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## Fidelity to Sensory Processing Interventions: What Are the Differences Between the Various Approaches and Interventions?

By  
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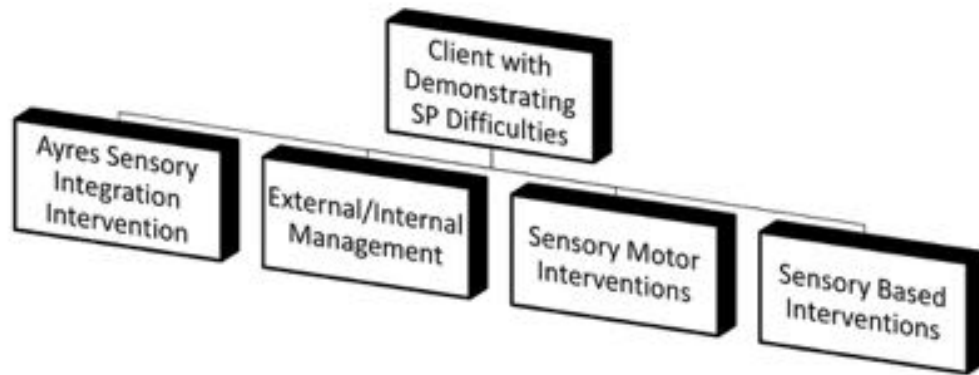
## Learning Outcomes

As a result of this course, participants will be able to:

1. describe Ayres Sensory Integration Intervention, sensory based interventions, sensorimotor interventions, and cognitive behavioral interventions to support self/emotion regulation.
2. compare and contrast various sensory interventions for diverse settings and populations.
3. identify the current status of evidence for the diverse sensory interventions to guide treatment planning.

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continued



3

continued

Occupational Therapy using the Sensory Integration Frame of Reference (OT-SI)



4

continued



## AYRES SENSORY INTEGRATION® INTERVENTION

### Ayres SI Intervention

- Hallmarked by its individualization to the child's needs.
- Therapist to adjusts the type of activity, its duration, and intensity from varying moments and glimpses of the child's interests.
- Therapists attempt to tap into child's inner drive (interests, motivations, and values) to facilitate a higher effort with the therapeutic activities.
- It is a constellation of principles that are sequenced together to facilitate an functional adaptive response.

(Roley, Mailloux, Miller-kuhaneck, & Glennon, 2007)

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## Ayres Sensory Integration Intervention

- Why was Ayres sensory integration® intervention trademarked?
  - Confusion between sensory integration intervention and sensory stimulation techniques implemented by OT's, other health professionals, or non-credentialed individuals.
  - The exclusion of OT from the evaluation and treatment of children, adolescents, and adults with sensory processing disorders.
  - The use of sensory integration techniques as a reward as a part of other behavioral based interventions.

(Roley, Mailloux, Miller-kuhaneck, & Glennon, 2007)

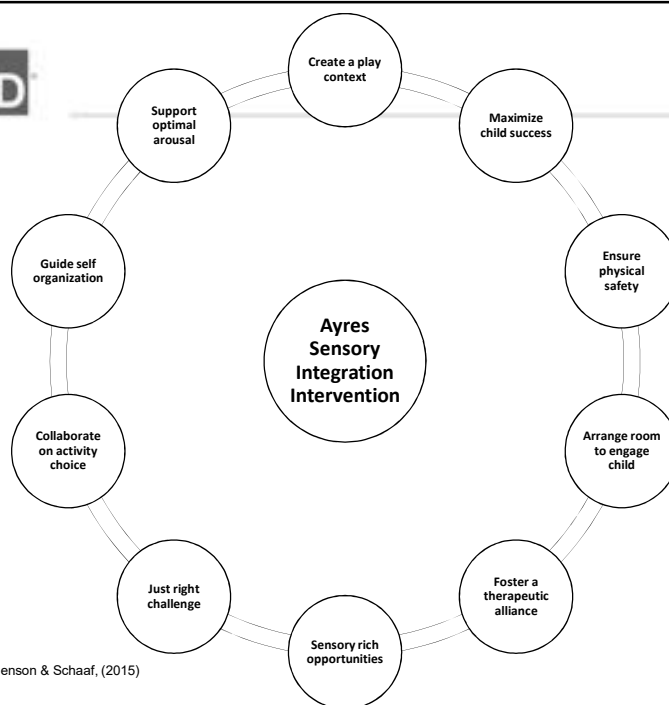
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## Ayres Sensory Integration Intervention

- Why was Ayres sensory integration® intervention manualized?
  - Document how the intervention differs from other sensory interventions OT's use.
  - Alignment of SPD, intervention objectives, and outcomes.
    - Knowing that specific outcome may be attributed to an intervention.
  - Replication of an intervention across cases
  - Ensure that the intervention was addressing occupation based outcomes.
  - Ensure the intervention practices align with the evidence that is being generated.

(Roley, Mailloux, Miller-kuhaneck, & Glennon, 2007)

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Parham, Cohn, Spitzer, et al., (2007); May-Benson & Schaaf, (2015)

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## Sensory Integration Intervention

- The therapist presents the child with opportunities for various sensory rich experiences, which include:
  - Tactile
  - Vestibular
  - Proprioceptive
  - Visual
  - Auditory
  - Gustatory/Olfactory
  - Intervention involves more than one sensory modality/channel
    - Proprioceptive
    - Vestibular
    - Tactile

The Core of SII

Parham, Cohn, Spitzer, et al., (2007); May-Benson & Schaaf, (2015)

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## Sensory Integration Intervention

- The occupational therapist facilitates a just right challenge
  - tailors activities so as to present challenges to the child that are neither too difficult nor too easy, to evoke the child's adaptive responses to sensory and praxis challenges.
    - Scaffolding: Hard vs. Soft
- The occupational therapist collaborates on activity choice
  - Treats the child as an active collaborator in the therapy process
    - allowing the child to actively exert some control over activity choice
    - does not predetermine a schedule of activities independently of the child

Parham, Cohn, Spitzer, et al., (2007); May-Benson & Schaaf, (2015)

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## Sensory Integration Intervention

- The occupational therapist supports and guides the child's self-organization of behavior:
  - to make choices and plan own behavior to the extent the child is capable
  - encourages the child to initiate and develop ideas and plans for activities
- The occupational therapist ensures that the therapy situation is conducive to attaining or sustaining the child's optimal level of arousal by making changes to:
  - environment or activity
  - to support the child's attention, engagement, and comfort.
  - "Goodness of Fit"

Parham, Cohn, Spitzer, et al., (2007); May-Benson & Schaaf, (2015)

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## Sensory Integration Intervention

- The occupational therapist creates a context of play by building on the child's intrinsic motivation and enjoyment of activities.
  - facilitates or expands on:
    - Object play
    - Social play
    - Motor play
    - Imaginative play
- The occupational therapist presents or modifies activities so that the child can experience success in doing part or all of an activity that involves a response to a challenge.
  - Use scaffolding.

Parham, Cohn, Spitzer, et al., (2007); May-Benson & Schaaf, (2015)

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## Sensory Integration Intervention

- The occupational therapist ensures that the child is physically safe either through
  - placement of protective and therapeutic equipment.
  - through the therapist's physical proximity and actions.
- The occupational therapist designs environmental affordances to
  - support sensory exploration
  - occupational performance
- arranges the room and equipment in the room to motivate the child to choose and engage in an activity.

Parham, Cohn, Spitzer, et al., (2007); May-Benson & Schaaf, (2015)

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## Sensory Integration Intervention

- The occupational therapist establishes and maintains a therapeutic alliance.
  - respects the child's emotions.
  - conveys positive regard toward the child.
  - seems to connect with the child.
  - relates a climate of trust and emotional safety.

Parham, Cohn, Spitzer, et al., (2007); May-Benson & Schaaf, (2015)

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## Ayres Sensory Integration® Intervention

### Evidence:

#### Cases

-Schaaf, R. C., Hunt, J., & Benevides, T. (2012). Occupational therapy using sensory integration to improve participation of a child with autism: A case report. *American Journal of Occupational Therapy*, 66(5), 547-555.

-Schaaf, R. C., Benevides, T. W., Kelly, D., & Mailloux-Maggio, Z. (2012). Occupational therapy and sensory integration for children with autism: A feasibility, safety, acceptability and fidelity study. *Autism*, 16(3), 321-327.

#### Randomized Control Trials

-Schaaf, R. C., Benevides, T., Mailloux, Z., Faller, P., Hunt, J., van Hooydonk, E., ... & Kelly, D. (2014). An intervention for sensory difficulties in children with autism: A randomized trial. *Journal of Autism and Developmental Disorders*, 44(7), 1493-1506.

-Miller, L. J., Coll, J. R., & Schoen, S. A. (2007). A randomized controlled pilot study of the effectiveness of occupational therapy for children with sensory modulation disorder. *The American Journal of Occupational Therapy*, 61(2), 228.

#### Systematic Reviews

-May-Benson, T. A., & Koomar, J. A. (2010). Systematic review of the research evidence examining the effectiveness of interventions using a sensory integrative approach for children. *American Journal of Occupational Therapy*, 64(3), 403-414.

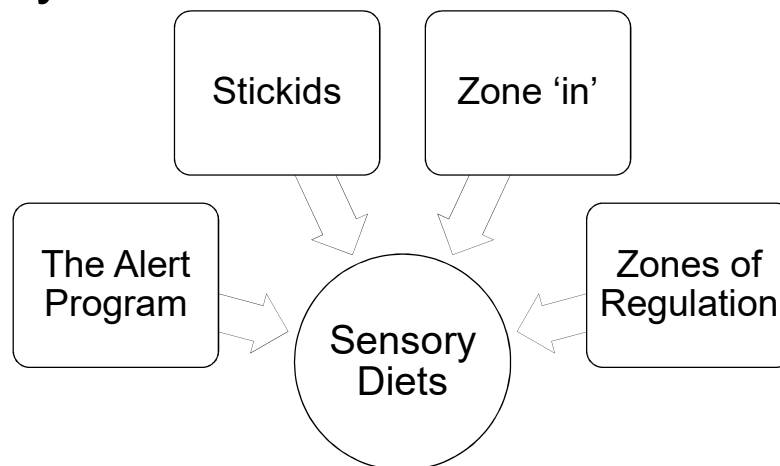
-Case-Smith, J., Weaver, L. L., & Fristad, M. A. (2015). A systematic review of sensory processing interventions for children with autism spectrum disorders. *Autism*, 19(2), 133-148.

-Watling, R., & Hauer, S. (2015). Effectiveness of Ayres Sensory Integration® and sensory-based interventions for people with autism spectrum disorder: A systematic review. *American Journal of Occupational Therapy*, 69(5), 6905180030p1-6905180030p12.

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## Sensory Diets



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## Sensory Diets

- Sensory Diets
  - Just as food is nourishment for the body, sensory input is nourishment for the brain. A sensory diet provides nourishment for the brain for children with sensory processing disorders (Case-Smith, 1996).
  - The therapeutic sensory diet provides the optimal combination of sensations at the appropriate intensities for an individual child.
  - For most typically developing children, the sensory diet does not require conscious monitoring by caregivers. The environment continuously feeds the child in a variety of nourishing sensations in the flow of everyday life.
  - Prescribed type and amount of sensory stimuli.
  - Externally implemented ----- internally managed

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## Definitions

Self regulation via synactive theory of development, in which self-regulation strategies aim to change physiological arousal:

- the effectiveness of the strategy is determined by evaluating change in physiological arousal (Martini, Cramm, Egan & Sikora, 2016)

Self regulation theory framework, the strategies aim to guide a self-monitoring or problem-solving process:

- the effectiveness of the self-regulation strategy would be ascertained by evaluating drives or how he throws the ball (Martini, Cramm, Egan & Sikora, 2016)
- Emotion regulation refers to the ability to adapt and modify behavior to maintain a balanced, calm, alert, and organized state (Bailer, 2017)

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## Sensory Diets

### ▪ Assumptions

- The sensory diet is comprised of:
  - tactile
  - vestibular
  - proprioceptive
  - oral
  - auditory
  - Visual
  - olfactory/gustatory
  - nourishment for the child unable to attain this input through self direction.
- The effects of sensation on overall organization can change and no one type of sensory input is always calming and organizing or always arousing. Much of it is dependent on the overall arousal level of the child at the time the activity is initiated (Williamson & Anzalone, 2002).

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## Sensory Diets

### ▪ Formal Sensory Diet Programs

- Include varying levels of active involvement to sensory stimulation to cognitive strategies for active, independent self regulation.
- 1:1 or curriculum based
  - StickKids – Muscles, Motion n’ Touch
    - <http://www.stickkids.com/>
  - How Does Your Engine Run: “The Alert Program”
    - <https://www.alertprogram.com/>
  - Zone ‘n’
    - <http://www.zonein.ca/>
  - Zones of Regulation
    - <http://www.zonesofregulation.com/index.html>

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## Sensory Diets Evidence

### Expert Review

- Reinson, C. (2012). A collaborative decision tree system for designing a sensory diet curriculum for children with autism in the classroom setting. *Journal of Occupational Therapy, Schools, & Early Intervention*, 5(1), 61-72.

### Cases

- Bertrand, J. (2009). Interventions for children with fetal alcohol spectrum disorders: Overview of findings for five innovative research projects. *Research in Developmental Disabilities*, 30, 986-1006.

### Pre Post Test Designs

- Barnes, K. J., Vogel, K. A., Beck, A. J., Schoenfeld, H. B., & Owen, S. V. (2008). Self-regulation strategies of children with emotional disturbance. *Physical & Occupational Therapy in Pediatrics*, 28(4), 369-387.
- Mac Cobb, S., Fitzgerald, B., & Lanigan-O'Keeffe, C. (2014). The Alert Program for self-management of behaviour in second level schools: results of phase 1 of a pilot study. *Emotional and Behavioural Difficulties*, 19(4), 410-425.

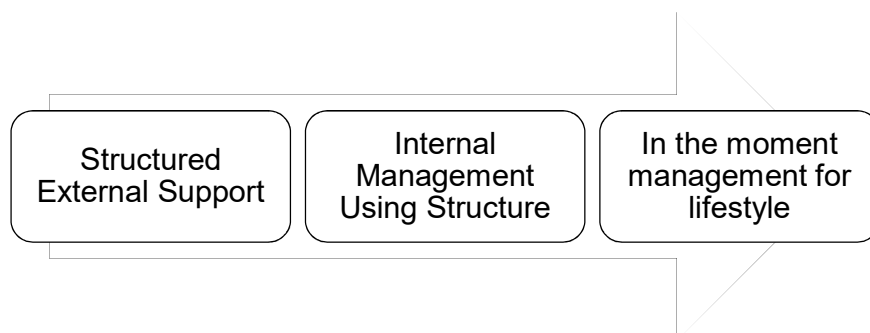
### Randomized Control Trials

- Soh, D. W., Skocic, J., Nash, K., Stevens, S., Turner, G. R., & Rovet, J. (2015). Self-regulation therapy increases frontal gray matter in children with fetal alcohol spectrum disorder: evaluation by voxel-based morphometry. *Frontiers in human neuroscience*, 9, 108.

### Systematic Reviews

- Gill, K., Thompson-Hodgetts, S., & Rasmussen, C. (2018). A critical review of research on the Alert Program®. *Journal of Occupational Therapy, Schools, & Early Intervention*, 11(2), 212-228.

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## Ecological Model of Sensory Modulation

- Sensory Modulation Disorder = physiological/behavioral deficits
- External Dimension's
  - Culture, environment, relationships, and task
- Internal Dimension's
  - Sensation, emotion, and attention
- Each internal dimension interacts with each external dimension

Miller, Reisman, McIntosh, & Simon, 2001

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## A SECRET (Miller, 2006)

- Attention
- Sensation
- Emotional Regulation
- Culture/Context/Current Conditions
- Relationships
- Environment
- Tasks

Individual  
Characteristics (internal  
influences)

Contextual elements  
(external influences)

Miller, 2014; Bialer & Miller, 2011

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## "A SECRET"

- What is it?
  - A process to develop strategies.
  - In the moment way of approaching a sensory processing problems.
- What isn't it?
  - prescribed list of pre determined activities.
  - Based upon a child profile of sensory difficulties.

Bialer & Miller, 2011

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## Sample A SECRET

Challenged Area	Elements from "A SECRET"						
	Attention	Sensation	Emotional Regulation	Cuture/Context/Current Conditions	Relationships	Environment	Task
Trouble falling asleep and staying asleep because of SOR	Use white noiseor, soft music to take their attention away from what is happening outside the door.	Use a weighted blanket to calm and organize the child such as a heavy down blanket.	Use transition objects that help them self regulate in bed.	Create a consistent routine that promotes a trend of relaxation such as bath time, then a story prior to bed.	Use transition objects that help them self regulate in bed such as a blanket, stuffed animal.	Remove extraneous lights that may be keeping the child up.	Give the child more specific time with a start and finish for each step.

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## Sensory – Based Interventions

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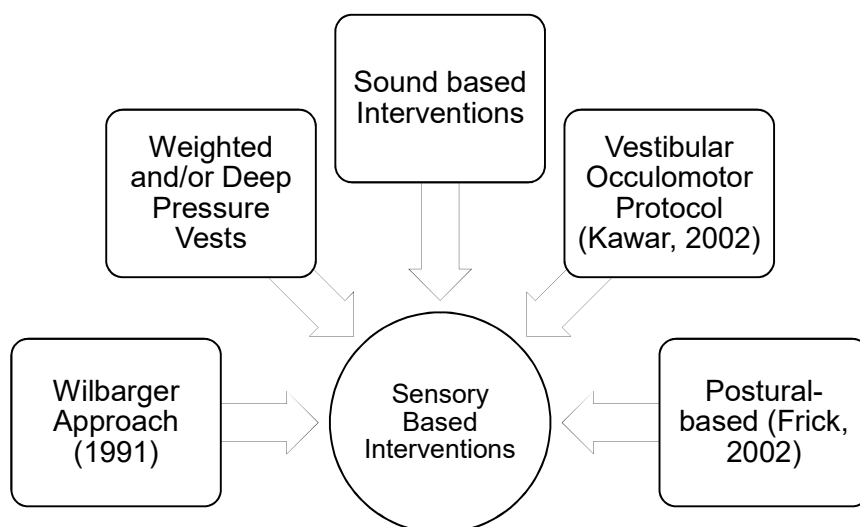
## Sensory-Based Interventions

- Assumptions:
  - Passive stimulation
  - Targeted sensory input will remediate a specific impaired sensory process
  - Preparatory based
  - May be as environmental modifications
  - May be incorporated within a Sensory Diet program

Polatajko, &amp; Cantin, (2010)

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## Sensory-Based Interventions



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## Sensory-Based Interventions

- Vests
  - Weighted
    - Provides resistance for sensory seekers (HT)
    - Proprioceptive input into the long axis of the body
    - Input should come from on top of the shoulders
    - Not as effective with clients who have postural control difficulties.
  - Deep Pressure
    - Vests, shorts, etc.
    - Deep pressure for an over responsive system (LT)
    - Similar to a wet suit made from neoprene.

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## Systematic Reviews

- Stephenson, J., & Carter, M. (2009). The use of weighted vests with children with autism spectrum disorders and other disabilities. *Journal of autism and developmental disorders*, 39(1), 105.
- Watling, R., & Hauer, S. (2015). Effectiveness of Ayres Sensory Integration® and sensory-based interventions for people with autism spectrum disorder: A systematic review. *American Journal of Occupational Therapy*, 69(5), 6905180030p1-6905180030p12.
- Case-Smith, J., Weaver, L. L., & Fristad, M. A. (2015). A systematic review of sensory processing interventions for children with autism spectrum disorders. *Autism*, 19(2), 133-148.

## Randomized Control Trial

- Reichow, B., Barton, E. E., Sewell, J. N., Good, L., & Wolery, M. (2010). Effects of weighted vests on the engagement of children with developmental delays and autism. *Focus on Autism and Other Developmental Disabilities*, 25(1), 3-11.
- Hodgetts, S., Magill-Evans, J., & Misiaszek, J. E. (2011). Weighted vests, stereotyped behaviors and arousal in children with autism. *Journal of autism and developmental disorders*, 41(6), 805-814.

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## Sensory-Based Interventions

## ▪ Sound-Based Interventions

## ▪ Center/clinic delivery

- Tomatis Method – 3-6 months (3x per week)
- Auditory Integration Therapy (2 hours per day – 10 consecutive days)

## ▪ Home based delivery

- The Listening Program (TLP)
  - [www.thelisteningprogram.com](http://www.thelisteningprogram.com)
- Integrated Listening (iLs)
  - [www.integratedlistening.com](http://www.integratedlistening.com)
- Therapeutic Listening (TL)
  - [www.vitalinks.net](http://www.vitalinks.net)

Auditory/Vestibular-  
Based  
Individualized

Auditory-Based w/  
prescribed sensorimotor  
activities

Vestibular-Based w/ in  
conjunction with  
structured prescribed  
sensory diet.

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## Sensory-Based Interventions

### Evidence:

- Bazyk, S., Cimino, J., Hayes, K., Goodman, G., & Farrell, P. (2010). The use of therapeutic listening with preschoolers with developmental disabilities: A look at the outcomes. *Journal of Occupational Therapy, Schools, & Early Intervention*, 3(2), 124-138.
- Francis, H. (2011). Effects of 'The Listening Program' on children with profound and multiple learning difficulties. *International Journal of Therapy and Rehabilitation*, 18(11), 611-621.
- Gee, B. M., Thompson, K., & St John, H. (2014). Efficacy of a Sound-based intervention with a child with an autism spectrum disorder and auditory sensory Over-responsivity. *Occupational Therapy International*, 21(1), 12-20.
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- Gee, B. M., Devine, N., Werth, A., & Phan, V. (2013). Paediatric Occupational Therapists' Use of Sound-based Interventions: A Survey Study. *Occupational therapy international*, 20(3), 155-162.
- Hall, L., & Case-Smith, J., (2007). The effect of sound-based intervention on children with sensory processing disorders and visual-motor delays. *American Journal of Occupational Therapy*, 61, 209-215
- Nwora, A. & Gee, B. (2009). A case study of a five-year-old child with pervasive developmental disorder-not otherwise specified using sound-based interventions. *Occupational Therapy International*, 16(1): 25-43
- Schoen, S., & Miller, L. J. (2016). Integrated Listening Systems for Children With Sensory Processing Problems: A Pilot Study. *American Journal of Occupational Therapy*, 70(4\_Supplement\_1), 7011515240p1-7011515240p1.
- Vargas, S., & Lucker, J. R. (2016). A Quantitative Summary of The Listening Program (TLP) Efficacy Studies: What Areas Were Found to Improve by TLP Intervention?. *Occupational therapy international*, 23(2), 206-217.

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## Sensorimotor Interventions

### ▪ Primary Assumptions

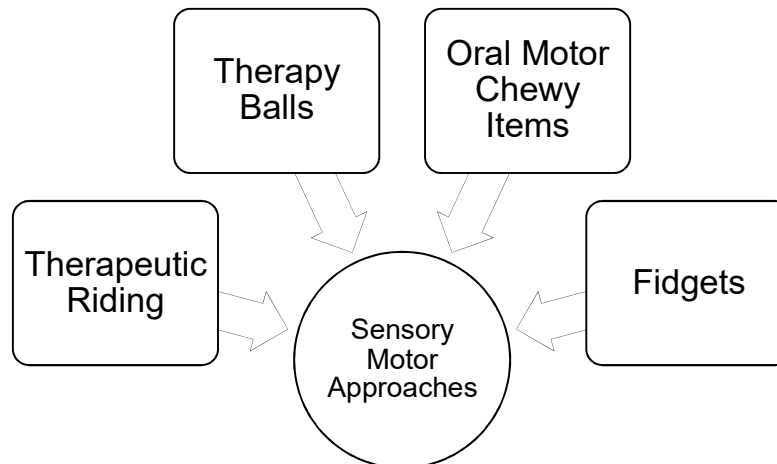
- A child's motor system is unable to successfully operate with processing and integrating information
  - Motor information is essential for motor performance (Dunn, 1997)
- Child actually initiates, executes, participates in the task/activity.
- Inherently includes sensory stimuli but is not the primary focus or purpose.

Polatajko, &amp; Cantin, (2010)

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## Sensorimotor Interventions



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## Sensorimotor Interventions

### ▪ Evidence:

- Bagatell, N., Mirigliani, G., Patterson, C., Reyes, Y., & Test, L. (2010). Effectiveness of therapy ball chairs on classroom participation in children with autism spectrum disorders. *American Journal of Occupational Therapy*, 64, 895–903. doi: 10.5014/ajot.2010.09149.
- Umeda, C., & Deitz, J. (2011). Effects of therapy cushions on classroom behaviors of children with autism spectrum disorder. *American Journal of Occupational Therapy*, 65, 152–159. doi: 10.5014/ajot.2011.000760

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## Discussion

- Hypothesis testing
  - Align with the assumptions of the intervention
  - Align with behavioral, neurological or physiological underpinnings.
  - Track performance with reliable observations, assessments, etc.
- What interventions fit best with which settings?

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## References

- Dunn, W. (1997). Implementing neuroscience principles to support habilitation and recovery. In C.Christiansen & C.Baum (Eds.), *Occupational therapy: Enabling function and well-being* (2nd ed., pp. 182–233). Thorofare, NJ: Slack.
- Martini, R., Cramm, H., Egan, M., & Sikora, L. (2016). Scoping Review of Self-Regulation: What Are Occupational Therapists Talking About?. *American Journal of Occupational Therapy*, 70(6), 7006290010p1-7006290010p15.
- May-Benson, T. A., & Schaaf, R. (2015). Ayres Sensory Integration® Intervention. In *International Handbook of Occupational Therapy Interventions* (pp. 633-646). Springer, Cham.
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