Sensory Processing and Learning Disabilities: Case Studies of a Neurodevelopmental Approach to Assessment & Successful Treatment in a Pediatric Population

Diana Croom-Atkins, OTD, OTR/L
The Morris Center
Ocala, FL
Learning Objectives:

- learn a neurodevelopmental model of phonological awareness, spoken language and written language that is based on multi-sensory processing.

- discover how multi- and sensory processing aid the development of fine motor skills, occulo-motor skills, oral motor, somatosensory and motor articulatory, postural control, general motor praxis, language skills, and reading and writing.

- understand the relationship between sensory processing and motor deficits and learning disabilities.

- explore how a transdisciplinary team follows neuro-developmental models during assessment and treatment.
“Learning and behavior are the visible aspects of sensory integration.” (Ayres, 2005, p. 27)

“Reading, writing, and arithmetic...are extremely complex processes that can develop only upon a strong foundation of sensory integration.” (Ayres, 2005, p. 11)
Promoting Academic Success

- Attention
- Sensory, Motor skills & Modulation
- Learning & Memory skills
- Spoken & Written Language skills
- Psychological health
- Self-esteem, interpersonal skills, regulation of mood or anxiety
- Behaviors for learning & achievement – Engagement, motivation, compliance
- Executive Functions
- Planning, organizing, managing time
What to do?

If attention, sensory, motor, visual, language, memory, executive functions and psychosocial skills contribute to academic and life success, then which professions can assess & treat deficits in these systems?

- Medical providers
- Speech-Language Pathology
- Occupational Therapy
- Neuropsychology/Clinical Psychology

A team of providers, but what type of team?

Transdisciplinary vs Multidisciplinary
Transdisciplinary vs. Multidisciplinary

**Multidisciplinary** –
- more than one discipline individually evaluates and treats
- each discipline retains its methodologies and assumptions without change or development from other disciplines
- cooperation may be mutual and cumulative, but is not interactive

**Transdisciplinary** –
- several disciplines evaluate and treat together
- each discipline is trained in some tenets of the other disciplines
- shared theoretical models that integrate perspectives from several disciplines
- blends the practices and assumptions of each discipline involved
Transdisciplinary Team Building

Team is built with:

1. Shared neurodevelopmental models of function
2. Cross-trained in each discipline’s treatments methods and goals
3. Creating an integrated immersion environment for treatment
4. Shared understanding of tenets of neural plasticity

Grant, Finocchio et al., (1995)
Interactive Transdisciplinary Team

- Transdisciplinary review of assessment data
- Transdisciplinary diagnoses
- Transdisciplinary team goals for patient
- Transdisciplinary members are interdependent for patient’s treatment progress
- Clinical environment enables collaboration:
  - Weekly transdisciplinary team rehab staffing
  - Daily/hourly hallway consultations
  - Weekly parent education meetings w/ psychologist

- Drinka & Clark (2000).
Interactive Transdisciplinary Team

**Advantages**

1. Integrated care
2. Shared leadership responsibility
3. Solutions to complex problems
4. Solutions with depth & breadth
5. Members are empowered
6. Creative approaches to complexity
7. Understand autonomous practice

**Disadvantages**

1. Initial decisions take more time
2. Members must learn different languages/norms
3. Effort to maintain the team
4. Need time and space to:
   - Clarify values
   - Renegotiate roles
   - Renegotiate leadership
   - Manage and resolve conflicts
Neural Plasticity and Neurogenesis

**Neural Plasticity** – the ability of the brain to change in response to experience. Experience leads to changes in the brain, which, in turn, facilitate new learning, which leads to further neural change.

**Neurogenesis** – growth of new neurons

**Brain Rewiring** – Sensory input and learning tasks change the structure and function of neurons – resulting in increased efficacy in existing neuronal circuits.
NEURONS & LEARNING

Tenets of Neuroplasticity

Neuroplasticity or LEARNING is promoted by:

1. **Intensity** - # of hours per day
2. **Frequency** - # of days per week
3. **Specificity** – explicit instructions/methods
4. **Neurodevelopmental Hierarchy**
   – training basic skills before advanced skills
5. **Duration** – # of weeks of treatment
7 Impactful Principles of Neural Plasticity

1. **Attention** – change only occurs when the brain is in the mood and alert.
2. **Change** strengthens connections between neurons engaged at the **same time**.
3. Neurons that **fire** together, **wire** together.
4. Initial changes are just temporary, do it **over and over again**.
5. Brain plasticity is a **two way street**. Bad habits change the brain too.
6. **Memory** is critical to learning, takes 8 seconds of focused attention to move information to long term memory.
7. **Motivation** is a key factor in brain plasticity.
Other factors which influence neuroplasticity

• Engagement in activity/motivation – “learn by doing” J Moore, 1980
• Enriched environments – overstimulation leads to fight or flight response – Moore, 1993
• Critical Periods – readiness periods, nervous system primed to acquire new skills – “Just Right Challenge”
• Age – neuroplasticity is a lifespan process
Shared Neurodevelopmental Models of Function Relative to Treatment Goals

Developmental Dyslexia
Sensory Integration
Dyslexia is the most common learning disability.

- 1 in 5 people have dyslexia
- 70-85% of children placed in special education for learning disabilities are dyslexic
- Dyslexia does not reflect an overall deficit in language, but a localized weakness with the phonological module of the brain
- 50-70% of people with dyslexia also have ADHD
- Those with dyslexia used about 5 times more energy to complete mental tasks

www.dosomething.org/facts/11-facts-about-dyslexia
WHAT DYSLEXIA IS NOT

DYSLEXIA...

- is **NOT** a visual problem
- is **NOT** a lack of intelligence
- is **NOT** due to lack of effort
- is **NOT** a developmental lag
- is **NOT** uncommon: 5–17.5 % of population
- is **NOT** responsive to standard reading instruction
DYS = TROUBLE  LEXIA = WORDS

**DYSLEXIA IS...**

- Neurologic in origin – genetic
- Lifelong – environment may alter course
- Core deficit = phonological awareness (language)
- Reading comprehension > word reading skills
- Dyslexia may include accompanying challenges
  - ADHD (50-70%)
  - Behavioral problems
  - Sensory motor difficulty
  - = More challenging to remediate
THE PICTURE OF DYSLEXIA
(ALL SYMPTOMS DO NOT OCCUR WITH EVERYONE)

ORAL LANGUAGE CHALLENGES

LISTENING
- Phonological Awareness
- Auditory Memory
  (word sequences, phone numbers, remembering directions)
- Foreign Language

SPEAKING
- Word Finding
- Multi-syllable Words
- Sequencing Ideas
- Foreign Language
THE PICTURE OF DYSLEXIA
(ALL SYMPTOMS DO NOT OCCUR WITH EVERYONE)

WRITTEN LANGUAGE CHALLENGES

READING
- Mechanics
- Speed
- Comprehension

SPELLING & WRITING
- Mechanics
- Expressing Ideas
- Speed
THE PICTURE OF DYSLEXIA
(ALL SYMPTOMS DO NOT OCCUR WITH EVERYONE)

ACCOMPANYING CHALLENGES (BEHAVIORAL)

- Attention & Executive Function
- Anxiety
- Brain / Behavior Disorders
- OCD
- Depression
- Oppositional Behavior
- Parents with similar challenges
THE PICTURE OF DYSLEXIA
(ALL SYMPTOMS DO NOT OCCUR WITH EVERYONE)

ACCOMPANYING SENSORIMOTOR CHALLENGES

- Praxis
- Messy Eating
- Writing/knots
- Lose Place
- Words Swim
- Left/Right
- Up/Down

Oral Motor

- Fingers
- Eyes

Tired

Spatial Awareness
“The inability to associate the position of their articulators with speech sounds may impair the development of phonological awareness and the ability to convert graphemes to phonemes. Unawareness of their articulators may be related to programming [sensory integration] or feedback [sensory perception] deficits.”
Why would you need occupational therapy as part of a treatment team for Language Disorder, Learning Disability or Dyslexia?

“Sensory Integration sorts, orders, and eventually puts all of the individual sensory inputs together into whole brain function” (Ayres, 2005, p. 28)

“Learning and behavior are the visible aspects of sensory integration.” (Ayres, 2005, p. 27)
Research shows that more than 50 percent of individuals with learning difficulties may also have sensorimotor difficulties. Occupational Therapists are the experts on the development of sensory and motor skills. These skills are other foundational skills, besides language, that can affect the development of academic skills or interfere with academic performance. The individual who has language and sensorimotor deficits are struggling even harder to develop their skills and perform daily activities.

“Society is placing more emphasis on language, academic, and intellectual development, and less on building the sensorimotor foundations for these higher functions.” (Ayres, 2005, p. 141)
The Morris Center
Transdisciplinary Team for
Assessment & Treatment

Disciplines:

- Neuropsychology
- Psychiatry
- Clinical Psychology
- Occupational Therapy
- Speech-Language Pathology
- Education
The Morris Center
Occupational Therapy Objectives

- Assess, educate, communicate, and plan to:
  - Address the sensory processing, sensorimotor, and arousal state modulation challenges of each client to optimize their learning potential throughout the day
  - Facilitate generalization of these skills into each person’s activities of daily living.

- Provide sensory-based occupational therapy intervention to:
  - Find the *just right challenges* to facilitate more functional responses to sensation in active, meaningful, and fun ways so the client is able to develop more appropriate and efficient adaptive responses/behaviors in academic, social, and self-care activities.

- Provide recommendations and education for:
  - Accommodations, adaptive equipment, or modification of activities to optimize positioning and provide support as needed to meet each clients’ individual needs as they develop endurance, stamina and skills in dynamic academic, physically active and social settings at TMC and in their daily lives.
- 5 to 10 hours of OT per week
- Transdisciplinary team understands the close relationship between language-based learning & sensorimotor difficulties
- Therapists confer daily regarding treatment progress
- OT Goals = improve overall core strength, balance, visual processing, sensory processing and coordination.
- Strengthening these areas will help improve sensorimotor skills, sensorimotor foundations of language skills, academic skills, build self-confidence and enhance self-esteem.
Sensory Processing refers to the ability of the nervous system to register, organize, and use sensory information. This includes information from the three “body senses,” which are the foundation for other sensory skills as well as the integration of sensory and motor systems and the integration of perceptual and motor systems (Miller). If any of the steps in the pyramid are weak or have not developed efficiently, it can cause difficulties and challenges in the higher levels of learning.
**Vestibular system** (balance and sense of movement and gravity) is the most powerful and crucial part of the sensory system.

**Proprioceptive system** (position sense) refers to the sensory input and feedback that tells us about our body’s movement and position in space based on information from our muscles, joints, ligaments, tendons, and connective tissues.

**Tactile system** processes information from our environment based on our sense of touch. There are many types of touch receptors including deep pressure/light touch, temperature, and pain receptors.

**Auditory processing** is related to listening and discriminating the differences in sounds. Even though hearing may be normal, when there are difficulties with auditory processing there is a mismatch in the ability to interpret or discriminate sounds. This can impact academic skills including language development, reading, spelling and being able to follow directions.
**Visual Perceptual Skills** involve the ability to organize and interpret the information that is seen, and give that information meaning. Some examples of visual perceptual skills include those that are important in navigating everyday life and academics:

**Visual Discrimination** – recognizing differences between similar objects

**Visual Memory** – being able to hold the visual image of an object in memory for a brief period of time and choose it from among similar items

**Spatial Relations** – accurately perceiving the position of objects in relation to oneself or other objects

**Visual Form Constancy** – recognizing an object despite changes in size, shape, or orientation

**Visual Sequencing** – being able to remember (the order or sequence) of a series of forms or characters

**Figure-Ground** – finding an object in a complex background

**Visual Closure** – being able to infer what an object is based on by seeing partial information about that object
Reflexes

The Moro Reflex occurs in response to loss of support of the head and upper body. A child who has not integrated the Moro reflex efficiently will often be in a high-alert or stressed state. The Moro and the TLR are also closely linked and involved in vestibular (balance) processing.

The Tonic Labyrinthine Reflex (TLR) comes in two forms in response to movement of the head (vestibular/proprioceptive processing). When not integrated efficiently, the TLR can impact motor development, muscle tone, postural control and gravitational security. The TLR supports the development of other reflexes into more mature movement patterns including the STNR and the ATNR.

The Symmetrical Tonic Neck Reflex (STNR) involves the bending of the elbows when the neck is flexed and knees are bent. This reflex helps prepare babies for learning to crawl on hands and knees. When present in older children, the STNR may interfere with postural control, gross and fine motor movement and ocular motor control.

The Asymmetrical Tonic Neck Reflex (ATNR) occurs when the head is turned to the side and the arm on the same side extends outward. This reflex assists an infant when reaching for objects and for learning to roll over. When not integrated efficiently, it may contribute to head-turning during visual motor activities, difficulty with motor planning and praxis with activities off of mid-line as well as rotational activities. When present in older children, the ATNR may interfere with daily performance in movement, activities of daily living and academic activities.
**Postural control** is the ability of the body to stay upright against the pull of gravity and to adjust one’s posture to keep from falling down. Postural control, joint stability, and strength and endurance are heavily reliant upon respiration efficiency, visual, vestibular, and proprioceptive information. Postural control provides a base of support for the arms and legs to work from and provides the stability for ocular motor and visual perceptual skills to develop in order to perform activities of daily living, movement and coordination activities, as well as academic skills (cutting, drawing, writing, copying from the board or book/paper at a desk).

**Praxis** is the ability of the brain and body to use sensory information in order to perform activities and involves a number of skills and abilities. *Motor planning* is one of those abilities and involves having an idea, planning the movements, and executing the plan. Once a movement pattern for a new skill becomes proficient, motor planning becomes automatic.

**Gross motor skills** require use of large muscle groups to perform tasks such as walking, balancing, and crawling.
**Fine motor skills** require use of smaller muscle groups to perform tasks that are precise in nature, such as writing and typing.

**Oculomotor control** refers to the ability of the eyes to locate objects in the environment, and maintain focus on a moving object. Deficits with these skills will likely impact visual attention to tasks and activities as well as performance in academics.

**Graphomotor production** refers to the quality of handwriting/drawing/copying. Pencil grip and the pressure used when writing can affect the quality and speed of grapho-motor production.

**Visual-motor integration** refers to the ability to use visual information to motor plan and to execute motor movements. Tracing, copying designs, taking notes from a blackboard and physical education activities are a few of the academic tasks that require solid visual-motor integration skills. Integrating visual information with motor skills often relies heavily upon one’s posture to provide joint stability for the hands to perform intricate movements and sensory processing of vestibular, proprioceptive, tactile, and visual information.
Core Concepts of Sensory Integration….  

- provides a foundation for learning and behavior. All sensory systems are important contributors to learning and behavior. The body related senses of tactile, vestibular, and proprioception provide reference points relating to the body and its place in the environment – a critical component to all learning and behavior.

- is a developmental process

- promotes neuroplasticity. Neuroplasticity is the ability to change in response to environmental input and demands. Lane and Schaaf concluded the literature related to neuroplasticity supports the concept that changes in neural function are possible and that meaningful sensory-motor activities mediate these changes.  

  (Schaaf & Mailloux, 2015)
ELEMENTS OF SENSORY PROCESSING

SENSORY INTEGRATION
(comparing & using multi-sensory input & dynamically adjusting output)

SENSORY MODULATION (Am I safe?)
DEFENSIVNESS (REGISTERS TOO MUCH SENSATION)
- DORMANT OR DIMINISHED (LOW REGISTRATION)

SENSORY ORIENTING (Where is it)?

SENSORY REGISTRATION & DISCRIMINATION (What is it?)
Case Study One:
A2015 – Winter

8 year old male
OT – 2 hours/day, 5-days/week
Language – 2 hours/day, 5-days/week
16 weeks of intensive therapy
<table>
<thead>
<tr>
<th>Composites and Subtests</th>
<th>Initial testing (12/2014)</th>
<th>Post-Therapy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Standard or Scaled Score</td>
<td>Standard or Scaled Score</td>
</tr>
<tr>
<td>Perceptual Quotient</td>
<td>90</td>
<td>90</td>
</tr>
<tr>
<td>Basic Processes†</td>
<td>96</td>
<td>99</td>
</tr>
<tr>
<td>Visual Discrimination</td>
<td>8</td>
<td>10</td>
</tr>
<tr>
<td>Visual Memory</td>
<td>11</td>
<td>7</td>
</tr>
<tr>
<td>Spatial Relations</td>
<td>13</td>
<td>17*</td>
</tr>
<tr>
<td>Form Constancy</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Sequencing</td>
<td>75</td>
<td>75</td>
</tr>
<tr>
<td>Sequential Memory</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Complex Processes†</td>
<td>85</td>
<td>80</td>
</tr>
<tr>
<td>Composites and Subtests</td>
<td>Initial testing (12/22/14)</td>
<td>Post-Therapy</td>
</tr>
<tr>
<td>--------------------------------------</td>
<td>----------------------------</td>
<td>--------------</td>
</tr>
<tr>
<td></td>
<td>Standard or Scaled Score**</td>
<td>Percentile Rank</td>
</tr>
<tr>
<td>TOTAL MOTOR COMPOSITE</td>
<td>32</td>
<td>38*</td>
</tr>
<tr>
<td>Fine Manual Control Composite</td>
<td>32</td>
<td>33</td>
</tr>
<tr>
<td>Fine Motor Precision</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>Fine Motor Integration</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Manual Coordination Composite</td>
<td>37</td>
<td>47*</td>
</tr>
<tr>
<td>Manual Dexterity</td>
<td>12</td>
<td>18*</td>
</tr>
<tr>
<td>Upper-Limb Coordination</td>
<td>7</td>
<td>10</td>
</tr>
<tr>
<td>Body Coordination Composite</td>
<td>30</td>
<td>44*</td>
</tr>
<tr>
<td>Bilateral Coordination</td>
<td>3</td>
<td>10*</td>
</tr>
<tr>
<td>Balance</td>
<td>8</td>
<td>16*</td>
</tr>
<tr>
<td>Strength and Agility Composite</td>
<td>38</td>
<td>40</td>
</tr>
<tr>
<td>Composites and Subtests</td>
<td>Initial testing (12/29/14) Standard or Scaled Score</td>
<td>Post-Therapy Standard or Scaled Score</td>
</tr>
<tr>
<td>-------------------------</td>
<td>---------------------------------------------------</td>
<td>-------------------------------------</td>
</tr>
<tr>
<td><strong>Phonological Awareness</strong></td>
<td>82</td>
<td>116*</td>
</tr>
<tr>
<td>Elision</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>Blending Words</td>
<td>9</td>
<td>12*</td>
</tr>
<tr>
<td>Phoneme Isolation</td>
<td>4</td>
<td>16*</td>
</tr>
<tr>
<td><strong>Phonological Memory</strong></td>
<td>79</td>
<td>85</td>
</tr>
<tr>
<td>Memory for Digits</td>
<td>8</td>
<td>7</td>
</tr>
<tr>
<td>Nonword Repetition</td>
<td>5</td>
<td>8*</td>
</tr>
<tr>
<td><strong>Rapid Symbolic Naming</strong></td>
<td>82</td>
<td>88*</td>
</tr>
<tr>
<td>Rapid Digit Naming</td>
<td>6</td>
<td>8*</td>
</tr>
<tr>
<td>Rapid Letter Naming</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td><strong>Alternate Phonological</strong></td>
<td>67</td>
<td>113*</td>
</tr>
<tr>
<td>Composite and Subtests</td>
<td>Initial testing (12/23/14)</td>
<td>Post-Therapy</td>
</tr>
<tr>
<td>---------------------------------------------------</td>
<td>-----------------------------</td>
<td>------------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>Standard or Raw Score</td>
<td></td>
</tr>
<tr>
<td>LAC-3</td>
<td>95</td>
<td>111*</td>
</tr>
<tr>
<td>Isolated Phoneme Patterns</td>
<td>15/16</td>
<td>16/16</td>
</tr>
<tr>
<td>Tracking Phonemes (Monosyllables)</td>
<td>4/18</td>
<td>10/18</td>
</tr>
<tr>
<td>Counting Syllables (Multisyllables)</td>
<td>7/10</td>
<td>2/10</td>
</tr>
<tr>
<td>Tracking Syllables (Multisyllables)</td>
<td>1/10</td>
<td>7/10</td>
</tr>
<tr>
<td>Tracking Syllables and Phonemes (Multisyllables)</td>
<td>N/A</td>
<td>3/12</td>
</tr>
</tbody>
</table>
alphabet: a b c d e f g h i j k l m n o p q r s t u v w x y z

Kim went home.
Mike likes popcorn.
Sherry jumped rope.
Fire is dangerous.

abcdefghijklmnopqrstuvwxyz
Case Study Five: S2015-Fall

7 year old male
OT – 2 hours per day, 5-days/week
Language – 3 hours per day, 5-days/week
12 weeks of intensive therapy
<table>
<thead>
<tr>
<th>Composites and Subtests</th>
<th>Initial testing (06/2015) Standard or Scaled Score</th>
<th>Post-Therapy (9/2015) Standard or Scaled Score</th>
<th>Percentile Rank</th>
<th>Descriptive Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceptual Quotient</td>
<td>105</td>
<td>104</td>
<td>61&lt;sup&gt;st&lt;/sup&gt;</td>
<td>Average</td>
</tr>
<tr>
<td>Basic Processes</td>
<td>110</td>
<td>110</td>
<td>75&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Average</td>
</tr>
<tr>
<td>Visual Discrimination</td>
<td>18</td>
<td>10</td>
<td>50&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Average</td>
</tr>
<tr>
<td>Visual Memory</td>
<td>10</td>
<td>5</td>
<td>5&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Below Average</td>
</tr>
<tr>
<td>Spatial Relations</td>
<td>9</td>
<td>17*</td>
<td>99&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Upper Extreme</td>
</tr>
<tr>
<td>Form Constancy</td>
<td>11</td>
<td>16*</td>
<td>98&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Above Average</td>
</tr>
<tr>
<td>Sequencing</td>
<td>105</td>
<td>90</td>
<td>25&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Average</td>
</tr>
<tr>
<td>Sequential</td>
<td>11</td>
<td>17*</td>
<td>99&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Upper Extreme</td>
</tr>
<tr>
<td>Composites and Subtests</td>
<td>Initial testing (06/29/2015)</td>
<td>Post-Therapy (9/2015)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-----------------------------------------</td>
<td>-----------------------------</td>
<td>-----------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Standard or Scaled Score**</td>
<td>Standard or Scaled Score**</td>
<td>Percentile Rank</td>
<td>Descriptive Category</td>
</tr>
<tr>
<td>TOTAL MOTOR COMPOSITE</td>
<td>40</td>
<td>64*</td>
<td>92&lt;sup&gt;nd&lt;/sup&gt;</td>
<td>Above Average</td>
</tr>
<tr>
<td>Fine Manual Control Composite</td>
<td>35</td>
<td>55*</td>
<td>69&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Average</td>
</tr>
<tr>
<td>Fine Motor Precision</td>
<td>7</td>
<td>18*</td>
<td>73&lt;sup&gt;rd&lt;/sup&gt;</td>
<td>Average</td>
</tr>
<tr>
<td>Fine Motor Integration</td>
<td>9</td>
<td>17*</td>
<td>66&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Average</td>
</tr>
<tr>
<td>Manual Coordination Composite</td>
<td>40</td>
<td>53*</td>
<td>62&lt;sup&gt;nd&lt;/sup&gt;</td>
<td>Average</td>
</tr>
<tr>
<td>Manual Dexterity</td>
<td>8</td>
<td>13*</td>
<td>35&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Average</td>
</tr>
<tr>
<td>Upper-Limb Coordination</td>
<td>14</td>
<td>20*</td>
<td>84&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Above Average</td>
</tr>
<tr>
<td>Body Coordination Composite</td>
<td>40</td>
<td>62*</td>
<td>89&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Above Average</td>
</tr>
<tr>
<td>Bilateral Coordination</td>
<td>10</td>
<td>21*</td>
<td>89&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Above Average</td>
</tr>
<tr>
<td>Balance</td>
<td>12</td>
<td>18*</td>
<td>73&lt;sup&gt;rd&lt;/sup&gt;</td>
<td>Average</td>
</tr>
<tr>
<td>Strength and Agility Composite</td>
<td>55</td>
<td>70*</td>
<td>98&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Well Above Avg</td>
</tr>
<tr>
<td>Running Speed and Agility</td>
<td>17</td>
<td>21*</td>
<td>89&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Above Average</td>
</tr>
</tbody>
</table>
ACPD
Bkze
OTV~gmxirly

my fish and blow flip

Cows live on farms.

Cows sleep in barns.

my fish and flip ves
### COMPREHENSIVE TEST OF PHONOLOGICAL PROCESSING-2nd Ed

<table>
<thead>
<tr>
<th>Composites and Subtests</th>
<th>Initial testing (06/2015)</th>
<th>Post-Therapy (9/2015)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Standard or Scaled Score</td>
<td>Standard or Scaled Score</td>
</tr>
<tr>
<td>Phonological Awareness</td>
<td>103</td>
<td>129*</td>
</tr>
<tr>
<td>Elision</td>
<td>9</td>
<td>14*</td>
</tr>
<tr>
<td>Blending Words</td>
<td>10</td>
<td>15*</td>
</tr>
<tr>
<td>Phoneme Isolation</td>
<td>12</td>
<td>14*</td>
</tr>
<tr>
<td>Phonological Memory</td>
<td>104</td>
<td>119</td>
</tr>
<tr>
<td>Memory for Digits</td>
<td>14</td>
<td>12</td>
</tr>
<tr>
<td>Nonword Repetition</td>
<td>7</td>
<td>14*</td>
</tr>
<tr>
<td>Rapid Symbolic Naming</td>
<td>92</td>
<td>92</td>
</tr>
<tr>
<td>Rapid Digit Naming</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Rapid Letter Naming</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>Alternate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Composite and Subtests</td>
<td>Initial testing (06/22/15)</td>
<td>Post-Therapy</td>
</tr>
<tr>
<td>---------------------------------------------</td>
<td>-----------------------------</td>
<td>--------------</td>
</tr>
<tr>
<td></td>
<td>Standard or Raw Score</td>
<td>Standard or Raw Score</td>
</tr>
<tr>
<td>LAC-3</td>
<td>98</td>
<td>134*</td>
</tr>
<tr>
<td>Isolated Phoneme Patterns</td>
<td>15/16</td>
<td>16/16</td>
</tr>
<tr>
<td>Tracking Phonemes (Monosyllables)</td>
<td>6/18</td>
<td>15/18</td>
</tr>
<tr>
<td>Counting Syllables (Multisyllables)</td>
<td>1/10</td>
<td>9/10</td>
</tr>
<tr>
<td>Tracking Syllables (Multisyllables)</td>
<td>4/10</td>
<td>7/10</td>
</tr>
</tbody>
</table>

LINDAMOOD AUDITORY CONCEPTUALIZATION TEST, 3rd ED
<table>
<thead>
<tr>
<th>Composites and Subtests</th>
<th>Initial testing (06/2015)</th>
<th>Post-Therapy (9/2015)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Standard Score</td>
<td>Standard Score</td>
</tr>
<tr>
<td>Total Reading</td>
<td>73</td>
<td>101*</td>
</tr>
<tr>
<td>Basic Reading</td>
<td>78</td>
<td>99*</td>
</tr>
<tr>
<td>Word Reading</td>
<td>70</td>
<td>96*</td>
</tr>
<tr>
<td>Pseudoword Decoding</td>
<td>85</td>
<td>105*</td>
</tr>
<tr>
<td>Reading Comprehension and Fluency</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reading Comprehension</td>
<td>82</td>
<td>97*</td>
</tr>
<tr>
<td>Oral Reading Fluency</td>
<td>63</td>
<td>75*</td>
</tr>
<tr>
<td>Oral Reading Accuracy</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Oral Reading Rate</td>
<td>54</td>
<td>75*</td>
</tr>
</tbody>
</table>
Impaired sensory and sensorimotor processing can impact higher level cognitive and academic skills.

Sensory and sensorimotor interventions can improve sensory and sensorimotor processing, supporting learning in other domains, such as language, behavior and academic skills.

Occupational Therapy IS a beneficial component of a transdisciplinary program to assess and treat sensory, motor, language, behavior, mood and attentional impairments.
References

QUESTIONS?

www.TheMorrisCenter.com
www.NOWprograms.com
www.einsteinschool.us

email:
info@MorrisCenters.com
info@NOWprograms.com