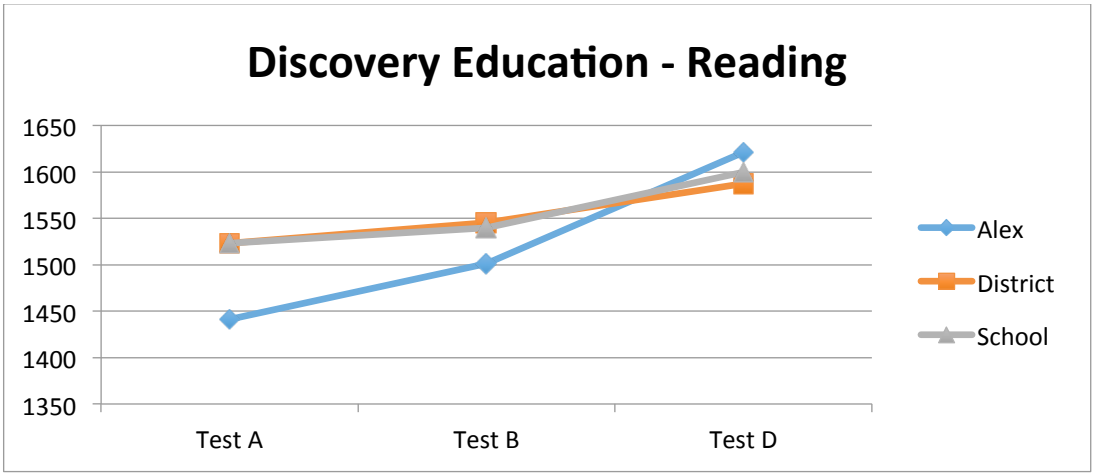
BOT – 2

The BOT-2 assesses the motor functioning of children ages 4-21. It identifies problems within multiple categories. At the initial evaluation in July, Alex's scores ranged between well below average and average. In February at the reassessment, Alex showed significant improvement in the areas of fine motor precision, fine motor integration, upper limb coordination, bilateral coordination, balance, and strength.



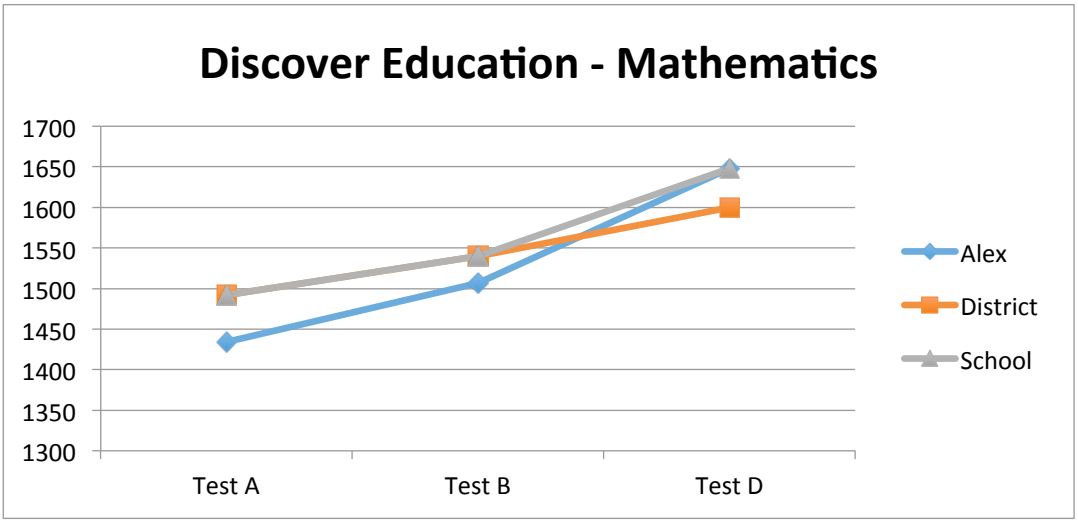
Discovery Education

The Discovery Education Assessment tracks a student's progress in Reading and Math at the beginning of the year at the end of the year allowing for comparison over time for Alex as well as comparison to peers at his school and throughout the entire school district.



In reading, Alex started the year below the district and the school's average. At the end of the year, Alex's scores were above the district and school's average. The target achievement level

for this assessment ranged from 1523-1628, which placed Alex below target achievement at the start of the year. By the end of the year, Alex scored in the upper end of the targeted achievement range placing him above his peers.



In Math, Alex started the year below the district and the school's average. At the end of the year, Alex's scores were above the district and equal to the school's average. The target achievement level for this assessment ranged from 1512-1698, which placed Alex below the target achievement at the start of the year. By the end of the year, Alex scored in the upper end of the targeted achievement range.

Therapist's Comments:
Alex began therapy at Brain Harmony with a shy and timid personality. Alex had a difficult time transitioning from preferred to non-preferred or new therapist directed tasks. He needed an excessive amount of time to write down his thoughts and ideas in an organized manner. Then in as little as 4-5 months, Alex began to flourish into a more attentive and joyful young boy. He began initiating conversations with excitement and more facial expressions. Alex was getting positive notes from his teachers and scoring off the charts on his school testing. He is easily making friends at school now. He met his goals and met age appropriate levels in 6 months by utilizing iLs one time a week when combined with Brain Harmony protocols.

Conclusions and Recommendations:
Overall, Alex demonstrated significant changes in many areas. The data provided shows only a portion of this client's success using iLs.

At the time of the evaluation, Alex was awkward, had poor eye contact, and had minimal facial expressions. He had poor grades, poor attention in school, and difficulty organizing thoughts, which prevented him from being able to clearly speak and write. Throughout the year, as Alex regularly listened to iLs, he began to change. School became easier. Notes from his teacher

said that he had good behavior, was a hard worker, and suggested he “keep doing whatever you’re doing”. His transitions from one activity to another became smoother, and his frustration level decreased. By the end of therapy, Alex was able to maintain eye contact, had smooth, clearer speech with improved response times. As well, he had a smiling and excited demeanor during therapy sessions.

Alex was discharged from Occupational Therapy treatments due to scores in standardized testing being age appropriate. This client’s therapist and parents will agree that using iLs was a key factor in helping Alex to be successful at home, school and on the playground. The iLs home program was recommended for future brain organization.

Co-Writer: Christine Fazzino, COTA/L, iLs Associate

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Case Study Lindsey

Clinicians: Carol Garner-Houston, OTR/L, Advanced iLs Practitioner, Safe & Sound Practitioner

Clinician's Discipline: Pediatric Occupational Therapy

Name of Organization: Brain Harmony

Diagnosis: ADD, Anxiety and Mild learning disability in math

Abstract:
Lindsey was struggling in school, particularly in math. She was having emotional mood swings and some anxiety as well. Mom said that Lindsey was trying so hard to hold herself together at school, that when she got home she could not hold it together anymore. Lindsey would have temper tantrums, mood swings, as well as, she refused to do homework.

Lindsey was brought to Brain Harmony for an initial Occupational Therapy evaluation for concerns regarding her ADD, anxiety and a mild learning disability in math.

Therapeutic Goals:
The goals for therapy focused on:

1) Improving fine motor skills including age appropriate handwriting skills
2) Improving self regulation
3) Improving attention span

Safe & Sound Protocol
The treatment plan included the completion of the Safe & Sound Protocol (SSP) at home for 5 days. Developed by Dr. Stephen Porges, the SSP is a five-day intervention designed to reduce stress and auditory sensitively while enhancing social engagement and resilience. By calming the physiological and emotional state, the door is opened for improved communication and more successful therapy. This non-invasive intervention involves listening to music that has been processed specifically to reorganize the nervous system (regulating state) to introduce a sense of safety and the ability to socially engage. This allows the client to better interpret not only human speech, but importantly, the emotional meaning of language. Once interpersonal interactions improve, spontaneous social behaviors and an enhanced ability to learn, self-regulate, and engage are often seen. The SSP has been effective in calming the emotional and physiological state by improving vagal regulation of the heart and improving auditory functions, as well as, improving difficulties in social communication.

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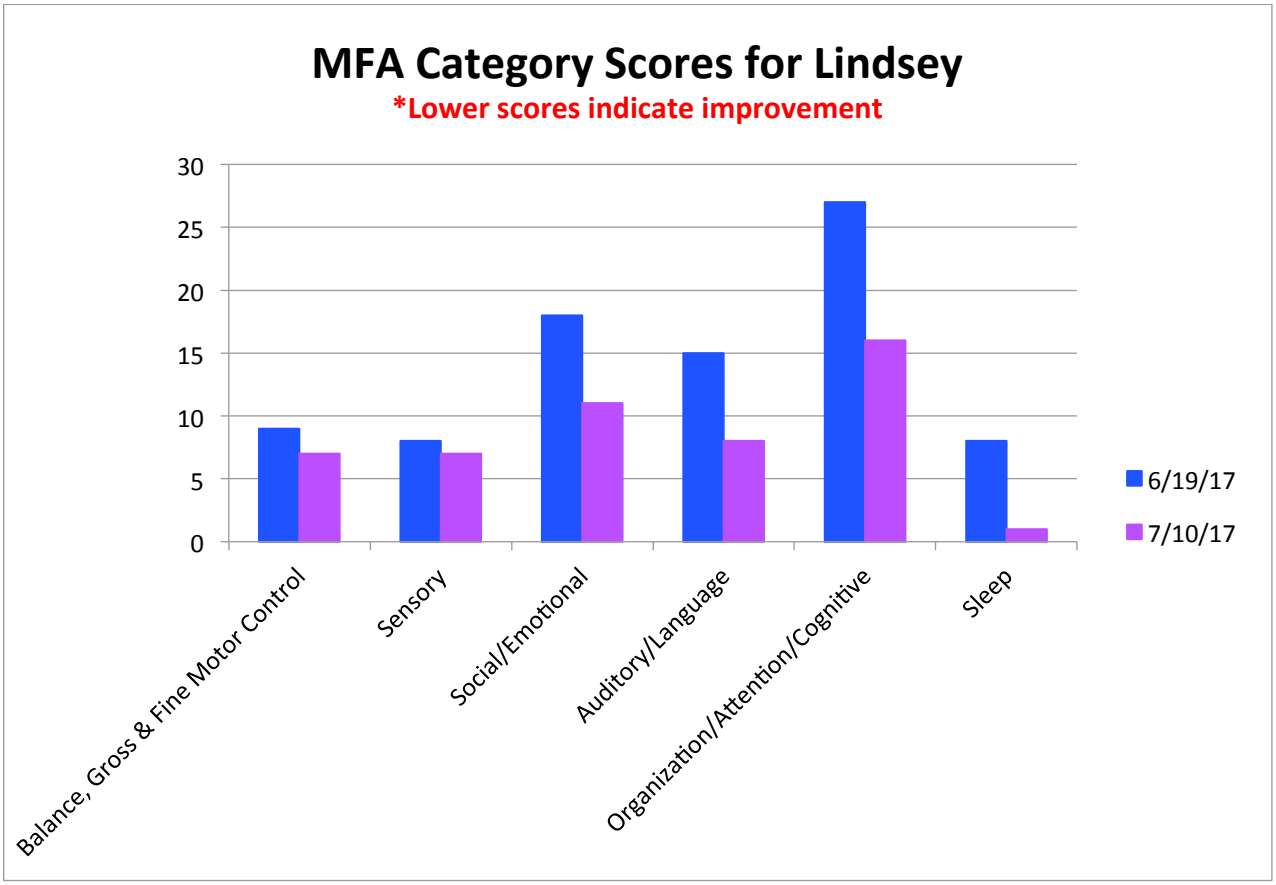
Pre & post-testing:
The tests used for both pre and post testing included the Measure of Foundational Abilities (MFA) – Grade School questionnaire.

The MFA is an online assessment of symptoms that measures change in six categories: balance, gross and fine motor, sensory, social/emotional, auditory/language, attention/organization/cognition, and sleep. The MFA was completed one week before and one week after completing the SSP.



Therapist's Comments:
"It is very exciting to know that after 5 hours of listening in the home setting, a child and family can be given the gifts of emotional stability, social confidence and improvements in sleep. For this adopted child, the SSP experience has set the platform for success in all areas of development."

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Conclusions and Recommendations:
Overall, Lindsey has made significant progress as shown by improvements in all categories in the Measure of Foundational Abilities questionnaire. This case study was written upon completion of the Safe & Sound Protocol. Lindsey took one week off before beginning the iLs home listening program, which was initiated to maximize improvements and achievement of therapy goals. Lindsey is expected to succeed in all areas of daily activities, including school.

Co-Writer: Christine Fazzino, COTA/L, iLs Associate, Safe & Sound Associate

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Name of Organization: Therapy Solutions, Wolverine, MI

Associates Name & Discipline: Amy Dubey, OTR/L, CBIS, iLsP, CIMP, SIPT

Age/Gender of Client: 6 ½ year old female

Date: November 1, 2016

Background Information:

Mary is a 6 ½ year old female. She is currently diagnosed with ADHD, anxiety and Sensory Processing Disorder. She attended speech and occupational therapy from June 2015 until approximately April 2016 at a hospital outpatient clinic.

Mary had chronic ear infections as an infant and had tubes put in her ears at 2 years old. She has also had a lot of dental problems and has approximately 17 cavities filled. She was still given a bottle until about the age 2. Per parent report, the following are difficulties or weaknesses they notice with Mary:

- difficulty problem solving
- difficulty determining cause and effect
- lack of motivation to take care of self needs
- toe walking
- "w" sitting
- rigid and does not adapt
- inappropriate responses to sensory stimuli
- understanding social cues

Presenting Problems: Speech Delay, Sensory Processing, ADHD, toe walking, and "W" sitting.

Therapeutic Goals:

1. Reflexes Integration
2. Body Awareness – copy motor movements and/or positions using a photograph or other person
3. Gross Motor Skills – perform bilateral lower extremity activities for balance and coordination without loss of balance
4. Attention/Arousal/Modulation/Posture – maintain focused attention for 20 minutes following sensory input, provided or directed by caregiver, and sit with upright posture on floor/chair.

Parent Goals:

1. Help her sensory issues
2. Learn to self-regulate better
3. Learn strategies to encourage self responsibility
4. Help her learn to be a bit more adaptable

iLs Program used: SSP was used 5 consecutive days in one week.
Mary was seen on Day 1, Day 3, and Day 5 in the clinic with this program. She performed Day 2 and Day 4 at home with parents.

Other Interventions Used:
Occupational Therapy – brushing and joint compressions performed throughout the day
She is seen 2 times a week for 1-hour durations in outpatient clinic

Summary of Changes:
This therapist noted that on Day 1 Mary choose 4 activities (Tanagrams, connecting beads, coloring, and Thera-putty with hidden beads) and performed them quickly. She moved through them before therapy time was finished. By Day 5 she choose 2 activities (Legos and connecting beads) and played with the Legos 80% of the time before moving on to the connecting beads. She completed building a complete Lego set of a miniature airport before moving on to the next task.
Mary worked on the floor or at a table. While sitting on the floor during the activities she often "w" sits and requires verbal cues to correct her positioning. The following are the results of verbal cues used for asking her to sit "criss-cross" style: Day 1 – 7 verbal cues, Day 3 – 3 verbal cues, and Day 5 – 2 verbal cues.
Another observation noted by therapist is that by Day 5, Mary did not seem to protrude her tongue as much as she had been observed during previous therapy sessions.

Post intervention based on the SSP Caregiver questionnaire parent reports improvement in:
Prior to intervention, my child used verbal language appropriately. NO was circled.
Description of spontaneously verbal language not previously observed, but used following the intervention.

Parent wrote: *"Before intervention, Mary would occasionally offer up information without prompting but normally we would have to have to ask and we normally wouldn't get much information."*
Parent marked: a lot better after treatment

Prior to intervention, my child talked to others in an appropriate manner: NO was circled.
Description of reciprocal conversations not previously observed, but used following the intervention.
Parent wrote: *"If prompted she could reciprocate more than twice but we would have to keep asking questions to get her to respond. In the last few days she has engaged more."*
Parent marked: a little better after treatment

Prior to intervention, my child initiated social interactions for the sake of social pleasure: NO was circled.
Description of initiating behavior not previously observed, but used following the intervention.
Parent wrote: *"She very rarely would initiate conversations unless she was asking for something. She seems to be doing it more freely now."*
Parent marked: a little better after treatment.

Prior to the intervention, my child read social situations appropriately: NO was circled.
Description of reading social cues not previously observed, but used following the intervention.
Parent wrote: *"Mary really struggles with reading social cues. She continues to need a lot of direction with this. She does tend to take her cues from other children, for example she will copy what they are doing whether it is appropriately or not."*
Parent marked: the same and a little better after treatment.

Prior to the intervention, my child listened in an appropriate manner: NO was circled.
Description of listening not previously observed, but noticed following the intervention.
Parent wrote: *"Mary still struggles with following these types of directions. She often needs to come back a few times to get the instructions again. Before the intervention she would often*

go to get it but then would just stay in the other room without the item or doing what she was asked to do without coming to ask for help."
Parent marked: a little better after treatment.

Prior to the intervention, my child regulated emotions in an appropriate manner: NO was circled.
Description of emotional control not previously observed, but observed following the intervention.
Parent wrote: *"She had trouble controlling her excitement when it is at an inappropriate level. This has resulted in tantrums in the past but she can control it better now."*
Parent marked: a little better after treatment.

Conclusions and Recommendations:
She will begin using the iLs system at home and in the clinic to address her above mentioned presenting problems.

Preliminary Study: The Effect of the iLs Pillow on Children with ADHD and Sleep-Related Difficulties

Site:
The Hallowell Center New York

Date:
October 25, 2012

Description:
This clinical program was conducted in collaboration with the Hallowell Center in New York to determine the feasibility and potential benefits of using the Integrated Listening Systems (iLs) Pillow for sleep problems in children with Attention Deficit Hyperactivity Disorder (ADHD).

The focus was to examine the immediate, short term effects of the iLs Pillow on the sleep behaviors of children as measured by sleep diary and parent questionnaire. Additionally, the effects of changes in sleep patterns on parents and family were of interest.

A total of eight children and families participated in this experimental program in advance of an IRB approved protocol. They were asked to complete two questionnaires at three points during the study: after Week One in which no iLs Pillow was used, after Week Two in which the iLs Pillow was used, and after Week Three in which no iLs Pillow was used.

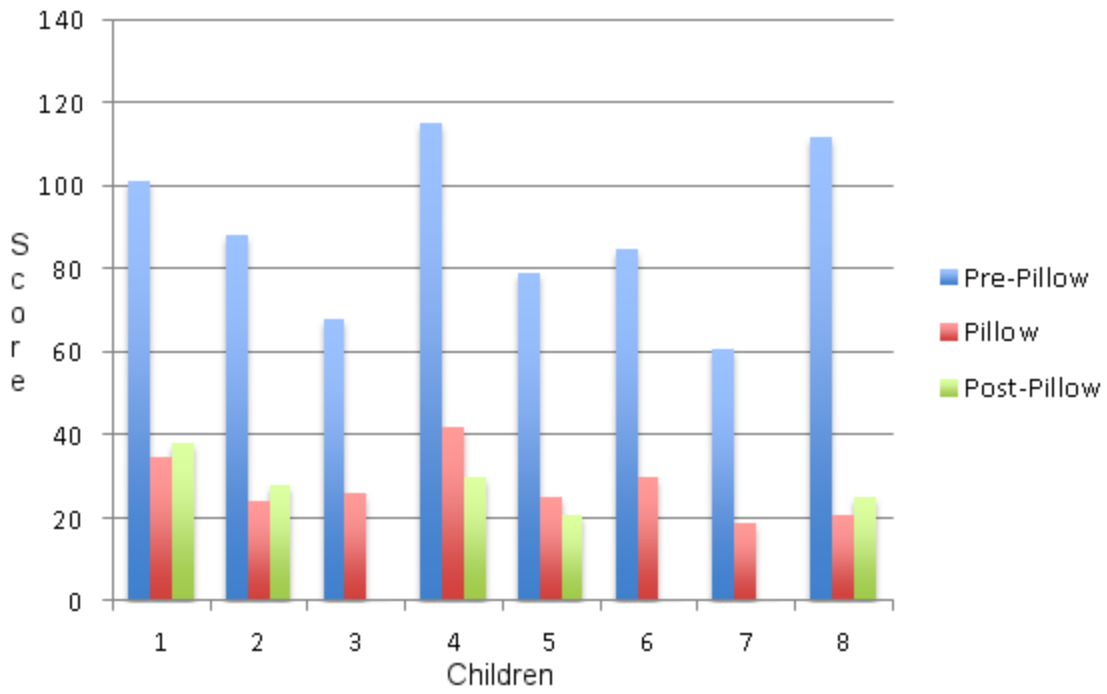
Results:
The results were quite promising for future study. All eight children showed a decrease in sleep problems as noted in response to the Child's Sleep Habits Questionnaire (CSHQ). None of the sleep problems returned to their original levels in week three, when the iLs Pillow was not used.

The CSHQ has four subscales: bedtime, sleep behavior, waking during the night and morning wake-up. The most notable changes were in sleep behavior, waking during the night and morning wake-up. All but one child no longer showed any problems waking during the night. All but two children showed improvement in sleep behavior and morning wake-up.

The graph below shows compiled data from the four subscales for each child for three weeks. The Pre-Pillow week is blue, the iLs Pillow week is red, and the Post-Pillow week is green. High scores indicate difficulty; low scores indicate better sleep habits.

Note: Children #3, #6 and #7 do not have data for the final week (post-intervention).

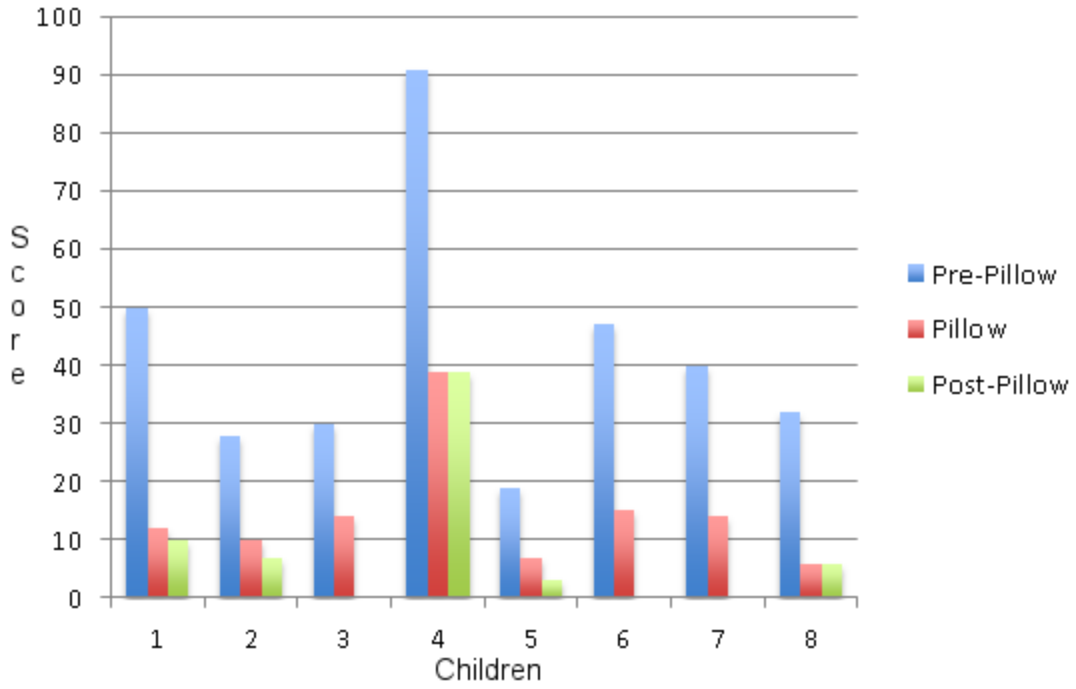
Child's Sleep Habits Questionnaire



Child's Sleep Habits Questionnaire

Similarly all eight children had improved scores on the Pediatric Quality of Life Inventory (PedsQL – see graph below) that persisted beyond the time they were actively using the iLs Pillow. Performance on this scale is measured in four domains: physical functioning, emotional functioning, social functioning and school functioning. Changes were most notable in emotional, social and school functioning. Improvements were reported by all but one parent in all four areas of function.

Pediatric Quality of Life Inventory



Here are some examples of behaviors that improved:

- Worrying
- Low energy level
- Keeping up with school work
- Getting along with other children

All of the parents reported a positive reaction to using the iLs Pillow and were interested in continuing its use. Many said their children were going to bed/sleep more quickly, sleeping more soundly, waking up more easily and generally seemed more relaxed.

An IRB approved protocol is slated to begin immediately to test the efficacy of the iLs Pillow on sleep patterns among children with ADHD as well as ASD.

iLs would like to thank the team at the Hallowell Center New York and the parents involved in this pilot program. Without their sincere interest in improving the lives of those with ADHD, this study would not have been possible.

Special Interest Section Quarterly

Sensory Integration

Sponsored in part by WPS
Volume 36, Number 4 • December 2013

Published by The American Occupational Therapy Association, Inc.

The Zones of Regulation: A Framework to Foster Self-Regulation

Leah M. Kuypers, MA Ed, OTR/L

The Zones of Regulation (or Zones, for short) is a framework for thinking, as well as a curriculum geared toward helping students gain skills in consciously regulating their behaviors. This in turn leads to increased self-control and problem-solving abilities. The Zones assists students in conceptualizing how they are feeling by creating a system to categorize their emotions and levels of alertness into one of four zones. It can be used and taught to students as young as preschool age (around 4 years old if cognitively they are at or above average intellect), elementary and secondary students, and even adults.

The Zones curriculum can be taught in schools as well as in private clinics. When implemented as part of a school-based intervention, the Zones supports the mandate for mental health prevention and early intervention services for all children. It is consistent with the principles of Social Emotional Learning in that it helps children recognize and manage their emotions and develop caring and concern for others (American Occupational Therapy Association, 2008). Occupational therapists can use the Zones to provide support for social emotional well-being and prevent problem behaviors, in collaboration with school personnel and parents. The ultimate goal is to develop skills and abilities that endure into adulthood.

The Zones learning activities target executive functions, including internalization of speech, flexible thinking, and inhibition. Using a cognitive behavior approach, the curriculum's learning activities are designed to help students recognize when they are in different zones, with each represented by a different color. The simplicity of the Zones helps students communicate how they are feeling in a safe, non-judgmental way.

The Four Zones

- The Red Zone is used to describe extremely heightened states of alertness and intense emotions. A person may be elated or experiencing anger, rage, explosive behavior, devastation, or terror when in the Red Zone. A person may be described as "out of control" if in the Red Zone.
- The Yellow Zone is also used to describe a heightened state of alertness and elevated emotions; however, one has some control in the Yellow Zone. A person may be experiencing stress, frustration, anxiety, excitement, silliness, the wiggles, or nervousness when in the Yellow Zone.
- The Green Zone is used to describe a calm state of alertness and neutral emotions. A person may be described as happy, focused, content, or ready to learn when in the Green Zone.
- The Blue Zone is used to describe low states of alertness and feelings, such as when one feels sad, tired, sick, or bored.

What is Self-Regulation?

Self-regulation can go by many names, such as *self-control, self-management, anger control*, and *impulse control*. These terms all describe people's ability to adjust their level of alertness and how they display their emotions through their behavior to attain goals in socially adaptive ways (Bronson, 2001). In other words, self-regulation is the ability to establish and maintain an optimal state for a given situation. This includes regulating one's sensory needs, emotions, and impulses to meet the demands of the environment, reach one's goals, and behave in a socially appropriate way. For example, given a stressful or frustrating experience, a person who can self-regulate well is able to remain calm and organized in order to successfully negotiate the event. If a person who struggles with self-regulation encounters the same frustrating experience, he or she may have difficulty coping and display less adaptive behaviors.

Besides the ability to adeptly process and modulate sensory input, two other processes are vital for self-regulation: emotional regulation and executive functioning. Emotional regulation involves processes (both intrinsic and extrinsic) that are responsible for controlling emotional reactions in order to meet one's goal. These include monitoring, evaluating, and modifying the intensity and temporal features of one's emotional response (Liebermann, Giesbrecht, & Muller, 2007). When one pairs emotional regulation skills, such as behavioral, language and metacognitive strategies, with the ability to modulate one's state of alertness, the person is able to function optimally (Prizant, Wetherby, Rubin, Laurent, & Rydell, 2006). As Prizant et al. aptly phrased it, "physiological alertness, emotional alertness, and emotional regulatory abilities have a cumulative impact on a child's attention, availability for learning, and ability to engage in social activities" (2006, p. 53). Emotional regulation also includes the following subfunctions: self-regulation of motivation and drive, a capacity for objectivity, and social

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perspective taking (also known as theory of mind; Barkley, 1997). Emotional regulation, including these subfunctions, is directly addressed in the Zones curriculum.

Executive function is an umbrella term that describes the cognitive processes involved in the conscious control of thoughts and actions (Leibermann et al., 2007). Our ability to self-regulate depends on the effectiveness of these functions. Numerous mental operations fall under executive functioning, but some that are influential to the ability to self-regulate are attention shifting (attending to two or more activities simultaneously, such as taking notes while listening to a lecture), working memory (updating and purging "files" in the brain with new information), internalization of speech (self-talk), flexible thinking (considering multiple options), and inhibition (impulse control). After involuntary emotions are elicited, it is our executive functions that help to modulate the emotional display and induce emotional states that are in the best interest of the goal-directed behavior (Barkley, 1997).

To self-regulate, it is important for students to understand theory of mind, or that other people's thoughts, feelings, and experiences differ from their own (Barkley, 1997). They need to see that others are affected emotionally by their behavior and how their behavior affects their relationships with those around them (Winner, 2000). The collective work by Michelle Garcia Winner on Social Thinking® helps students understand the perspectives of others (i.e., social perspective taking). Winner's Social Thinking concepts are infused throughout the Zones curriculum to help students understand the effects of their behavior on the thoughts and feelings of those around them. This in turn can help motivate students to use regulation tools when they notice themselves moving toward dysregulated states and emotions.

All of these components (sensory processing, executive functioning, emotional regulation, and social perspective taking) are working together to effectively help the person self-regulate. If one of these components does not function adequately, the person's ability to self-regulate will be diminished.

About the Curriculum

To teach students how to self-regulate, 18 lessons explore numerous underlying skills that are necessary to be an effective regulator. Students work to expand their vocabulary of emotional terms, gain skills in reading facial expressions, deepen their perspective on how others see and react to their behavior, identify events that trigger their emotions, increase their problem solving skills, and much more. Given that each student's needs and preferences are unique, students explore various tools in the following three categories: (a) calming techniques/mindfulness strategies, (b) cognitive or thinking strategies, and (c) sensory supports. Besides the tools introduced in the curriculum, regulation strategies the student or instructor are already familiar with can be categorized using the Zones framework. Ultimately, students build a toolbox of their preferred methods to manage and move between zones.

Having a toolbox of strategies to aid in regulation is a start, but self-regulation is complex and takes more than knowing about tools. When assessing students' baseline skills in self-regulation, students often are able to list a tool or two that would help them, though they aren't able to put these tools into practice in real-time situations. Students need to learn *when* and *how* to use tools and problem solving skills to change the way they are thinking and feeling. There are several lessons designed to help students accomplish this. Inhibition, or impulse control, is another underlying skill that interferes with one's ability to regulate. *Inhibition*, as defined by Liebermann et al. (2007), is the ability to restrain or stop the automatic and dominant impulse responses. When impulse control is functioning adequately, a student will be able to complete the problem solving necessary to clear the hurdles he or she meets. *STOP, OPT* (short for options) *and GO* (Kuypers, 2011) is a tool and lesson taught within the curriculum to address this skill. It teaches students to *stop* before they act, think about all the good and bad *opt*ions and how they will play out, and *go* with the best one.

Many of the Zone's lessons offer extension activities and ways to adapt the activity for individual student needs. The curriculum also includes worksheets, handouts, and visuals to display and share. These can be photocopied from this book or printed from the accompanying CD. The curriculum is designed to be taught by anyone with an interest in teaching students self-regulation skills. This can include, but is not limited to, special education and regular education teachers, occupational therapists, speech-language pathologists, psychologists, counselors, behaviorists, social workers, and parents.

Who Can Benefit

Initially the curriculum was developed for students with neurobiological and mental health disorders, such as an autism spectrum disorder (ASD), sensory processing disorder (SPD), attention deficit hyperactive disorder (ADHD), Tourette syndrome, oppositional defiant disorder, conduct disorder, and anxiety disorders. However, it became apparent that the curriculum could reach a much broader population.

When one student starts using the Zones, often parents and teachers see the positive effects it has on the other children and even themselves. Adults who teach the Zones report better insight into their own states and become more aware of the tools they can use to self-regulate. This has prompted many regular education teachers to adopt it for use with their whole class, seeing that students who can self-regulate are more available for learning, and have more capacity to take in and process the academic content.

Case Example: Mikey

Mikey was a third grade student when his parents sought help to address his self-regulation needs. Upon intake, it was reported by his parents that Mikey had significant difficulty managing his emotions, problem solving conflicts, and getting along with his peers. He had been evaluated by his local school district but was not found to qualify for any special education services. Upon initial assessment, Mikey was found to be hypersensitive to noise, causing him to become agitated. Using Michelle Garcia Winner's ILAUGH informal assessment (2000), Mikey demonstrated difficulty taking others' perspectives, using flexible thinking, and seeing the *gestalt*

Sensory Integration
Special Interest Section Quarterly
(ISSN 1095-7250)

Published quarterly by The American Occupational Therapy Association, Inc., 4720 Montgomery Lane, Bethesda, MD 20814-3449; subscriptions@aota.org (e-mail). Periodicals postage paid at Bethesda, MD. POSTMASTER: Send address changes to *Sensory Integration Special Interest Section Quarterly*, AOTA, 4720 Montgomery Lane, Suite #200, Bethesda, MD 20814-3449. Annual membership dues are $225 for OTs, $131 for OTAs, and $75 for Student members. All SIS Quarterlies are available to members at www.aota.org. The opinions and positions stated by the contributors are those of the authors and not necessarily those of the editor or AOTA. Sponsorship is accepted on the basis of conformity with AOTA standards. Acceptance of sponsorship does not imply endorsement, official attitude, or position of the editor or AOTA.

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or big picture versus the details. Despite a large emotional vocabulary, he had difficulty reading emotions in others. He also struggled to use appropriate nonverbal communication, often talking with a sharp tone and displaying gestures that came across to others as being irritated. When Mikey was interviewed he stated that he had difficulty controlling his feelings. When asked if he knew of any tools that helped, he stated he could take a deep breath or count to 10, though when pressed further, he stated these never worked for him but he had been told for years to do them.

Mikey was seen for 2 years in a weekly small group with two to three other same-aged peers with similar profiles. The group met at a private therapy clinic, though group outings into the community occurred at least every other month to promote generalization of skills across settings. Mikey's parents also granted his private occupational therapist permission to consult with Mikey's classroom teacher to foster insights on his performance and share information regarding his needs in the school environment as well as ideas to help generalize concepts into the school setting. The weekly therapy format included 50-minute small group learning time followed by 10 to 15 minutes of parent education and discussion. During the learning time, a skill or concept was introduced to the group, followed by an engaging activity where the students practiced the skill, and teachable moments prompted by the therapist so students gained competency. Using the Zones of Regulation, Mikey was taught to categorize his level of alertness and feeling into the four Zones. Through this process, Mikey learned to differentiate between when he was "agitated" and in the Yellow Zone (such as when he was in a noisy environment) versus "irate" and in the Red Zone (such as when he perceived something as unfair). These are the two zones Mikey struggled the most to regulate. Mikey instantly grasped the Zones concept and was able to offer numerous events (later identified through a learning activity as a "trigger") that affected which zone he was in. The Zones concept and language were introduced to his parents, and ideas were given for how they could reinforce the concept at home and in the community, as well as infuse it into the school environment. Mikey worked on his ability to identify emotions in others by watching preferred YouTube video clips, such as therapist-edited clips from "Annoying Orange," a comical but rude and grumpy character, and using magazine pictures to make a collage of emotions representing the four Zones. During these activities, the therapist noted the facial expressions and body language that accompanied each emotion and helped Mikey to relate to the characters by describing a time he experienced a similar emotion. This assisted Mikey in understanding that everyone experiences these emotions and behavioral states and that there is no such thing as a bad or naughty Zone.

Given Mikey's difficulty in perspective taking, he was taught concepts from Think Social! (Winner, 2007) that are introduced in the Zones of Regulation curriculum, such as the terms *expected behavior* and *unexpected behavior*. Given his deficits in theory of mind, it was eye-opening for him to see that his behavior was impacting the thoughts and feelings of those around him. Mikey was taught that all of the Zones are *expected* at different times, and it is our job to try to match our Zone to the environmental and social demands. Initially, it was easy for him to see when another person's Zone was *unexpected* but he had difficulty recognizing how his own *unexpected* Zones and behaviors impacted those around him unless they were pointed out to him. Often this was done by asking Mikey to notice how a peer around him was feeling or to make a *smart guess* about what a peer was thinking when he was demonstrating unexpected Yellow Zone behavior (for example raising his voice, furrowing his brows, and rudely telling a peer that he was wrong when playing a game together). Through using these real-time teachable moments (see Kuypers, 2011, pp. 62–72), as well as Winner's *Social Behavior Maps* (2007), Mikey developed an understanding of how his unexpected Yellow and Red Zone behaviors were playing a role in how much his peers wanted to socialize with him. He was now able to make the connection of how his behavior affected others' thoughts and feelings, and how this accounted for such things as no one wanting to work with him on projects or play games with him.

Each week a tool was introduced to Mikey and the other boys in his small group and, after learning and practicing the tool, they were each asked to reflect on which Zone or Zones the tool would help them in. Although sensory supports, mindfulness techniques, and thinking strategies were taught, it was apparent through Mikey charting the effectiveness of his tools that the cognitive-based tools were the most effective for him. These helped him address his underlying deficits in flexible thinking by assisting him in noticing when he was stuck on a thought, seeing the big picture versus overreacting to a small problem, and using positive self-talk to counteract the automatic negative thoughts that plagued him. In addition, Mikey came up with tools to cope with his noise sensitivity, which included ignoring the person making the noise, wearing noise cancelling headphones, and asking to move to a quieter environment. Although it wasn't always apparent to those around him that Mikey was using a tool, by having him graph each time he used one, it was evident he was making frequent attempts to self-regulate.

Over the course of 2 years, Mikey made significant strides in his ability to regulate his emotions and behavioral states. When Mikey was re-interviewed, he communicated that he liked the Zones because it gave him a way to think about how he was feeling and figure out what to do. He stated, "I used to make a scene when something upset me. I had been told so many times to 'calm down' and it never worked. That's why I like the Zones. It teaches you how to control yourself."

Conclusion

As occupational therapy practitioners, it is our mission to assist others in being able to engage and participate to their fullest potential in their meaningful occupations. Self-regulation deficits impede performance for many people with SPD, ASD, and ADHD, who are often referred to occupational therapy. When self-regulation deficits interfere with an individual's daily life activity, it is the occupational therapist's role to assist him or her in gaining the skills and tools to handle the behaviors that hinder more meaningful engagement. Cognitive behavioral strategies such as those outlined in the Zones of Regulation curriculum may complement other approaches used with these children in helping them reach their goals. Self-regulation skills are needed everywhere, not just in a one-to-one or small group setting behind a therapy clinic door. Therefore, for strategies to be effective, it is vital that the concepts and tools be taught and reinforced across environments for optimal skill acquisition and functioning. The straightforward language laid out in the Zones of Regulation curriculum facilitates optimal functioning across contexts; in addition, the Zones curriculum highlights numerous ways to generalize the acquired skills. ■

Resources

The Zones of Regulation app: www.selosoft.com/zones.html
Social Thinking Web site: www.socialthinking.com
Social Thinking videos: www.youtube.com/user/socialthinking

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