

**MINDS IN MOVEMENT: A STUDY OF THE BENEFITS OF BRAIN
BREAKS FOR STUDENTS WITH SENSORY PROCESSING DISORDER**

by

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TO MY PARENTS

who taught me to never give up and keep pushing

TO MY HUSBAND

my best friend and biggest cheerleader

AND TO MY SON

I love you more than pizza!

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ABSTRACT

Sensory processing disorder (SPD) is a neurological disorder that effects how sensory stimuli is translated in the brain and then incorrectly circulated into responses. It is estimated that one in twenty people may have been diagnosed with SPD. Children diagnosed with SPD have responses to stimuli that are over-responsive or under-responsive and find it challenging to correctly process sensory input compared to their peers.

This IRB approved study focused on investigating the benefits of brain breaks for middle school students with SPD. Sixteen middle school teachers in one school participated in a needs assessment survey regarding their knowledge of sensory processing disorder and brain breaks and how they implemented brain breaks into their classroom. Questions were based on prior knowledge of sensory processing and brain breaks. Regarding the level of prior knowledge about sensory processing disorder, 6.25% of participating middle school teachers reported that they are very familiar with SPD, 50% of teachers reported they are somewhat familiar with SPD, 12.5% of teachers reported they are not so familiar with SPD, and 31.25% of teachers reported that they are not at all familiar with SPD. Teachers were also asked how effective they thought brain breaks are on student learning and its impact on behavior in the classroom with teachers responding that, “students seem more engaged after we do a brain break in class,” or, “I feel that they are effective because it gives students the opportunity to energize and restart.”

A handbook was created to help teachers understand what SPD is and how to recognize it in their classroom. Guidelines are included in the handbook for ways to use brain breaks in the classroom to help with sensory seeking students needing movement.

CHAPTER 1. INTRODUCTION

Statement of the Problem

Sensory processing disorder (SPD) is the interference of the organization of sensory input to the brain with an estimated three million children diagnosed in the United States (Walbam, 2013). Dr. Jean Ayers was an occupational therapist who studied SPD in the 1970s and categorized SPD as a new disorder. Dr. Ayers believed that children with SPD responded to stimuli by being hyper-sensitive; by over-responding to inputs or were hypo-sensitive; by under-responding to inputs. Children with SPD cannot correctly organize sensory information and often seek out movement to meet the stimulation their brains need. When a child has SPD they often struggle to interact and function properly within the classroom, which often leads to obstacles to maintain their attention (Walbam, 2013).

Integrating movement in the classroom, or brain breaks, is a proactive approach to help refocus students with SPD (Howie, Shatz, & Pate, 2015). The concept of brain breaks is a research-based method, which can be used in schools by classroom teachers, to provide needed respite for students from their concentrated attention and work. A brain break is derived from the definition of a movement break which is “an aerobic exercise session but with the duration of only five minutes” (Kubesch et al., 2009, p. 237). Short duration physical activity has shown improvement in academic endurance (Hillman, Pontifex, Raine, Castelli, Hall, & Kramer, 2009) and the goal for this paper is to identify if brain breaks are beneficial for middle school students with SPD.

Significance of the Project

This project about sensory processing disorder is significant to all teachers because SPD can have great influence over how children behave, learn, and play and can oftentimes go unnoticed (Walbam 2013). A student with a disorganized sensory system craves activities that reorganize the brain by using proprioceptive, auditory, vestibular and tactile inputs to put things in order (Zimmer, 2012). Brain breaks are one way to organize a system that desires order.

This study focused on investigating the benefits of brain breaks for middle school students with SPD. A survey was given to general and special education teachers to find out how they currently utilize brain breaks in their classroom. A handbook was created to help teachers understand what SPD is and how to recognize it in their classroom. Guidelines are included in the handbook for ways to use brain breaks in the classroom to help with sensory seeking students needing movement.

Purpose of the Study

The purpose of this study was to identify the benefits of brain breaks for middle school students with sensory processing disorder. The study identified a teacher's understanding of SPD and how they currently utilized brain breaks with their students with SPD. A handbook was developed that presented research proven brain breaks for secondary teachers to use in the classroom to benefit students with SPD.

Research Approach

This study used a qualitative and quantitative study format. To assess the teacher's responses and needs, data was gathered through a needs assessment survey: Appendix A. The teachers at Midwestern middle school were asked to complete a one-time survey consisting of

two demographic questions and twelve short answer or multiple-choice questions. The survey inquired about each teacher's knowledge and understanding of SPD and how they currently utilize brain break strategies in their classroom. The survey questions were created based on information gathered through peer-reviewed articles. The survey was confidential. The teachers were contacted through a recruitment email: Appendix B. The principal of Midwestern middle school permitted this survey: Appendix C.

Literature Review

What is sensory processing disorder? SPD was first described by occupational therapist A. Jean Ayers, Ph.D., in the 1970s. Sensory integration is how the body processes sensory inputs it receives from the environment around it. Ayers (1979) reasoned that the body's sensory system develops as the child grows and those deficits could occur while the sensory system is being formed. Ayers believed that SPD happens when sensory neurons are not communicating with the brain efficiently and when this happens it is possible to have deficits in learning, development or emotional regulation (Zimmer, 2012). Ayers (1979) also suggested, "Children with sensory processing disorder are either over- responsive or under-responsive to stimuli and cannot process information like other children." When children have sensory processing disorder they are unable to process sensory information into meaningful knowledge (Walbam, 2013).

What do brain breaks look like in the classroom? What exactly are brain breaks? They are short periods of exercise that last about 5 to 10 minutes. Research has shown that physical activity, or breaks in the day dedicated to physical movement may help students increase their ability to focus during the school day and complete the tasks associated with their

classroom lessons (Mahar, 2011). Brain breaks are designed to help a student take a break, reactivate their brain and begin to focus again.

Research Questions

1. What do special education and general education teachers know about sensory processing disorder?
2. What are the perspectives of general education and special education teachers about the effectiveness of brain breaks for middle school students with sensory processing disorder?
3. How do special education and general education teachers incorporate brain breaks into the classroom for middle school students with sensory processing disorder?

Methodology

Participants and Setting. Participants contacted for this study were Indiana licensed staff members that teach at a Midwestern middle school. The staff members interact and teach sixth through eighth-grade students. The research collected for this study was gathered at a middle school at a Midwestern state. The middle school is one of twelve middle schools in the district. The middle school is a fully accredited school and educates an average of 800 students.

Recruitment and Data Collection Procedures/Methods. Participates were recruited using a recruitment email. The email request their assistance in completing a survey anonymously. The short-answer questions were attached to the email. After completing the survey, the data was returned to the researcher anonymously.

Data Analysis Procedures/Methods. After all surveys were collected, the investigator analyzed the responses. The information was categorized according to response and used to determine the information that was produced for a handbook for teaching brain breaks in the classroom setting.

Timeline. Recruitment emails with surveys were one week before the participants were asked to respond. Once all surveys were completed and collected, the answers were analyzed and used to guide the development of the handbook about brain breaks in the classroom.

Outline for Development of the Special Project

The special project handbook was developed to help secondary teachers implement brain breaks more effectively for students with sensory processing disorder. It also provided guidelines for ways to use brain breaks in the classroom to help with sensory seeking students needing movement. The handbook include research-based strategies and examples on how to implement brain breaks with their students in their classrooms.

Definitions of Terminology

Ayres Sensory Integration – Resembles the original framework Ayers created for intervention strategies and core principles for sensory processing disorder (Leong, Carter, & Stephenson, 2014).

Brain Breaks – A short period of time when physical activity is introduced so the brain is able to do a reset (Desautels, 2016).

Hypersensitive (Sensory Over Responsive) – Responds too much, too soon, or for too long to sensory stimuli more people find quite tolerable.

Hyposensitive (Sensory Under-Responsive) – Unaware of sensory stimuli and may have a delay before responding, responses are muted or responds with less intensity compared to the average person.

Occupational Therapist – health care professional that use research-based methods to promote independence for their patients.

Proprioceptive system – The sense of self-movement and body position and sometimes described as the "sixth sense".

Sensory Processing Disorder –the inability for the brain to correctly organize stimuli and sensory information (Ayers, 1979).

Tactile System – Our sense of touch, which receive input through our skin.

Vestibular System – A sensory system that is responds to the pull of gravity

CHAPTER 2. LITERATURE REVIEW

Introduction

Sensory processing disorder (SPD) has become a common term thanks to the work of occupational therapist Dr. Jean Ayers and her book *Sensory Integration and Learning Disorders*, published in 1972. Dr. Ayers (1972) defined in her book that sensory integration was “the neurological process that organizes sensation from one’s own body and from the environment and makes it possible to use the body effectively within the environment” (p. 11). The term sensory processing disorder has evolved over the years, as more research and discovery of a deeper understanding of the disorder has been investigated.

Purpose Statement

The purpose of the research was to understand the relationship between sensory processing disorder and the benefits of brain breaks in the classroom. In order to accomplish this purpose, a survey was used to investigate teachers’ understanding of sensory processing and the benefits of brain breaks in the classroom for students with sensory processing disorder. This literature review focused on the definition and characteristics of students with sensory processing disorders, diagnostic criteria for sensory processing disorders, definition of brain breaks, and effective researched based brain breaks that can be used in the classroom.

Sensory Processing Disorder

Sensory Processing Disorder was first discovered by occupational therapist A. Jean Ayeres, PhD in the 1970s. Ayers reasoned that the body’s sensory system develops as the child grows and that deficits could occur while the sensory system is being formed (Zimmer, 2012).

Standardized measures such as the Sensory Profile, are commonly used by occupational therapists to determine if a child has any sensory deficits. The Sensory Profile measures sensory processing capabilities and creates a profile of how much this affects the daily activities of a child. Once the Sensory Profile is completed a sensory-based therapy is developed specifically for that child that is believed to reorganize the sensory system (Zimmer, 2012).

Diagnostic Criteria for Sensory Processing Disorder

It is estimated that SPD occurs in 5% of the population in the United States (Walbam 2013). In 2013, the fifth edition of the diagnostic and statistical manual of mental disorders (DSM-5) was contemplating adding sensory processing disorder to its manual. However, because arguments that SPD symptoms can overlap other diagnoses, the decision to embrace SPD in the fifth edition of DSM was rejected (Walbam 2013). Even though SPD is not officially recognized in the DSM-5, it is included as a diagnosis in the Diagnostic Manual for Infancy and Early Childhood (ICDLDMIC; Greenspan & Wieder, 2005) and the Diagnostic Classification of Mental Health and Developmental Disorders of Infancy and Early Childhood. It has been estimated that children without other disabilities ranges from 5% to 10% based on clinical diagnosis. Those children with various other disabilities along with SPD have been reported to be as high as 40-88% (Ahn et al., 2004).

The Individuals with Disabilities Education Act (IDEA) is a law that makes available a free appropriate public education to eligible children with disabilities throughout the nation and ensures special education and related services to those children (U.S. Department of Education, retrieved 2019). IDEA does not list sensory processing disorder as one of the thirteen categories that requires special education services; however, students may qualify under the category of Other Health Impairment (OHI). Students with SPD could qualify for OHI because SPD is a

medical condition which has the ability to limit strength and alertness in students (Zimmer, 2012). Sensory processing disorder could also qualify under the category of Learning Disability because it affects processing of information and the ability to focus. If a student does not meet the conditions for an Individualized Education Program (IEP) under IDEA for sensory processing disorder they may still qualify for services under Section 504 as a physical or mental impairment.

Treatment of Sensory Processing Disorder

Treatment for SPD is usually completed by an occupational therapist (OT) and children may be referred for services through school or family physician. The OT will do an initial evaluation for symptoms of SPD and then come up with a program best matched for the child. OT's work with children to retrain how their brain processes sensory information. Treatment is found to be most effective on younger children because their brain can be adjusted as new neurons are still being formed as they grow.

Challenge of Students with Sensory Processing Disorders

When we think about our senses, we typically acknowledge the five senses: vision, taste, touch, smell and hearing but we actually have two more: vestibular and proprioceptive. The vestibular sense focuses on feelings of movement and the balance of the body. For example, do you get car sick when sitting in the back of the car or does your body crave fast or spinning motions? How your body processes those sensations falls somewhere on the vestibular spectrum. The proprioceptive sense uses sensations perceived through the muscles and skin, as well as the joints (Noddings, 2017b). For example, before you work out or begin to play a sport you stretch your muscles, which helps to refocus attention and even relax you.

Two Types of Sensory processing disorders: Hypersensitive and Hyposensitive

There are two types of sensory processing disorders: hypersensitive and hyposensitive (Noddings, 2017a). Someone that is hypersensitive will usually try to avoid sensory input and will avoid sensations because their brain can't process the stimuli correctly. Someone that is hyposensitive is under responsive to stimuli and needs a lot of stimulation for their brain to register (Noddings, 2017a). You can also have a mixture of both depending on the sense. Some sample behaviors for hypersensitive (avoiding) would be: avoids touching objects or people, becomes overexcited when there is too much to look at, complains about noises and smells that don't bother others, gags easily on certain textures and temperatures of food, avoids running, climbing or swinging and likes feet firmly planted on the ground. Sample behaviors for hyposensitive (seeking): unaware of pain or temperature, misses important visual cues, ignores voices and cannot follow verbal directions, ignores unpleasant odors such as dirty diapers, licks or tastes inedible objects such as toys or Play-Doh and craves fast spinning movements.

What are the criteria for when sensory interference is significant enough to cause harm in a child's daily functioning? The answer isn't so simple, but once a child has been correctly diagnosed, a treatment program with a sensory integration approach can prove to be effective. Research has shown that a program of sensory input that is implemented at school and at home can have positive changes to a child's nervous system. When using sensory integration therapy the possibility of gaining higher order learning skills such as reading and writing and improving motor coordination are a probability (Samayan, Dhanavendan, & Nachiketa, 2015).

Research proven intervention for Students with Sensory Processing disorders

When Ayers began her research about sensory processing disorder, she developed an intervention program called sensory integration therapy (SIT) to help children with sensory

processing issues. The term ‘Ayres Sensory Integration’ has been trademarked and resembles the original framework Ayers created for intervention strategies and core principles for sensory processing disorder (Leong, Carter, & Stephenson, 2014). To begin the process of SIT, an OT will complete the sensory integration praxis test, which was created by Ayers, which measures sensory integration processes and explains what the child’s sensory needs are. Parents will also fill out a Sensory Profile or sensory processing measure that is a questionnaire about sensory responses and behaviors of the child. Trained occupational therapists in SIT will begin treatment with a patient in a one-on-one setting one to two times a week for at least 10 weeks, and possibly up to a year or more depending on the severity of SPD (Noddings, 2017b).

Research studies have shown the effectiveness of SIT when clients commit to 2 to 3 sessions per week for at least 6 months (Noddings, 2017b). The variance is less based on the client’s age but more so on the specific need and severity of the sensory challenges. Ayers suggested that SIT was most beneficial for younger children because their brains are still developing and have a higher plasticity or ability to change while forming neural connections (Ayers 1972). The main goal of SIT is to modify the way the brain processes and organizes sensations. Activities to alter this process and engage the central nervous system may include sitting or lying on large balls, having clients feel different fabric textures or being rubbed with brushes, swinging in a hammock or special swing, lying on a scooter board while being pushed or having joint compression from wrist weights. These activities will challenge the client to integrate with different sensory sensations, improve sensory gating, and have the possibility of regulating their senses. Treatment of SPD is specifically designed for each child’s needs whether they are sensory seeking, sensory avoiding, or a mixture of both.

In a study done by Schaaf, Roseann C., et al, (21012) ten children diagnosed with autism spectrum disorder received 1-hour OT sessions three times a week for six weeks. These sessions followed, a manualized protocol based on Ayers sensory integration principals. Approximately 80-90% of individuals with autism experience sensory impairments, which contributes to their maladaptive behavior (Schaaf, Benevides, Kelly, & Mailloux-Maggio, 2012). At the conclusion of the six-week study parents where giving satisfaction questionnaires with one hundred percent of the parents agreeing that the SIT helped their child deal with challenges faced in daily life (Schaaf, Benevides, Kelly, & Mailloux-Maggio, 2012).

Research has shown that children with SPD can benefit from sensory integration therapies whose purpose is to reorganize the sensory system. When students are asked to sit for long periods in a classroom their central nervous system is on overload and they are craving movement. While not every class is able to use all the typical interventions used for SPD, simply allowing students to get up and move is providing sensory input they need. These short physical breaks have been proven to improve classroom behavior and help refocus student learning (Mahar, 2011).

Defining Brain Breaks

A brain break is a short physical break that helps the brain refocus (Desautels, 2016). In order for the brain to restore to a calm focus; these planned learning activity breaks must revitalize the part of the brain that is being blocked by stress or the intensity of higher order thinking (Willis, 2016). When the brain is given a break from a task, it refreshes its thinking and can help discover an answer to a problem or see a circumstance from a different view. When the brain takes a break from learning, problem solving, and memorizing for just a few short minutes, the brain revitalizes and processes the new information (Desautels, 2016). When

teachers present new standards, material, and complicated topics, students need to be calm and focused to attain the new information. Using brain breaks can positively influence knowledge and emotional states. Research has shown that brain breaks have the ability to increase activity in the prefrontal cortex by either stimulating or refocusing the areas where problem solving or emotional regulation occur (Desautels, 2016).

Timing and Brain Break Strategies

The timing of brain breaks is vital for focused learning and should take place before distraction, fatigue, and boredom takes place. The frequency of brain breaks also varies depending on the age and focus development of the students. Dr. Judy Willis (2016), a board-certified neurologist, suggests that for every 10 to 15 minutes for elementary school and 20 to 30 minutes for middle and high school of rigorous study requests a three to five minute break. Some teachers may believe that a brain break will disrupt or distract the flow of learning but that is simply not true. In fact, simply moving the body in a variety of ways, stretching or adding music can allow the brain to relax and open up possibilities for learning.

The Neuroscience of Brain Breaks

Dr. Willis (2016) clarifies that for new information to end up a memory, it must pass through an emotional channel called the amygdala and after that it reaches the prefrontal cortex. The amygdala activates when students' brains become overwhelmed, anxious or exceedingly confounded. These emotions cause no new learning to take place and cannot pass to the prefrontal cortex to sustain a memory. In addition, there is a point in which too much information causes the amygdala to shut down even if there is no stress or high rigor of learning. When the amygdala shuts down, a brain break can be

used to renovate the enthusiastic state required to return the amygdala into its ideal state for beneficial data to be absorbed.

Why Movement Matters

When students are seated for long periods, it makes it hard for them to pay attention and learn. The brain craves movement and students will naturally start fidgeting in order to get the movement their bodies desperately need. When the body starts to move or fidget, it is trying to turn the brain back on. This fidgeting can sometimes be a distraction to other students so the teacher will ask the student to sit still and pay attention, therefore, their brain goes back to sleep. For students to be able to learn, they need to be able to pay attention. To be able to pay attention they need to be allowed to move. Simple exercises such as tuning in to music, laughing, moving, or collaboration with peers can refocus the brain and calm the amygdala in order to transfer to the next learning activity (Willis, 2016).

Relationship Between SPD and Brain Breaks

When Dr. Ayres first described sensory integration dysfunction in the 1970s, sensory-based therapies were created and used to help children reorganize their sensory systems (Zimmer, 2012). These therapies were created to be used in a variety of settings including clinics, schools and at home. These sensory-based treatments included exercises and movements that are thought to organize the sensory system by providing auditory, vestibular, tactile, and proprioceptive inputs (Zimmer, 2012). At the core of integration therapy used by OT's is movement and activating the nervous system because of an unorganized brain that can't filter sensory inputs. When we use movement, or brain breaks, the result of the method is an organized brain, which creates our behavior, learning, and perceptions.

Vestibular System.

In her book, *Sensory Integration and the Child*, Dr. Ayers (1979) explains, “The vestibular system is the unifying system. It forms the basic relationship of a person to gravity and the physical world. All other types of sensation are processed in reference to this basic vestibular information. The activity in the vestibular system provides a “framework” for the other aspects of our experience. Vestibular input seems to “prime” the entire nervous system to function effectively. When the vestibular system does not function in a consistent and accurate way, the interpretation of other sensations will be inconsistent and inaccurate, and the nervous system will have trouble getting started” (p. 43). When a child with sensory processing has vestibular dysfunction, they have issues handling information about balance, gravity and movement through space. A child that is sensory seeking, and craves vestibular input, never gets enough satisfying movements. Seeking vestibular input such as jumping off the top of the jungle gym, running instead of walking, hanging upside down or twirling in circles are just a few examples of vestibular seeking students. Brain breaks would be beneficial for those seeking movement to satisfy their nervous system.

Proprioceptive System.

A functioning proprioceptive system tells us about our movements and body position in space. Receptors of the proprioceptive system are typically in the skin and muscles but can also be found in ligaments, tendons, joints, and connective tissue (Kranowitz, 2005). When muscles and skin stretch and move, the result is that body parts straighten and bend and messages are sent to the central nervous system about how and where the movement occurs (Kranowitz, 2005). The proprioceptive framework is closely associated to both the vestibular and tactile systems. When there is a proprioceptive dysfunction, there is a strong chance there is also difficulties in

the tactile and/or vestibular systems. It is very common for a child to only have an unorganized tactile or vestibular system by itself but highly unlikely to only have an unorganized proprioceptive system. A child that has proprioceptive dysfunction that is sensory seeking craves active movement such as pushing, pulling, and charging into people, walls, and tables. They need input to muscles and joints and can strongly benefit from sensory integration treatment where they can receive the stimuli their body craves (Kranowitz, 2005).

Tactile System.

Our sense of touch, or tactile system, is how we feel all touch sensations, including temperature, vibration, light and deep pressure, textures and pain (Kranowitz, 2005). We get tactile information through sensory receiving cells called receptors which are in our skin. All types of touch sensations including light touch, deep pressure, skin stretch, vibration, movement, temperature, and pain will activate the tactile system (Kranowitz, 2005). When a child has tactile dysfunction, their central nervous system is not able to get efficient sensations perceived by the skin. A child that is seeking sensory input because of a disharmonious tactile system may crave deep pressure and more skin contact. They may try to touch everything in sight to gain the sensory input their nervous system needs.

Summary

In conclusion, based on the evidence reviewed, brain breaks may be considered effective for students with sensory processing disorder. Brain breaks stimulate the vestibular, proprioceptive and tactile systems in the body. It is critical to stimulate these sensory systems for students with SPD because when their nervous system is integrated correctly there is a

connection between cognitive processing and the ability for academic achievement (Noddings, 2017a). Brain breaks help provide movements that are needed to stimulate the vestibular, proprioceptive, and tactile system to help aid those with SPD.

CHAPTER 3. METHODOLOGY

Introduction

The purpose of the needs assessment survey was to determine if brain breaks are beneficial for students with sensory processing disorder. The needs assessment survey was used to identify the teacher's understanding of sensory processing disorder and if they implement any type of brain break in the classroom. This study included evidence-based research associating the effectiveness of brain breaks with students with sensory processing disorder. The handbook contains information about sensory processing disorder and describes brain breaks and how to implement them in the classroom. The handbook is relevant for those with sensory processing by connecting sensory integration and vestibular stimulation through the use of brain breaks.

Participants

The participants in this research study were general and special education teachers at an urban middle school in a Mid-Western state. There are forty teachers in this school building consisting of grades sixth through eighth grade. There are twenty-six general education teachers, five special education teachers, eight unified arts teachers and one English Language Learner teacher. Teachers were asked to complete a Needs Assessment Survey about sensory processing disorder and the effectiveness of brain breaks in the classroom. Participants were contacted for this study through a recruitment email that requested their participation. This email clearly stated that participating in this survey was optional.

Setting

The Needs Assessments Survey was given to all licensed teacher at an urban public middle school in a Mid-western state. There are 740 students enrolled in 6-8th grade with 38.2% of the student population receives free meals and 9.6% receive reduced meals. The ethnicity of the school is 59.3% white, 14.2% black, 13.1% Hispanic, 8.5 multiracial, 3.6% Asian, 0.9% Native Hawaiian and 0.3% American Indian (“DOE compass,” 2018). Of the 740 students enrolled in grades 6 through 8th, 97 students are in special education and have an IEP. Of the 97 students with IEPs 17 are enrolled in the Emotional Disturbance program. These 17 students still receive integrated services and participate in the general education setting.

Research Design

The process included a survey, which wanted a teacher’s thoughts on research-based strategies for brain breaks for students with sensory processing disorder. A survey was given to all licensed teachers, which investigated the teachers’ use of research-based brain breaks in the classroom and their perception of the effectiveness with students with sensory processing disorder. The special project was created based on the teachers’ current knowledge and familiarity of students with sensory processing disorder and their need for movement in the classroom.

The survey asked teachers two demographic questions of how many students are diagnosed with sensory processing disorder in their classroom. The other demographic question was how many students in their previous years of teaching they had taught with sensory processing disorder. Teachers were asked if they had any prior knowledge of sensory processing disorder and then had to define sensory processing disorder in their own words.

The survey questions also asked about the teachers' familiarity with brain breaks and if they currently use a specific brain break program in their classroom. This question was chosen to gauge if teachers were using research-based brain breaks in their classroom. If the teacher implemented brain breaks, in their classroom they were asked what exactly it looks like and how often do they implement the brain break.

In addition, teachers were also asked their opinion on the effectiveness of brain breaks on student learning or improved learning. They had to respond with a short answer to explain what effectiveness they had witnessed in their classroom. All survey questions were significant in the construction of the teacher-friendly and researched-based handbook about sensory processing and the use of brain breaks.

Table 1

Survey Questions and Purposes

	Questions	Purpose of Questions	Sources
1.	How many students are diagnosed with Sensory Processing Disorder in your class?	Demographic	
2.	How many students, in previous teaching years, have you taught with Sensory Processing Disorder?	Demographic	
3.	Do you have any prior knowledge of Sensory Processing Disorder?	Understanding teacher knowledge	Walbam, K. (2013)
4.	How would you define sensory processing disorder?	Understanding teacher knowledge	Walbam, K. (2013)
5.	Do you currently implement brain breaks?	Understand teachers' use of strategies	Mahar, M.T. (2011)
6.	Do you use a specific brain break program? If so which one?	Understand teachers' use of strategies	Howie et al., (2015)
7.	How do you typically implement brain breaks into your classroom?	Understand teachers' use of strategies	Mahar, M.T. (2011)

(continued)

8.	Have you observed the effectiveness of brain breaks on student learning or improved behavior?	Teacher perspectives	Howie et al., (2015)
9.	How would you describe how your students respond to the brain breaks?	Teacher perspectives	Howie et al., (2015)
10.	How many days do you implement brain breaks in one week?	Understand teachers' use of strategies	Kubesch et al., (2009)
11.	How many times do you implement brain breaks in one class period?	Understand teachers' use of strategies	Kubesch et al., (2009)
12.	How effective do you believe brain breaks are on student learning or behavior in the classroom?	Teacher perspectives	Mahar, M.T. (2011)

Recruitment and Data Collection Procedures

The present study has the approval of the building principal (see Appendix C) and approval from the Purdue IRB (see Appendix G). A recruitment email (Appendix B) along with the survey (Appendix A) was sent inviting general education and special education teachers to participate. The email explained that participation is voluntary and their responses would remain anonymous. The participants were given approximately two weeks to complete the survey. The completed survey was collected using an online survey system called Survey Monkey. Once the participants completed the survey, the data was sent anonymously to the investigator's email. The investigator only had access to the email with a username and password. The principal approved of the study.

Description of Handbook

The handbook provides general and special education teachers with research-based brain breaks strategies to use in the classroom. The handbook explains the use and implementation of brain breaks and how it can help aid students with sensory processing disorder. The need for the

handbook is to help teachers implement a program for sensory seeking students that have sensory processing disorder.

The handbook assists teachers who are pursuing information on students with sensory processing disorder and implementing brain breaks in the classroom. A new handbook was created to benefit those with sensory processing disorder who have difficulties with behavior in the classroom by using brain breaks. Sensory integration and the vestibular system are the specific components of the brain break program. This handbook provides details for teacher's with activities that will help students with sensory processing disorder. Included in the handbook are 10 Brain Break strategies that incorporate research-based kinesthetic movement that benefits students diagnosed with SPD.

Analysis of Previous Published Handbooks

There have been numerous handbooks, teacher manuals and resources created to benefit students with sensory processing disorder or information about how to implement brain breaks in the classroom. Some of these handbooks, manuals and resources can be long and tedious with many hours spent reading to comprehend the strategies used. For most teachers, when information is not readily available or needs to be searched for, the resource is tossed aside for something that is quick and easy. One of the handbooks that I reviewed was *Brain Breaks for the Classroom: Help Students Reduce Stress, Reenergize & Refocus* by Michelle Gay. One of the benefits of this handbook is that it is available to purchase in both paperback and eTextbook form. The eTextbook form enables you to download the book on various electronic devices including laptops, iPad or a Kindle. While this handbook only was 48 pages and had 40 different brain breaks the book gave limited ideas and was not very thorough in its explanation of strategies for brain breaks.

A second handbook that I reviewed was called *Self-Regulation and Mindfulness: Over 82 Exercises & Worksheets for Sensory Processing Disorder, ADHD, & Autism Spectrum Disorder* by Varleisha Gibbs. The benefit of this handbook is that it was written by an OT and provides evidence-based resources for helping children who have trouble with self-regulating, staying focused, managing their senses and controlling their emotions. A weakness of the handbook is that it provides limited strategies for sensory processing disorder, ADHD and Autism Spectrum. The handbook is broken down into only focusing on one disorder at a time so only a third of the book is geared towards strategies for kids with SPD. Another weakness is it is not as comprehensive on self-regulation and mindfulness and does not go in depth for strategies that it should be.

Of resources available for sensory processing disorder and brain breaks there seems to be, none that implement brain breaks specifically for students with sensory processing disorder. For this reason, a handbook is needed correlating the effects of brain breaks and their benefits for students with sensory processing disorder. The brain breaks provided in the new handbook is tailored to the needs of sensory input required for students with sensory processing disorder.

Timeline

Data collection began with the distribution of the online survey on December 2, 2019. The last date to collect the finished surveys was by December 16, 2019. Data analysis began immediately after the collection. The data was then organized and used to create a handbook for teachers to use to identify sensory processing disorders and use effective strategies for brain breaks in the classroom. In March 2020 the finalized Special Project was submitted.

Summary

After thoroughly reading and reviewing multiple articles on brain breaks, sensory processing disorder, the vestibular, proprioceptive and tactile systems, it is evident that there is a need for a handbook to be remade benefiting SPD students seeking movement. By creating a new handbook, teachers will have new background knowledge of what sensory processing disorder is and how movement in the classroom using brain breaks is vital for students with SPD. Teachers of all grade levels will benefit from this new handbook because odds are that they have at least 1 out of 20 students having sensory processing issues. These students are usually mainstreamed into a general education classroom so a handbook would be valuable for both general and special education teachers.

CHAPTER 4. RESULTS

The purpose of the data analysis was to determine licensed middle school teacher's knowledge of sensory processing disorder and the benefits of using brain breaks in their classroom. In order to provide these licensed teachers with a useful handbook for knowledge about sensory processing disorder and brain breaks, information was collected through a short answer needs assessment survey. The information from the needs assessment survey was used to create a handbook with activities used to benefit students diagnosed with sensory processing disorder.

Needs Assessment

The beginning of the twelve-question needs assessment survey began with two demographic questions followed by ten multiple choice or short answer questions. The questions were divided into five categories. The first two questions were demographic questions to see if teachers had a prior knowledge of SPD. Questions 3 and 4 were created to assess teachers' awareness of SPD and a definition of SPD in their own words. Questions 5, 6, and 7 were created to get a better understanding of how teachers use brain breaks in their classrooms and the way they implement brain breaks into their daily lessons. Questions 8, 9, and 12 asked teachers to describe how effective they thought brain breaks were on student learning and behavior. Questions 10 and 11 were quantitative questions asking how many days and times do they implement brain breaks in a week.

Demographic Information

The first and second question of the needs assessment survey contained background information used to identify licensed teachers knowledge of sensory processing disorder and how many students were currently diagnosed with SPD in their classroom and how many students in previous teaching years had they taught with SPD. The survey was distributed to 40 licensed middle school teachers through a secure email server with a link for the teachers to complete the survey anonymously. Of the 40 teachers given the option to complete the survey, 16 completed the survey with a 40% completion rate. Question 1 asked the participants how many students are diagnosed with sensory processing disorder in their class. Answers varied from statements of, “I do not know,” to between 0 and 5 students with sensory processing disorder. The highest response rate was 6 of the 16 surveyed listed 0 students diagnosed with SPD in their class. Question 2 asked how many students in previous years they have taught with sensory processing disorder. Answers varied from the lowest number of 0 students diagnosed with SPD and the highest number being 50 students. Another common answer was three respondents stated that they had 3 students in previous years diagnosed with SPD.

Prior Knowledge of Sensory Processing Disorder

Respondents were asked if they had any prior knowledge of sensory processing disorder and then asked how they would define SPD in their own words. Figure 1 shows participants responses to question 3 (Do you have any prior knowledge of sensory processing disorder?). One participant (6.25%) stated that they were very familiar with SPD. Eight participants (50%) stated that they were somewhat familiar with SPD. Two participants (12.5%) stated that they were not so familiar with SPD. Five participants (31.25%) stated that they were not familiar at all with SPD. Participants were also asked a follow up question that asked them to write all they

know about SPD and for question 4 they had to define SPD in their own words. Most respondents had a basic understanding with responses such as, “Sensory processing disorder is when a person is not able to handle certain textures or touches.” Or stating that, “Sensory processing disorder is when students can’t process information from their senses.”

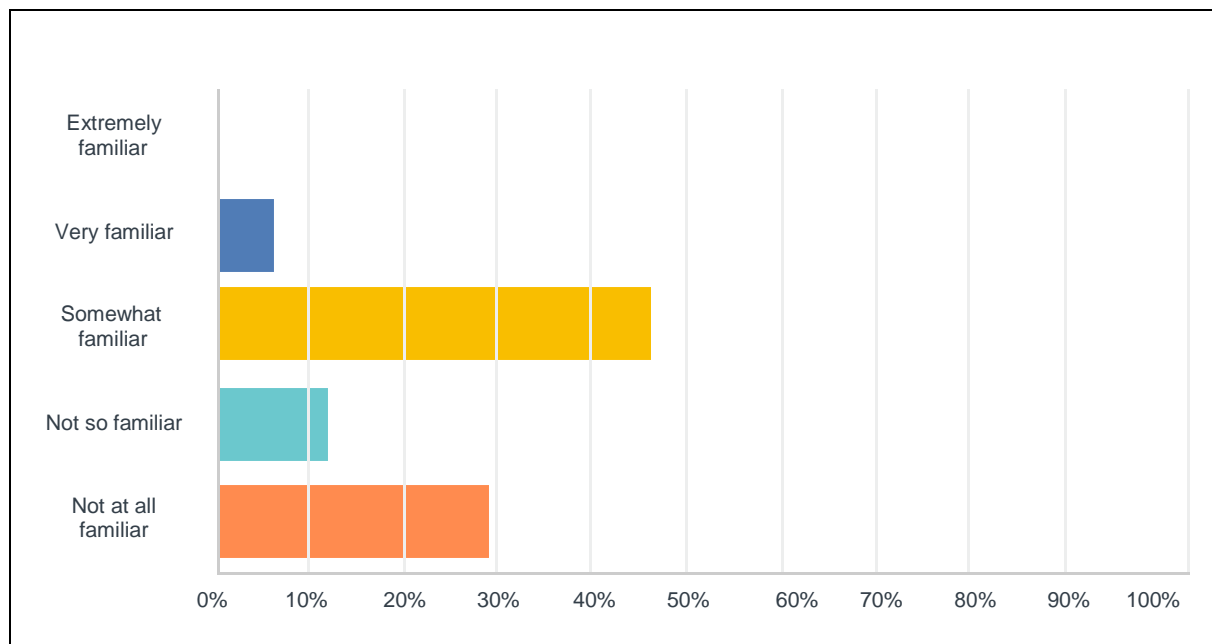


Figure 1 Do you have any prior knowledge of Sensory Processing Disorder?

Use of Brain Breaks in the Classroom

Questions 5, 6, and 7 were asked to gain understanding of how teachers implement brain breaks into the classroom and how often? For question 5, “Do you currently implement brain breaks,” respondents were given five multiple choices to answer this question with the responses being: Always, Usually, Sometimes, Rarely, or Never. All sixteen respondents answered this question. One respondent (6.25%) stated they always implement brain breaks. Two respondents (12.5%) stated they usually implement brain breaks. Eight respondents (50%) stated they sometimes implement brain breaks. Four respondents (25%) stated they rarely implement brain breaks. One respondent (6.25%) stated they never implement brain breaks. For question 6, “Do

you use a specific brain break program? If so which one?" all sixteen respondents answered this question. Three respondents (18.75%) stated that they use a specific brain break program and thirteen respondents (81.25%) stated that they don't use a specific program. When asked which brain break program they specifically use respondent one stated, "Lori Desautels brain break cards." Respondent two stated, "The cards given to us at school." Respondent three stated, "The one from FWCS." For question 7, "How do you typically implement brain breaks into your classroom?" thirteen of the participants answered and three participants skipped this question. Common responses were, "when kids are fidgeting," or "when kids are getting antsy or start to become distracted." Another respondent answered by saying, "I usually implement after sitting for a period of time or after a large amount of information was given."

The effectiveness of Brain Breaks on Student Learning and Behavior

Questions 8, 9 and 12 asked respondents to state their opinion on how effective they believed brain breaks to be on student learning and behavior in the classroom. Figure 2 shows the results the respondents answered if they had seen the effectiveness of brain breaks on student learning or if it improved behavior. Respondents were given five multiple choices to answer this question with the responses being: Always, Usually, Sometimes, Rarely, or Never. A majority of respondents said that they observed brain breaks to usually or sometimes have effectiveness on student learning and improved behavior. Question 9 asked respondents to describe how students respond to brain breaks with a short answer response. One respondent stated, "They seem to pay attention more after we complete a brain break." Another respondent stated, "Some can get overstimulated but as a whole I have seen productivity increase," and another stated, "They generally like the distraction and it helps them stay focused longer." Question 12 asked respondents to write a short answer response to how effective do they believe brain breaks are on

student learning or behavior in the classroom. Respondents had positive things to say about the effectiveness of brain breaks such as, “Students seem more engaged after we do a brain break in class.” Another respondent stated, “I feel that they are effective because it gives students the opportunity to energize and to restart.”

Answer Choices	Percent	Responses
Always	0.00%	0
Usually	37.50%	6
Sometimes	37.50%	6
Rarely	12.50%	2
Never	12.50%	2
Total		16

Figure 2 Have you observed the effectiveness of brain breaks on student learning or improved behavior?

Use of Brain Breaks: Frequencies

Questions 10 and 11 were asked to obtain quantitative data of how often brain breaks were used in the classroom. Figure 3 shows how many days the participants implement brain breaks in their classroom with the option to choose more than one answer. Seven respondents (63.64%) choose Monday. Six respondents (54.66%) choose Tuesday. Five respondents (45.45%) choose Wednesday. Seven respondents (63.64%) choose Thursday. Five respondents (45.45%) choose Friday. Question 11 asked respondents, “How many times do you implement brain breaks in one class period?” They were able to choose one answer of: zero times, one time, two times, three times, or four plus times. Four respondents (25%) choose zero times in one

class period to implement brain breaks. Ten respondents (62.5%) choose one time in one class period to implement brain breaks. Two respondents (12.5%) choose two times in one class period to implement brain breaks. Zero respondents choose three or four plus times to implement brain breaks in one class period.

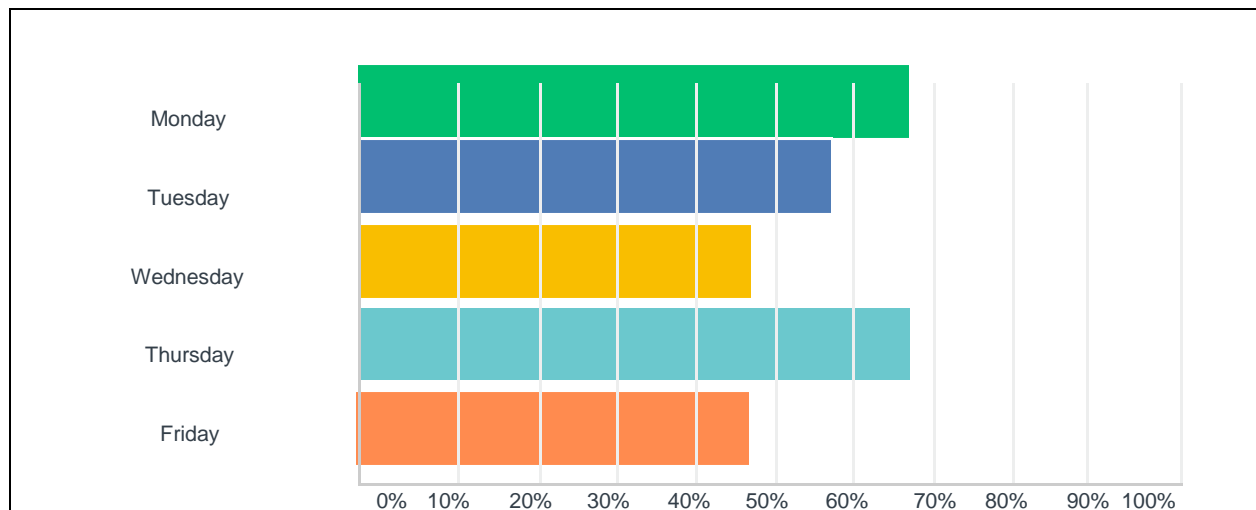


Figure 3 How many days do you implement brain breaks in one week?

Summary of findings

In conclusion the needs assessment survey identified the teacher's understanding and knowledge of sensory processing disorder and brain breaks. The data shows that the from the teachers responses that they have a limited understanding of what exactly sensory processing disorder is and different strategies to help their students diagnosed with SPD. However, most teachers surveyed agreed that when using brain breaks in the classroom, it had a positive effect on students. Most respondents agreed that after implementing a brain break in the classroom students were more focused and reenergized. The survey findings prove a need for a handbook that provides teachers with a basic understanding of sensory processing disorder and examples of research-based strategies, such as brain breaks, and their benefits on students with SPD.

CHAPTER 5. HANDBOOK

Minds in Movement

A handbook to implement Brain Breaks for
students with Sensory Processing Disorder

Minds in Movement



Photo Credit: <http://www.nickcarnes.com/complimentary-brains/>

A handbook to implement Brain Breaks for
students with Sensory Processing Disorder

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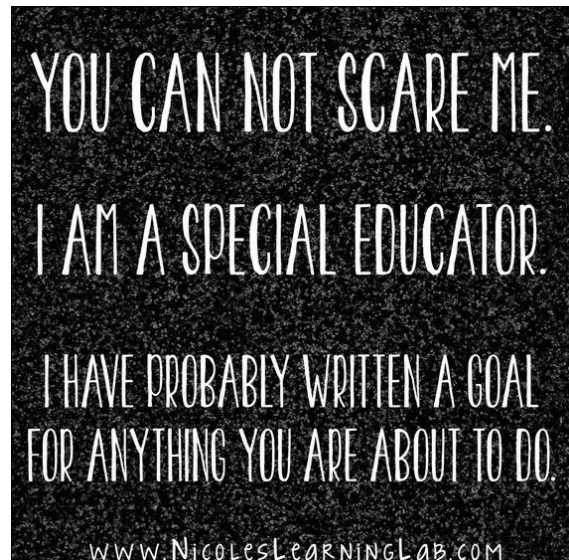
All About the Author



Hi! My name is Taylor Autrey and I am a licensed special education teacher at Jefferson Middle School in Fort Wayne, Indiana. I am in my second full year of teaching middle school students grades 6-8th grade. I started my education career by earning my Bachelors of Science in Elementary Education from Olivet Nazarene University in 2008. After college I worked for a company that

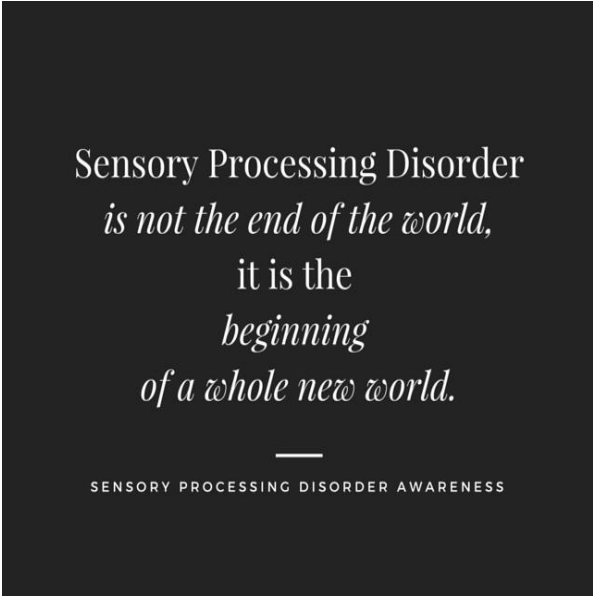
provided services for individuals with developmental disabilities. I was a direct care provider for a 10 year old boy that was diagnosed with Autism and worked one-on-one with him for 3 years. I was finally offered my dream job as a full-time 3rd grade teacher and taught for 2 years before the pull of special education became too strong and I decided to go back to school to receive my Masters in Special Education. I received my Indiana (Pre K-12th grade) Special Education license in December 2019 and received my Masters of Science in Special Education in May 2020. One of my favorite quotes is by the great Walt Disney that says, "It's kind of fun to do the impossible!" I feel like every day at my job I am doing the impossible with my special education students and I'm having a blast doing it! Being a Special Education teacher at times can be hard but the reward always outweighs the difficulty when you see a student succeed!

Taylor A. Autrey



Section 1: Introduction

How to Use this Handbook



Sensory Processing Disorder
*is not the end of the world,
it is the
beginning
of a whole new world.*

—
SENSORY PROCESSING DISORDER AWARENESS

Photo Credit: <https://lemonlimeadventures.com/what-is-sensory-processing-awareness-month/>

Welcome to the Minds in Movement Handbook that assists students with sensory processing disorder (SPD). Thank you for taking the time to read all about SPD and different research proven strategies to benefit those diagnosed with SPD. This handbook provides a basic explanation of sensory processing disorder and brain breaks and even offers a checklist to use to determine if a student may have symptoms of SPD. Ten brain break strategies are provided to use for those students who are craving movement and research has shown the benefits of movement for all students not just those diagnosed with SPD.

Definition of Terms

Sensory Processing Disorder

Sensory processing disorder (SPD) was first identified as its own unique disorder by occupational therapist Jean Ayers in the 1970s. SPD is a neurological disorder in which sensory information goes to the brain but does not get organized into appropriate responses (Ayers, 1979). Dr. Ayers explained SPD as a neurological ‘traffic jam’ that prevents correct sensory information from reaching the brain (Ayers, 1979). It is estimated that at least one in twenty people in the general population may have SPD (Walbam, 2013). Children with SPD are either hyper-sensitive (over-responsive) or hypo-

sensitive (under-responsive) to stimuli and find it difficult to process sensory input as other typically developing children could. When a child cannot properly organize sensory information, they often seek out movement to meet the stimulation their brains are requiring.

Brain Breaks

Integrating movement in the classroom, or brain breaks, is a proactive approach to help provide the stimulation required to help refocus students with SPD. The concept of brain breaks is a research-based method, which can be used in schools by classroom teachers to provide mental breaks to help students refocus (Howie, Shatz, & Pate, 2015). The movement that students get from the brain breaks carries blood and oxygen to the brain, energizes, and relaxes them enabling them to solidify their learning. A brain break typically lasts just a few short minutes and is a physical activity that can be done right at the student's desk (Willis, 2016).

Dr. Lori Desautels Brain Break Program

Dr. Lori Desautels program is based on research proven strategies that address the stress response in the limbic brain areas and also the sensory and motor systems in the brain stem area. Dr. Desautels brain breaks bring novelty and curiosity stimulating motor and sensory systems while initiating emotional regulation in the more reactive and primitive areas of the brain. When we use sensations, breath, movement, novelty, art, and our body awareness, we activate those areas in the brain that pay attention to what is happening now, in this moment, while supporting the areas we need for learning, attention, and engagement. These brain breaks can be used as bell work or morning meeting exercises and throughout the class period or day when students need to refocus, calm down or attend to learning.

Section 2: What is Sensory Processing Disorder?

Definition

Sensory processing disorder (SPD) is when the brain does not have the ability to process information received through the senses (Kranowitz, 2005). The sensory systems including tactile, olfactory, auditory, gustatory, visual, vestibular and proprioceptive can all or some be impaired. These impairments can appear in many ways but in order for a diagnosis to apply the dysfunction must occur with frequency, intensity and/or duration (Kranowitz, 2005). SPD may cause difficulty in one's movement, emotions, attention, relationships, or adaptive responses.



Characteristics

A few characteristics of children with SPD can be described in the following picture:

Children may have some, all or none of the following examples of SPD because SPD presents itself differently in every person.

Treatment of Sensory Processing Disorder

Treatment for SPD is usually completed by an occupational therapist and children may be referred for services through their school or primary care doctor. The OT will do an initial evaluation to determine if SPD

is present and then come up with a treatment program best suited for the child. OT's work with children to retrain how their brain processes sensory information. Treatment is found to be most effective on younger children because their brain can be adjusted as new neurons are still being formed as they grow.

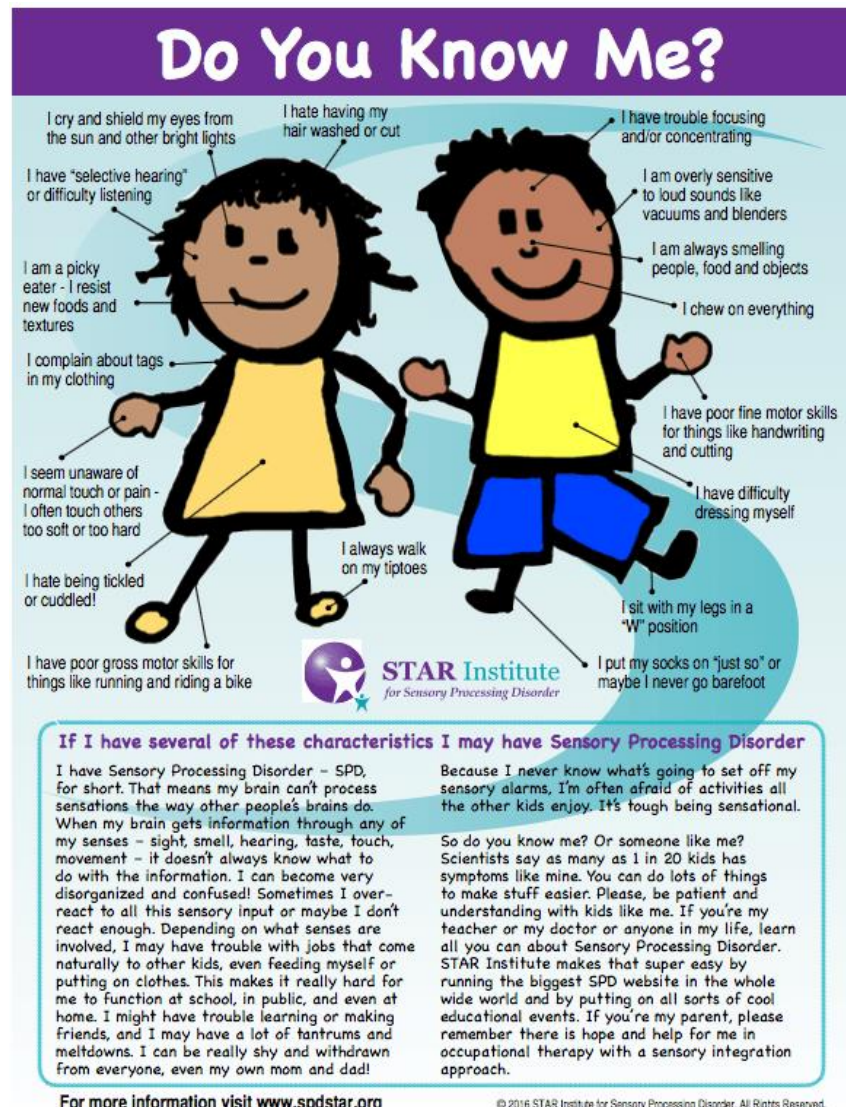
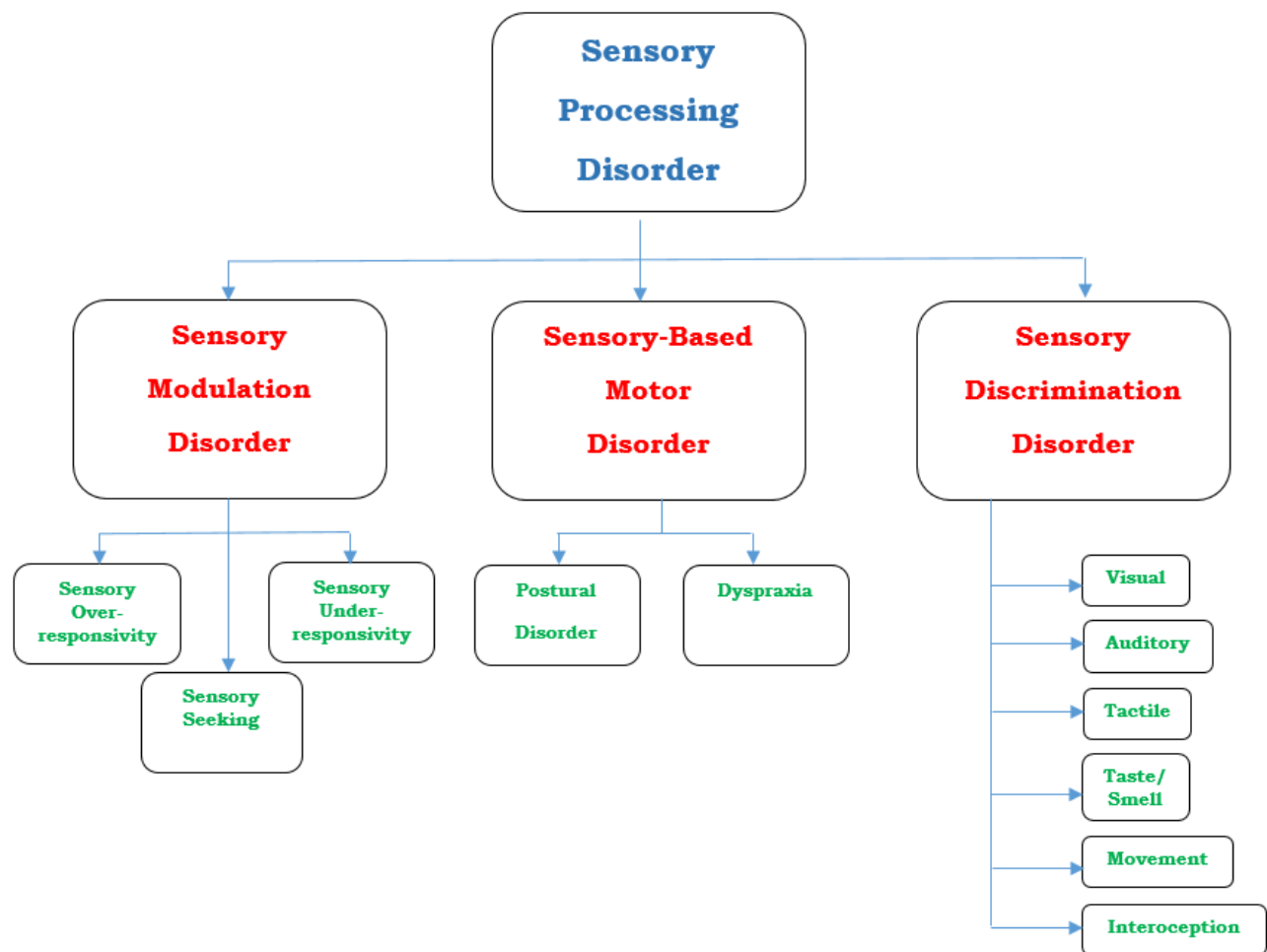


Photo Credit: <https://i1.wp.com/theraconcepts.com/wp-content/uploads/2018/02/Eye-View-SPD-Symptoms-STAR-Institute.png>

Categories and Subtypes of Sensory Processing Disorder¹

Using Dr. Ayer's original concepts, SPD was classified into diagnostic groups. In this classification sensory processing disorder is the overall term, encompassing three main categories of Sensory Modulation Disorder, Sensory Discrimination Disorder, and Sensory-Based Motor Disorder and their subtypes.



¹ <https://www.spdstar.org/basic/subtypes-of-spd#pattern3>

Section 3: What are Brain Breaks?

Definition

A brain break is a short period of time when you change up the dull routine of incoming information that arrives predictable, tedious, or monotonous (Desautels, 2016). In order for the brain to restore to a calm focus; these planned learning activity breaks must revitalize the part of the brain that is being blocked by stress or the intensity of higher order thinking (Willis, 2016). When the brain is given a break from a task, it refreshes its thinking and can help discover an answer to a problem or see a circumstance through a different lens. When the brain moves away from learning, problem solving, and memorizing for just a few short minutes, the brain actually helps to incubate and process new information (Desautels, 2016). When teachers present new standards, material, and complicated topics, students need to be calm and focused to attain the new information. Using brain breaks can positively influence emotional states and learning. Brain breaks refocus neural circuitry with either quieting practices or stimulating that generate increased activity in the prefrontal cortex, where problem solving and emotional regulation occur (Desautels, 2016).



Photo Credit:

https://static.planetminecraft.com/files/resource_media/screenshot/1252/Brain-Break_4529620.jpg

Benefits of Brain Breaks

When students are seated for long periods, it makes it hard for them to pay attention and learn. The brain craves movement and students will naturally start fidgeting in order to get the movement their bodies desperately need. When the body starts to move or fidget, it is trying to turn the brain back on. This fidgeting can sometimes be a distraction to other students so the teacher will ask the student to sit still and pay attention, therefore, their brain goes back to sleep. For students to be able to learn, they need to be able to pay attention. To be able to pay attention they need to

be allowed to move. Simple activities such as listening to music, laughing, moving, or interacting with peers can refresh brains and return to the next learning activity with a subdued amygdala and full supply of neurotransmitters (Willis, 2016).

Incorporating Brain Breaks into the Classroom

Studies have shown that taking breaks throughout the day can help refocus students. When students are beginning to lose focus a few minutes of physical activity can reset their attention and give their brain a much needed break. The timing of brain breaks is vital for focused learning and should take place before distraction, fatigue, and boredom takes place. The frequency of brain breaks also varies depending on the age and focus development of the students. Dr. Judy Willis (2016), a board-certified neurologist, suggests that as a rule, concentrated study of 10 to 15 minutes for elementary school and 20 to 30 minutes for middle and high school students calls for three to five minute break. Some teachers may believe that a brain break will disrupt or distract the flow of learning but that is simply not true. In fact, simply moving the body in a variety of ways, stretching or adding music can allow the brain to relax and open up possibilities for learning.

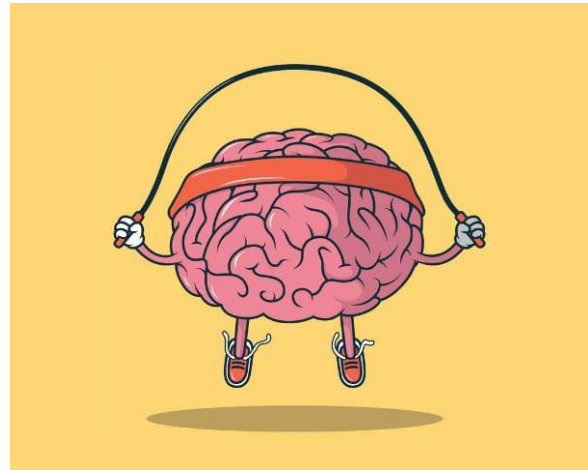


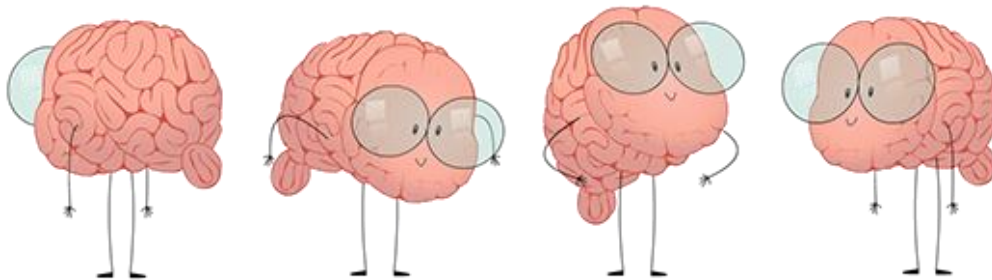
Photo Credit:

<https://www.weareteachers.com/brain->

Section 4: Implementing Brain Breaks in the Classroom

Description of the 10 Brain Break Activities

Each of the 10 brain breaks states the significance of the activity and how it can be incorporated into the classroom. The title of the activity, materials needed, setting, and description of how to do the activity and how it benefits students with SPD is listed on each page. The activities are all teacher-lead and directions should be given to students before each brain break. These brain breaks use research proven strategies that help benefit students diagnosed with sensory processing disorder. The kinesthetic movement breaks give students the ability to calm down, focus, and learn—enabling them to self-regulate. All 10 brain break activities were used by written permission from Dr. Lori Desautels from her website: Revelations in Education (Desautels, 2020).



["organ donations campaign"](#) by ahmad nady, ali anwar is licensed under [CC BY-NC 4.0](#)

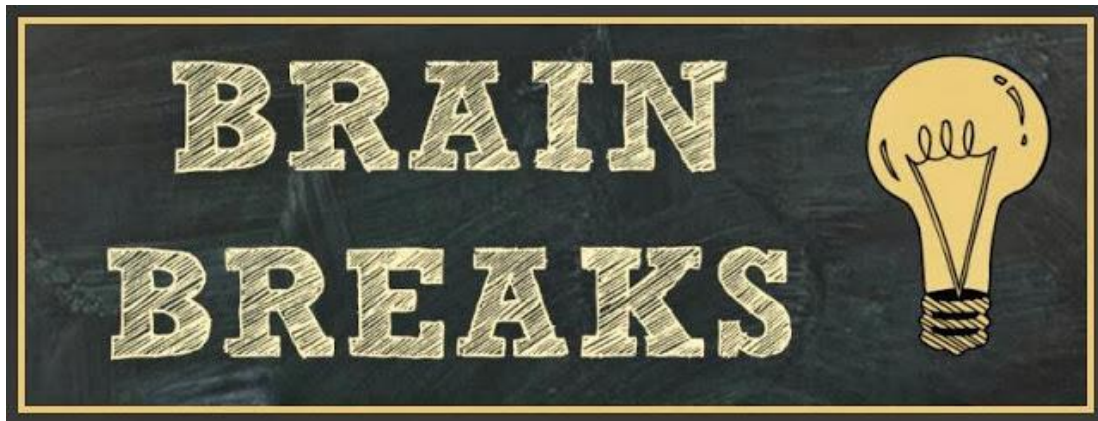
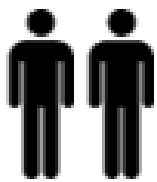


Photo credit: http://3.bp.blogspot.com/- tKW0im9Jxv4/UkD_QbVMdAI/AAAAAAAAHQc/VUx39TV8YMM/s1600/brain+breaks.JPG

Brain Break: an activity involving novelty, rhythm/pattern, and movement designed to create a state of relaxed alertness

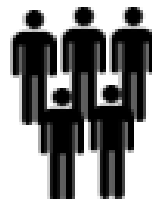
Key: each strategy contains the following symbols to quickly indicate details about each brain break



Partner
Activity



Large
Movements
Required



Whole Group
Activity



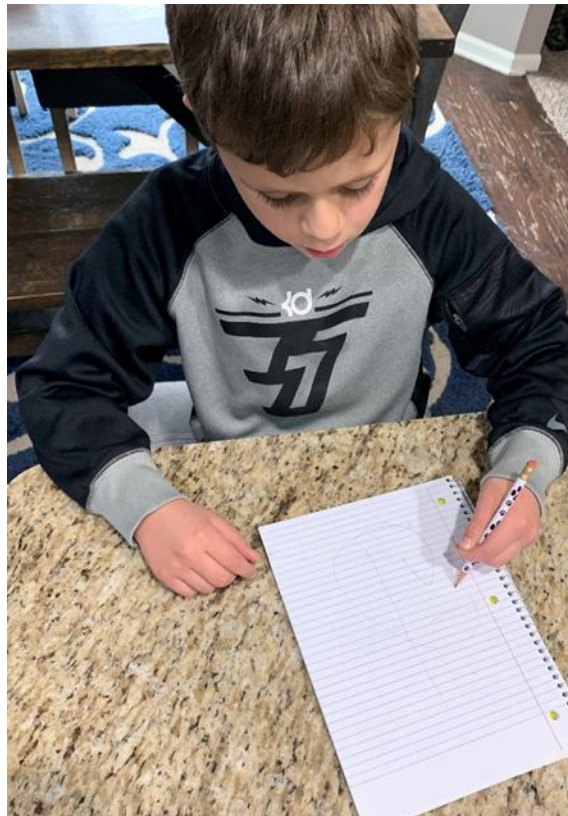
Technology
Needed

Brain Break Strategy #1

Title: Squiggle Story

Materials/Setting:

- Blank sheet of paper, whiteboard or Promethean Board
- Pencil/marker/or crayons



How?

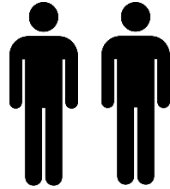
- Give students one minute to stand and draw with their non-dominant hand, turning the line into a picture or design of their choice.

Brain Break Strategy #2

Title: Rock, Paper, Scissors, Math

Materials/Setting:

- Partner
- fingers



How?

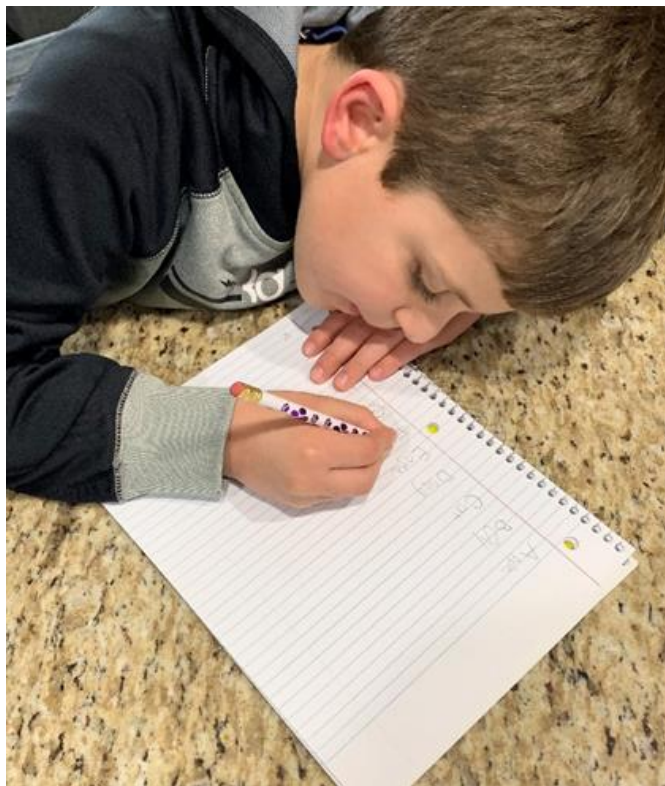
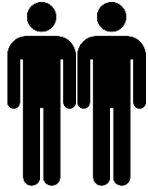
- After players say, “Rock, paper, scissors,” the last call-out is “math.” With that call, students lay out one, two, three, or four fingers in the palm of their hand. The first player to say the correct sum of both players’ fingers wins.

Brain Break Strategy #3

Title: Alphabet Game

Materials/Setting:

- Partner



How?

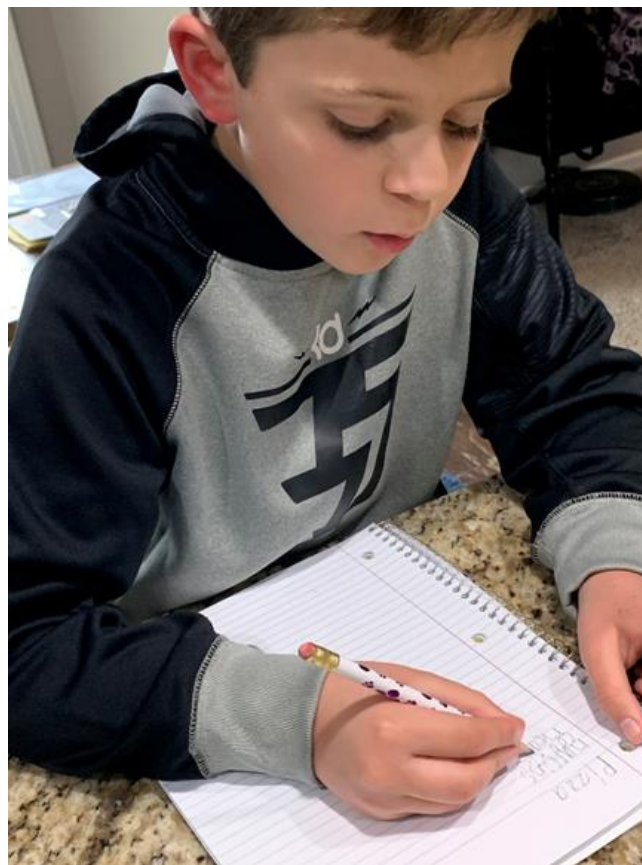
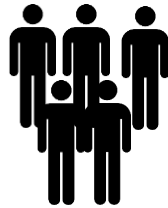
- Switching back and forth each letter, partners must go through the entire alphabet by naming things by first letters. (ex: Apple, Bear, Car, Donkey, Ear....)

Brain Break Strategy #4

Title: Categories

Materials/Setting:

- Whole group
- Pencil
- Paper



How?

- Have someone pick a category (ex: food). Have everyone write down as many food items as possible. See who can write down the most (no repeats) in a set amount of time!

Brain Break Strategy #5

Title: Flamingo

Materials/Setting:

- Large area



How?

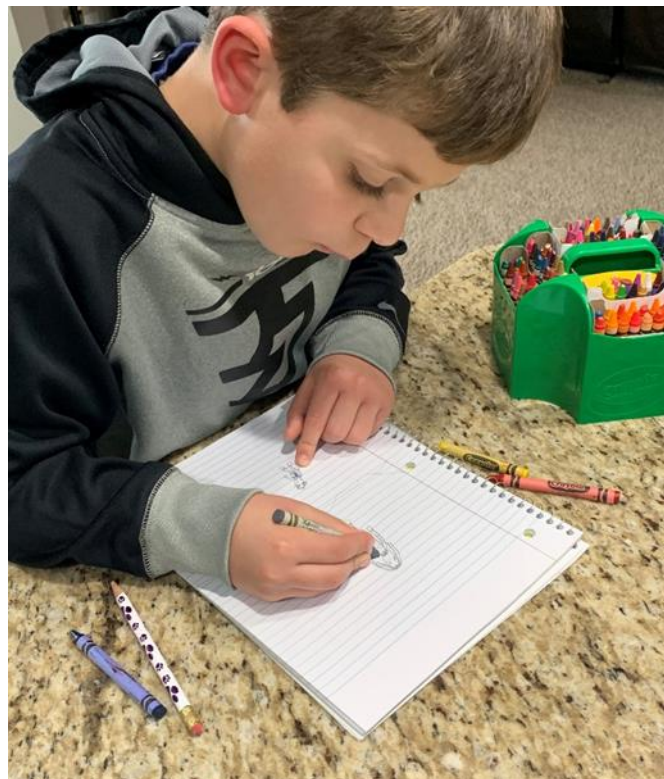
- Put your right hand on your left hip. Hands together and balance on your left foot. Put your left hand on your right hip and balance on your right foot. Hands together. Flamingo. Together. Repeat.

Brain Break Strategy # 6

Title: First Thought

Materials/Setting:

- Pencil or markers or crayons
- Paper
- Technology



How?

- Using technology to start playing a song. Everyone must draw a picture that describes what they hear and think about when they listen to the song.

Brain Break Strategy # 7

Title: Book Balance

Materials/Setting:

- Large area
- Textbook or Library book



How?

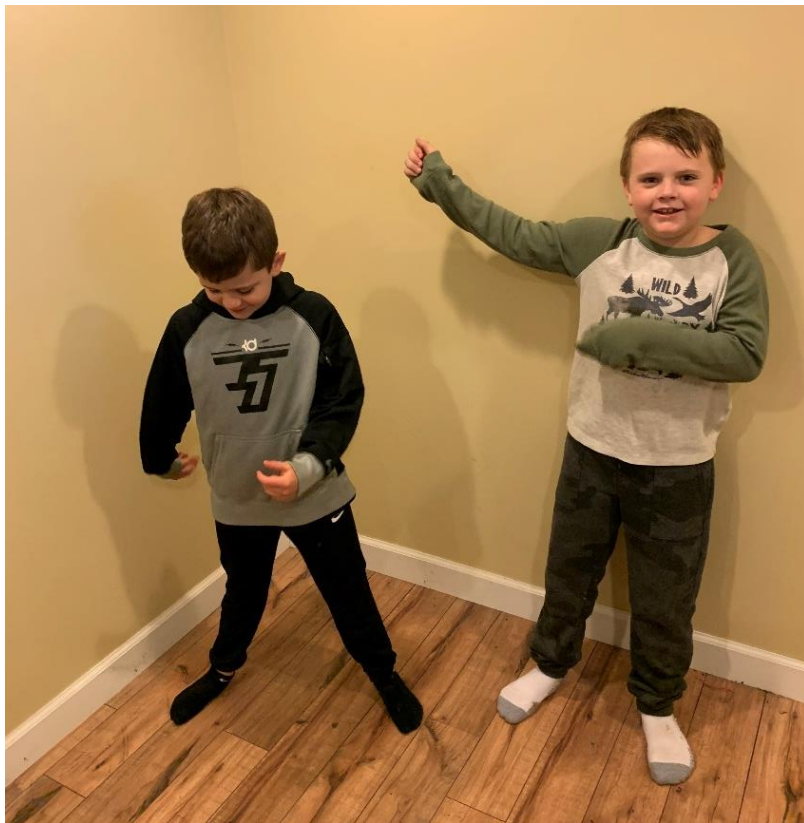
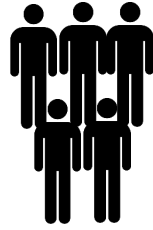
- Take out a light textbook or library book. Place it on top of your head and try to balance it. Now try to walk with the book balanced on your head as well.

Brain Break Strategy # 8

Title: Air Band

Materials/Setting:

- Large area
- Multiple people



How?

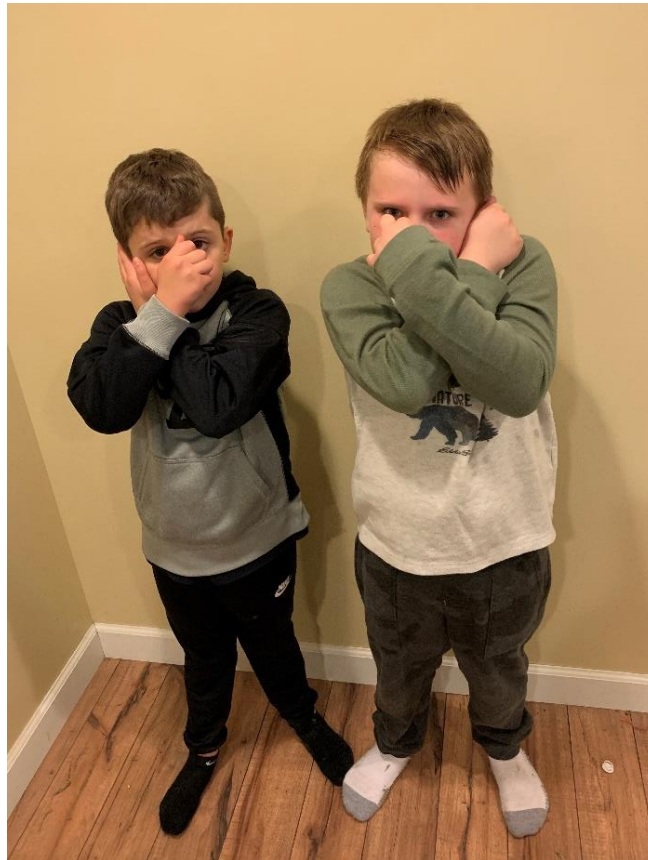
- Perform a silent song with invisible instruments. Have a guitarist, pianist, lead singer and anything else you can think of!

Brain Break Strategy # 9

Title: Grab Ear and Nose

Materials/Setting:

- Space to move



How?

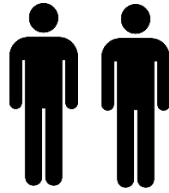
- Take your right hand and grab your left ear. Take your left hand and touch your nose. Now switch; take your left hand and grab your ear. Take your right hand and touch your nose. Switch back and forth.

Brain Break Strategy #10

Title: Animal Noises

Materials/Setting:

- Partner



How?

- Pick a partner. One person make an animal noise while the other tries to guess what it is. It is okay to be creative, so try something like an ostrich or hyena noise. Take turns making sounds and guessing.

Section 5: Assessments for Students with Sensory Processing Disorder

A checklist for teachers can be requested to help identify students who they think may have sensory issues. This checklist is no way to medically diagnose a student with sensory processing disorder and they should be referred to their family doctor that can provide insight into how a student may process sensory information.

Does Your Student Have Sensory Processing Challenges?

Research shows that sensory issues affect 5-16 percent of the general population and up to 90 percent of people with autism spectrum disorders. Please fill out this checklist for the student indicated in order to help assess the impact of any sensory processing challenges on this student's classroom performance.

Student's Name _____

Tactile

Avoids casual touch from classmates or teachers	Yes ___ No ___ Unsure___
Becomes "silly" or annoyed when touched	Yes ___ No ___ Unsure___
Craves excessive physical contact with others	Yes ___ No ___ Unsure___
Distressed by messy hands or face—glue, clay, paints, sand, food, etc.	Yes ___ No ___ Unsure___
Dislikes or craves certain textures— materials, paper, toys, etc.	Yes ___ No ___ Unsure___
Distracted by clothing or shoes	Yes ___ No ___ Unsure___
Chews or sucks on clothing, hands, pencils, others objects	Yes ___ No ___ Unsure___
Craves or avoids hot or cold items, water play, art supplies	Yes ___ No ___ Unsure___
Disturbed by vibration— such as air conditioner or trucks	Yes ___ No ___ Unsure___
Tactile stims—tapping, rubbing, squeezing, banging	Yes ___ No ___ Unsure___

Vision

Squints, blinks, or rubs eyes frequently	Yes ___ No ___ Unsure___
Makes poor eye contact	Yes ___ No ___ Unsure___
Struggles with reading	Yes ___ No ___ Unsure___
Has difficulty with eye-hand coordination—beading, writing, drawing	Yes ___ No ___ Unsure___
Difficulty copying from the board	Yes ___ No ___ Unsure___
Distracted by glare, bright light, fluorescent lighting	Yes ___ No ___ Unsure___
Distressed when lights are dimmed or by the dark	Yes ___ No ___ Unsure___
Struggles to follow moving objects or people	Yes ___ No ___ Unsure___
Poor ball skills—catching and/or throwing	Yes ___ No ___ Unsure___
Easily overloaded by crowded visual fields	Yes ___ No ___ Unsure___
Visual stims—hand flaps, flick fingers in front of eyes, spins objects	Yes ___ No ___ Unsure___

Vestibular/Balance

Avoids changes in head position	Yes ___ No ___ Unsure___
Seems clumsy, moves awkwardly	Yes ___ No ___ Unsure___
Excessively cautious on stairs	Yes ___ No ___ Unsure___
Slumps in chair/sits in W-position on floor/needs support for floor sitting	Yes ___ No ___ Unsure___
Touches furniture or walls when walking	Yes ___ No ___ Unsure___
Rocks in chair, wraps legs around chair legs	Yes ___ No ___ Unsure___
May fall out of chair or onto another student during floor time	Yes ___ No ___ Unsure___
Fidgets constantly	Yes ___ No ___ Unsure___
Seems restless or always “on the go”	Yes ___ No ___ Unsure___
Seems lethargic or hard to “wake up”	Yes ___ No ___ Unsure___
Gets dizzy easily	Yes ___ No ___ Unsure___
Avoids or craves moving playground equipment or riding on bus/in car	Yes ___ No ___ Unsure___
Difficulty using playground equipment—slides, swings, ladders, sandbox	Yes ___ No ___ Unsure___
Vestibular stims—spinning, rocking jumping	Yes ___ No ___ Unsure___

Auditory

Distressed by loud noises (fire drill, PA announcements, gym whistle)	Yes ___ No ___ Unsure___
Disturbed by sounds such as singing and musical instruments	Yes ___ No ___ Unsure___
Complains that everything/everyone is too loud	Yes ___ No ___ Unsure___
Speaks with a very loud voice	Yes ___ No ___ Unsure___
Speaks with an unusually quiet voice	Yes ___ No ___ Unsure___
Doesn't seem to hear you	Yes ___ No ___ Unsure___
Has difficulty filtering out noise and focusing on teacher's voice	Yes ___ No ___ Unsure___
Frequent outbursts in gym and recess	Yes ___ No ___ Unsure___
Frequent outbursts in cafeteria or assemblies	Yes ___ No ___ Unsure___
Seems to learn more easily in one-to-one situations than in a group	Yes ___ No ___ Unsure___
Auditory stims—hums, repeats, makes odd noises	Yes ___ No ___ Unsure___

Proprioception

Poor body awareness—doesn't know where body parts are	Yes ___ No ___ Unsure___
---	--------------------------

Bumps into classmates, furniture, walls	Yes ___ No ___ Unsure___
Difficulty grading force— breaks crayons, pencil points, toys	Yes ___ No ___ Unsure___
Poor handwriting— difficulty forming letters, presses too hard or too soft	Yes ___ No ___ Unsure___
Accidentally spills when opening containers, pouring, or drinking	Yes ___ No ___ Unsure___
Drops items on floor, slams doors although not angry	Yes ___ No ___ Unsure___
Crashes and falls on purpose	Yes ___ No ___ Unsure___
Lies down on floor at inappropriate times	Yes ___ No ___ Unsure___

Smell and Taste

Complains about smells	Yes ___ No ___ Unsure___
Complains about tastes	Yes ___ No ___ Unsure___
Doesn't seem to notice strong odors—glue, markers, food	Yes ___ No ___ Unsure___
Picky eating or very self-limited diet	Yes ___ No ___ Unsure___
Acts out at snack time or in cafeteria	Yes ___ No ___ Unsure___
Mouths or licks objects and people	Yes ___ No ___ Unsure___
Smells objects and people	Yes ___ No ___ Unsure___

Behavior, Learning & Social Issues

Craves predictability	Yes ___ No ___ Unsure___
Engages in repetitive play	Yes ___ No ___ Unsure___
Doesn't understand concept of personal space	Yes ___ No ___ Unsure___
Has difficulty joining group activities	Yes ___ No ___ Unsure___
Has difficulty with transitions between activities	Yes ___ No ___ Unsure___
Difficulty initiating and completing tasks	Yes ___ No ___ Unsure___
Struggles with sequencing activities	Yes ___ No ___ Unsure___
Poor organization, loses things frequently	Yes ___ No ___ Unsure___
Easily overwhelmed or frustrated	Yes ___ No ___ Unsure___
Frequently tunes out or withdraws	Yes ___ No ___ Unsure___
Frequently acts out or tantrums	Yes ___ No ___ Unsure___

Please fill out for your student and return to _____

Disclaimer

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CHAPTER 6. CONCLUSION

For this project, the purpose of the research was to determine the effectiveness of brain breaks on middle school students diagnosed with sensory processing disorder. A handbook was created to help educators with limited knowledge of sensory processing disorder and strategies such as brain breaks to help students diagnosed with SPD. Research was conducted using a needs assessment survey for educators to complete. The purpose of the survey was to answer three questions: What do special education and general education teachers know about sensory processing disorder? What are the perspectives of general education and special education teachers about the effectiveness of brain breaks for middle school students with sensory processing disorder? How do special education and general education teachers incorporate brain breaks into the classroom for middle school students with sensory processing disorder? The data from these questions helped guide the creation of the handbook and gave teachers new strategies to help give students with SPD kinesthetic movement breaks.

Implications of Needs Assessment

The results from the needs assessment suggested that a majority of teachers believed that incorporating brain breaks into the classroom had benefits not just for students with sensory processing disorder, but for all students. Educators noted that their students seemed to pay more attention after they complete a brain break while another stated their students were more relaxed and ready to move forward with their learning. Another conclusion from the needs assessment was most teachers had a basic understanding of what sensory processing disorder is but not the full encompassing definition of SPD.

Limitations of the Study

Limitations for this study was the sample size as the survey was only given to 40 licensed teachers. Of the forty surveys given only sixteen (40%) teachers completed the anonymous needs assessment survey. If more teachers had responded, more data could have been analyzed and used for the creation of the handbook. The small sample size of forty teachers also lacked diversity which could have caused some bias in responses. Input from students on the effectiveness of brain breaks was also missing which could have provided more insight and been beneficial to the creation of the handbook. A Likert Scale was used for seven of the questions and the remaining six questions were short answer responses. When the multiple choice Likert Scale was used as a question, respondents were more likely to answer the question as opposed to the short answer questions. The questions with short answer responses had more respondents skip the question or give very general answers. If given the choice to redo the survey, more multiple choice questions using the Likert Scale would be used because more teachers responded to these types of questions.

Strengths and Limitations of the Handbook

The use of the handbook is for teachers to gain knowledge of what sensory processing disorder is and how to help students that are seeking kinesthetic movement to help refocus in the classroom. Many teachers can benefit from the handbook because after reviewing the needs assessment survey there is a lack of knowledge of SPD and how to help those students. The handbook is an easy and quick read that provides educators with a background knowledge of SPD and brain breaks. The handbook also gives 10 strategies to use in the classroom to help refocus students. The 10 strategies in the handbook not only benefit students with SPD but all students who need movement to refocus and be academically successful.

Limitations of the handbook include lack of input from the students themselves and how they see brain breaks as beneficial. Approval for student input would have been a relatively time consuming practice as the students were minors and parent consent would have been needed to complete the survey. The Institutional Review Board (IRB) would have also needed to make sure the rights of the minors were protected so they could have participated in research activities and approval from IRB could have been a lengthy process.

Recommended use of the Handbook

Through the research presented in this study, a handbook was created to share knowledge about the topic of sensory processing disorder and the benefits of brain breaks in the classroom. Many educators can benefit from this handbook because as the needs assessment survey proved that most educators lack the basic knowledge of sensory processing disorder and how it effects their students. The handbook provides a basic explanation of sensory processing disorder and even offers a checklist for educators to use to determine if a student may have symptoms of SPD. The handbook offers 10 brain break strategies to use for those students who are craving movement and research has shown the benefits of movement for all students not just those diagnosed with SPD.

Suggestions for Future Research

The results of the needs assessment survey suggest that most teachers find brain breaks to be effective for students. For future research, it would be important to see if there was a higher effective rate for students if educators had background knowledge of SPD before implementing brain breaks in the classroom. Other future research could also involve students of different ages to see if brain breaks are more or less effective on elementary or high school age students. Also

adding more than 10 brain breaks into the handbook would also be beneficial for educators to have an abundant number of strategies to use for kinesthetic movement in the classroom.

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APPENDIX A: NEEDS ASSESSMENT QUESTIONNAIRE

Instructions: Please complete the following questions in a comprehensive manner to the best of your knowledge and ability. You will not be asked to share any personal information. When you have finished the survey, please submit online with answers being submitted anonymously. All completed surveys will be kept confidential. Thank you for your participation and time completing this survey.

What are brain breaks? Brain breaks are brief activities (2-10 minutes each), taken at regular intervals during instruction, and are used to achieve optimal learning. Brain Breaks are best when they are physical, as they allow blood and oxygen to move to the brain. They allow the brain to re-focus on learning, giving students an academic boost.

Demographic Questions:

1. How many students are diagnosed with Sensory Processing Disorder in your class? ____
2. How many students, in previous teaching years, have you taught with Sensory Processing Disorder? _____

Multiple Choice/Short Answer Questions:

1. Do you have any prior knowledge of Sensory Processing Disorder?

Extremely familiar	Very familiar	Somewhat familiar	Not so familiar	Not at all familiar
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Write all you know about sensory processing disorder

2. How would you define sensory processing disorder?

3. Do you currently implement brain breaks?

Always

☐

Usually

☐

Sometimes

☐

Rarely

☐

Never

☐

4. Do you use a specific brain break program? If so which one? _____

☐

Yes

☐

No

5. How do you typically implement brain breaks into your classroom?

6. Have you observed the effectiveness of brain breaks on student learning or improved behavior?

Always

☐

Usually

☐

Sometimes

☐

Rarely

☐

Never

☐

7. How would you describe how your students respond to the brain breaks?

8. How many days do you implement brain breaks in one week?

Monday	Tuesday	Wednesday	Thursday	Friday
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

9. How many times do you implement brain breaks in one class period?

0 Times	1 Time	2 Times	3 Times	4+ times
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

10. How effective do you believe brain breaks are on student learning or behavior in the classroom?

Extremely Effective	Very Effective	Somewhat Effective	Not so Effective	Not at all Effective
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Explain your response to Question #12.

APPENDIX B: RECRUITMENT LETTER

Dear Staff Member of [REDACTED] Middle School,

My name is Taylor Autrey. I am a teacher at [REDACTED] Middle School and a graduate student at Purdue University Fort Wayne. I am requesting your assistance with my research, a critical component in the completion of my Master's program in Special Education.

You are invited to complete a needs assessment questionnaire about your knowledge of the brain breaks. This survey is optional and will be kept confidential. You will not be asked to provide any identifiers or personal information. This one-time questionnaire will take you no longer than ten minutes to complete and your answers will be beneficial to my study. Once the questionnaire is collected, they will be stored in a locked filing cabinet in my classroom. The questionnaire will be disposed of once the study is complete. Our principal, [REDACTED] has approved this study.

I appreciate your participation and your time taking this needs assessment questionnaire. Please feel free to contact me with any questions at [REDACTED] or taylor.autrey@fwcs.k12.in.us. You may also contact my professor, Dr. Jeong-il Cho, Ph.D. at [REDACTED] or choj@pfw.edu. Thank you for your time and attention.

Special Education Teacher

[REDACTED] Middle School

APPENDIX C: SUPPORT LETTER FROM PRINCIPAL



WE OUR YOUR SCHOOLS

September 27, 2019

To Whom It May Concern:

Taylor Autrey has asked me to allow our staff to participate in her needs assessment study regarding my staff's knowledge and understanding of brain break and its effectiveness in the classroom.

Taylor is a teacher at [REDACTED] Middle School, and I welcome the opportunity to have her complete the required research at [REDACTED] Middle School.

Sincerely,

[REDACTED]

[REDACTED], Principal

[REDACTED] Middle School



[REDACTED]

APPENDIX D: NEEDS ASSESSMENT SURVEY TIMELINE

September 16, 2019- Ask permission of Principal at [REDACTED] Middle School to send a survey to his staff

September 19, 2019- Finalize survey questions and recruitment letter

October 14, 2019 - Submit IRB Application

November 11, 2019- Email recruitment letter and survey to all participates

December 9, 2019- Collect all completed surveys and begin to analyze data

2020- Organize data

2020- Use result of data to complete Chapter

APPENDIX E: CITI TRAINING COMPLETION REPORT



Completion Date 15-May-2019
○ Expiration Date 15-May-2023
Record ID 31608539

This is to certify that:

TAYLOR AUTREY

Has completed the following CITI Program course:

Human Research

(Curriculum Group)

Group 2.Social Behavioral Research Investigators and Key Personnel

(Course Learner Group)

1 - Basic Course

(Stage)

Under requirements set by:

Purdue University



Verify at www.citiprogram.org/verify/?w245e16c9-5e28-468a-b8c9-e06d1ff4b31d-31608539

APPENDIX F: IRB APPROVAL

Date: 10-31-2019

IRB #: IRB-2019-544

Title: MINDS IN MOVEMENT: A STUDY OF THE BENEFITS OF BRAIN BREAKS FOR STUDENTS WITH SENSORY PROCESSING DISORDER

Creation Date: 10-27-2019

End Date:

Status: **Approved**

Principal Investigator: JEONG-IL CHO

Review Board: Exempt Reviewer

Sponsor:

Study History

Submission Type	Initial	Review Type	Exempt	Decision	Exempt
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Key Study Contacts

Member	JEONG-IL CHO	Role	Principal Investigator	Contact	cho93@purdue.edu
Member	Taylor Autrey	Role	Primary Contact	Contact	taautrey@purdue.edu

APPENDIX G: TIMELINE OF THE PROJECT DEVELOPMENT

September

Week 2- IRB Rough draft, Final Timeline and begin 5-page proposal

Week 3 – Find at least 5 articles for Lit Review and begin draft

Week 4 – Find 5-10 more articles for Lit Review and continue draft

- begin working on Methodology and Introduction

October

Week 1 – Draft Special Project Proposal for SPED committee

- Introduction, Lit Review, Methodology

Week 2 – Final Draft Special Project Proposal done

Week 3 – First 5 pages of Lit review done

Week 4 – IRB Final Application done

November

Week 1 – Finalize first 5 pages of Methodology

Week 2 – Begin working on PowerPoint slides

Week 3 – Final draft of Chapters 1, 2, & 3

Week 4 – Send survey questions to teachers

December

Week 1 – Finish PowerPoint

Week 2 – PowerPoint presentation on chapters 1-3

Week 3 – Begin review data from surveys

January

Week 1 – Begin design of Special Project

Week 2 – Finish Abstract, dedication, acknowledgements, table of contents, timeline, & resume

Week 3 – Finish chapter 4 Results

Week 4 – Continue Special Project/Chapter 5

February

Week 1 – Proposal and submission of the Purdue Fort Wayne Student Research and Creative Endeavor Symposium

Week 2 – Chapter 5/Special Project first 3 pages of each chapter

Week 3 – Begin Discussion/Reflection/Chapter 6

Week 4 – Revise Chapters 4-6

March

Week 1 – Draft symposium presentation with poster and PowerPoint

Week 2 – Submit PDF poster to the symposium

Week 3 – Draft handbook all chapters, references, appendices and one-page resume

Week 4 – Final copy of special project submitted to PFW

April

Week 1 – Draft of PowerPoint presentation

Week 2 – Submit PowerPoint presentation and revise special project for approval

Week 3 – Present special project to peers and Special Education Department

Week 4 – Final revised version of special project submitted

VITA

TAYLOR AUTREY

SPECIAL EDUCATION TEACHER

resume objective

Special Education Middle School Teacher with 4+ years of experience managing classrooms of 20-25 students. Licensed K-6th elementary teacher and P-12 special education teacher in state of Indiana, and with a B.S. Elementary Education and Masters in Special Education. Seeking a position where I can motivate and encourage student growth through carefully monitored academic progress.

professional experience

SPECIAL EDUCATION TEACHER

Jefferson Middle School / Fort Wayne, IN / 2017 - Present

- Prepare and administer regular subject tests to 24 students, complete with detailed quarterly progress reports for parents
- Create and adapt lesson plans according to students' academic needs, including both individual and group work
- Identify IEP goals and progress in reading, writing and math
- Create progress monitoring reports at the end of each quarter
- Update and compile data to use for annual case conferences for a caseload of 20+ students
- Hold annual case conferences, initial, move-in, re-evaluation and behavior plan review conferences multiple times a year

THIRD GRADE TEACHER

Prince Chapman Academy / Fort Wayne, IN / 2016 - 2017

- Designed and implemented daily lesson plans for classroom of 26 students
- Met with parents, guardians, administrators, and counselors to address and resolve students' behavioral issues

education

M.S.Ed SPECIAL EDUCATION

*Purdue University,
Fort Wayne, IN*

2018 - 2020

B.S. ELEMENTARY EDUCATION

*Olivet Nazarene University,
Bourbonnais, IL*

2004 - 2008

key skills

Lesson Planning

Accuracy and Attention to Detail

Classroom Management

Differentiated Instruction

Active Listening

Organization

certifications

INDIANA ELEMENTARY GENERALIST

K-6TH

2015

SPECIAL EDUCATION MILD

INTERVENTION

P-12

2019