

The Use of Sensory Integration Techniques during Instruction
for Children with Autism Spectrum Disorders

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McPherson Elementary School

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Action Research Plan

Action Research Question

What happens when sensory integration techniques are used during instruction to improve attending skills during reading for Children with Autism Spectrum Disorders (ASD)?

Sub-questions

1. What does attending to task look like for my students?
2. What does non-attending look like for my students individually?
3. How will I tell the difference between non-attending sensory behaviors and avoidance behaviors for each student?
4. What sensory integration techniques will I use and how and/or when will I use them?
5. Do I see any other changes when I use sensory integration techniques during instruction?

Context

I teach an Instructional Autism Spectrum Disordered classroom in a large urban school district. My school is a pre-K to 8th grade elementary school for regular education and my program is housed in this school. This

provides us many opportunities for inclusion. For example, all of my students attending Gym, music, library, and computers with their regular education peers. When appropriate, our students are included for academic areas also. We are visible in the neighborhood in which my school is located. The neighborhood sees us out and about like the other students in the school. Sometimes, they will see us with the other students in the school. There has been a decrease in student enrollment in my school due to the gentrification of the neighborhood. It has become much more expensive to live in this neighborhood, so many families have had to move out.

My classroom is designed to meet the needs of children with Autism Spectrum Disorders (ASD). I have seven students, 5 boys and 2 girls in grades kindergarten to third grade. I have one kindergartner, 3 first graders, 2 second graders, and 1 third grader. Each of my students falls on the ASD spectrum.

The local school counsel (LSC) is active in my school. They have regular meetings to discuss the successes and areas of improvement for the school on a regular basis. The LSC consists of teachers, administrators, parents, and residents of the neighborhood. This make up of people provides a balance of representation of all who are involved or have concerns with the school. The faculty and staff are quite close and there is much collaboration.

There are bi-weekly grade level meetings and biweekly staff meetings that take place in the morning before the students arrive. The environment is a positive one, which helps students' attitudes and achievement. The administration is available to ensure this cohesiveness. Many wonderful things have been accomplished due to this attitude. For example, a student of our school died unexpectedly. Due to the efforts of two teachers, they were able to organize the faculty in building a garden at our school in his memory. This was successful because everyone, especially students, were involved in the construction. The end result was a beautiful garden that won 3rd place in a mayoral contest. This school is about students and for students. Another example that must be mentioned is that the entire faculty pooled money together to help another of our students purchase a bed. This student was very ill and his old bed was making things more difficult for the family. The bed purchased by the family helped to provide comfort for the child in his last days alive. This student passed away soon after the bed was purchased for him.

For each of my students, progress is measured by their Individual Education Plans (IEP), The IEP dictates the student's instruction and where they will be placed for services. The IEP is developed by a team that consists of the parents, teachers (both special and regular education), school

counselor, speech and language pathologists, occupational therapists, and any other professional that is needed to develop an IEP and meet the child's individual needs. Each student, in addition to my classroom, also receives speech and language services and occupational therapy. Nursing and Social Work services are available if necessary depending on the student's needs. Students are assessed by how they are progressing toward their IEP goals, portfolios, and parent interviews.

As a part of their instruction, we go out into the community on functional skills field trips. I tap into a variety of skills, at a primary level, that will help the children be members of their communities and neighborhoods. Field trips we have taken include going to a restaurant, Christmas shopping at a dollar store, going to the grocery store, and using the public transportation system. My students typically do not like to be around people; these field trips help to prepare them for these types of experiences.

One very important aspect that makes my program successful for my students is parent involvement. Parents go on field trips, help with parties, and attend assembly performances. We participate in the Holiday Winter Show and the Spring Fling Show and any other school functions that may arise. All of this programming prepares my students for their future, but is

also aligned with the intermediate classroom and the upper grade classroom. We work collectively to ensure that our students are getting the best services and educational experiences they deserve.

Rationale

Children with Autism Spectrum Disorders (ASD) have sensory integration difficulties, which result in low ability to stay on task, lack of impulse control, and many other behaviors that may seem unusual. The various types of sensory deficits include, tactile, vestibular, kinesthesia, flexion, extension, equilibrium, motor planning, and bilateral motor coordination. Tactile refers to the sensory messages received through touch and is important in motor planning. When there is deficit in this area, students may misjudge the distance of where something is that they may be reaching for. Vestibular is a mechanism located in the inner ear and is important to movement. When a student has deficits in this area, they may trip or fall when they change the position of their head. Kinesthesia (proprioception) is information from inside the body from muscles, joints, and ligaments. This can look like difficulty walking and bumping into things because students are unaware of their space in the environment. Other deficits that occur are more for motor planning. These motor deficits are best

addressed through occupational therapy services and involve balance and coordination.

One area in which my students, who are all on the Autism Spectrum Disorder spectrum, struggle on a daily basis is the area of sensory integration. When these deficits manifest, the students may display odd behaviors, such as hand flapping, odd noises and grimaces, acts of aggression, and eye movements. There are many more of these behaviors, but the ones listed are easily observable. My area of concern is meeting these deficit areas during their instruction. These sensory deficits have a large impact on students' learning and can take them away from their instruction. Also, I believe that when these needs are addressed during instruction, it will not only impact their ability to attend, but also generalize to everyday activity, help reduce the odd behaviors, and provide strategies to have their sensory needs met in a less obvious manner.

For the purpose of this research, I am going to focus on sensory deficits. It is important to note that when a sensory issue arises, the behaviors can be misleading. For example, when a student is having what may appear to be a tantrum, it could simply be a sensory issue of kinesthesia (information from inside the body).

When a sensory deficit of this type occurs, I try to meet that need using various techniques. I will provide a deep pressure massage, applying pressure to their arms, joints, or torso similar to a bear hug, or provide them with a weighted vest. These techniques help students integrate the information they are receiving and relax. Students with ASD have sensory deficits throughout the school day.

Typically during the school day, when a student needs a sensory break or sensory integration technique, one is given. This removes them from the instruction and can result in skills not being taught. My idea is to provide sensory integration techniques during instruction instead of removing students from instruction. Examples of how this might work are to provide a weighted vest, deep pressure applied by squeezing on the forearms of the student in need, or provide a therapy ball for the student to sit on during instruction. I believe that providing the sensory integration technique during instruction will help my students to attend to task and learn the skills they need rather than miss out on critical learning time.

Ethics and permission needed

My research will include all of my students because they all have sensory deficits, they just manifest in a variety of ways. Each child will be a part of the baseline data collection and the intervention. I began by sending

home a permission slip to all parents. I briefly described my research, what my intended intervention is, and wrote about the possible need for pictures and video. All of my parents have returned the permission slip, which has provided me with their permission to use their children in this research.

Once I have completed the research, it is my intention to share the information with other teachers who serve children with ASD. This group of teachers includes regular and special education, also, administration.

Ethically speaking, this research is all about improving student learning, and therefore will benefit and not in any way harm my students.

Literature Review

Autism is a spectrum disorder. What that means is that there is an umbrella in which there are varying degrees and types of autism. In my work with children with Autism, I have worked with a variety and differing forms of Autism Spectrum Disorder (which is how it is referred in the present).

Basically, in simple terms, Autism Spectrum Disorder (ASD) is a social communication disorder. Children with ASD lack the ability to pick up on social cues for example, gestures, facial expressions, voice tone, and other means of communication. Hetzroni and Shalem (2005) state, children with autism demonstrate difficulties in communication skills, verbal skills, communicative initiation, and social communicative behaviors. Some

children with ASD are non-verbal where as others may be quite verbal and able to request their wants and needs using language. Hetzroni and Shalem (2005) explain that augmentative and alternate communication strategies may enhance their means to communicate and provide them with acceptable means of communicating with people, helping them to become independent and to have influence over their environment. Hetzroni and Shalem (2005) also state that graphic symbols such as line drawings, photographs, or pictograms are often used. Children with ASD who are non-verbal can be taught to use pictures to communicate. The Picture Exchange Communication System (PECS) is a method often used to help non-verbal children with ASD to communicate.

PECS is a system where children are taught a vocabulary using pictures. As the student progresses in the program, they are able to form sentences using pictures, for example, I want pencil. Here there is a picture for I want and then a picture of a pencil. They place these pictures side by side on a sentence strip and then hand the sentence strip to the person they are requesting the pencil from. Like all children, children with ASD will make requests for things they cannot have or it is not time for. The person who they hand the sentence strip to can say “No” if that is an appropriate response. For example, they child may ask for a piece of candy at a time

when it is not appropriate to receive candy. The use of PECS gives our non-verbal students a voice and can help in decreasing acting out behaviors because they are more able to have their wants and needs met.

Children with ASD can have behaviors that to some may seem odd. Conroy, Asmus, Sellers, and Ladwig (2005) tell us that as the incidence of children with ASD increases, there is a parallel increase in the number of children with ASD served in general education classrooms. Since more children with ASD are being educated in the general education classroom, it is important that the odd behaviors these children can have be addressed. These behaviors can interfere with their education and are the result of sensory integration deficits. These behaviors range from hand flapping to grunts and grimaces to acts of aggression. Aggression can happen in the form of tantrums, hitting, kicking, biting, and the list goes on. I have found in my work with children with ASD, that many of these odd behaviors are a result of too much sensory input at once. Conroy, et al. (2005) state that to facilitate the success of children with ASD in general education settings, it is essential to identify strategies teachers can use to reduce the occurrence of (these) behaviors in these settings. Current research on these children suggests that their learning will be facilitated by strategies to help reduce these disruptive behaviors.

Children with ASD may have deficits in the ability to sort out everything that comes at them at once. It becomes overwhelming and as a result a child may hand flap, act out aggressively, or withdraw from what is happening. Janzen in her book, “Autism: Facts and Strategies for Parents” tells us that ASD is sometimes called a sensory integration disorder, which is an inability to process and respond to incoming sensory information efficiently or effectively (1999). When this occurs, there are a variety of techniques that can be used to help calm the person. These techniques are typically used in the form of a sensory break. This is where the child is removed from the situation and a sensory integration technique is used to help them.

Sensory integration techniques involve movement activities and various forms of pressure and desensitization activities (Janzen, 1999). Pressure techniques are in the form of tight hugs, rolling a student in a blanket tightly, brushing on the arms and back with a sensory brush, and there are many more examples that one can find in catalogues that specifically address sensory needs. These techniques also desensitize students so they are able to relax and be calmer in order to help sort all of the sensory input they are receiving. For example, during instruction, a student may appear to becoming agitated and try to hit, bite, or may become self-

injurious. When this happens, the teacher may remove the student and provide a sensory break. During the break, the teacher may apply a deep pressure massage, which helps the child to calm down and be able to sort out the input that is bombarding them. This break could take up to a half hour or maybe longer. This removes the student from instruction and delays their learning of skills. Janzen (1999) tells us that the use of sensory integration techniques helps to normalize the sensory system and helps many children with ASD live more comfortably as they learn to tolerate and process sensory information more reliably. Children with ASD being able to regulate their sensory system will help them to integrate into the general education classroom and setting.

In this research, my goal is to be proactive when these sensory issues arise. What I mean is, when a student begins to show agitation, I will provide them with a sensory technique that is appropriate for that student. For instance, I will apply deep pressure to a student's forearm and continue to teach while doing this. So, while teaching vocabulary, I will apply the pressure and with my other hand continue to present the vocabulary. I do realize that my current classroom is an instructional classroom designed specifically for children with ASD who are unable to be in the regular education classroom. My goal in giving sensory integration during

instruction is to not only teach my students new skills, but also teach them ways to manage their sensory needs on their own and not be disruptive to a classroom, and to give them maximum instructional time.

What I am doing with this research is bring the child with ASD to the next level in regards to meeting their sensory needs. This is another step closer to including them in the regular education classroom. Currently, my students are included for gym, computer lab, library, music, assemblies, lunch and when able, the regular education classroom for academics. This allows my students to practice self-monitoring and to be able to take care of their sensory issues while still with an adult (classroom aide) who can help them through the process.

Even the lowest functioning child with ASD can be taught to monitor their sensory needs. It takes time, but it is possible. It is necessary for them to learn to take care of this because there is not always going to be someone with them that not only understands their sensory needs but also, can help them through the process. What this means for us is that we have even more people in our already diverse world, to contribute to life and the world. They do have a place.

Data Analysis/Interpretation

I have chosen to collect my data on attendance, by looking at 4 defined areas. These areas are, on task, noise, motor, and off task. On task is defined as the student engaged and working on the task(s) placed before them to complete. Noise is defined as the student talking, making noise instead of completing the task(s) placed before them. Noise comes in the form of echolalia, grimaces, banging, and others. Motor is defined as being out of seat, running from seat due to lack of impulse control, scooting chair away from the table, etc. Finally, off task is defined as looking off to the distance, staring at an object, playing with hands or other objects that keep the student from completing their work (tasks).

Many behaviors that are considered noise, motor, and off task, can be perseverated behaviors. This means they are repetitive and difficult to stop so the student can be on task. For example, a student may continue to make the same statement over and over again and it is difficult for the student to stop, but it is even more difficult for the teacher to give the student alternatives so that they will stop. The perseverating behavior may be more enjoyable for the student.

To collect my data, I took 3-minute samples during reading instruction. Reading instruction occurs in the middle of the school day starting at 12PM and ending at 1:15PM. There are four settings the students

are in during reading. These settings are IEP (each student has an Individual Education Plan (IEP) that has their specific goals for reading that are unique to that student) instruction at the worktable, work systems, computer, and books or LeapPad learning centers. During IEP instruction the students and I are working on their IEP goal(s) for reading. For example, one of my students has an IEP goal for comprehension of written text goal. During IEP reading instruction, the student and I are working on his comprehension of text. For work system instruction, each of the students has their own three-drawer work system that relates to their individual needs. For example, one of my students work system has in drawer one, filling out their name, address, and telephone number, in drawer two, a handwriting page to help reinforce proper letter formation and size, and in drawer three, a book where they have to attach pictures that represent what the story is about on each page. Computer instruction consists of the students typing their name, address, and telephone number. Also during computer time, the students each work on what is known as the DT (discreet trial) Trainer. This program teaches the students addition and subtraction facts, word identification, colors, and other skills using a discreet trial format. As the students learn and improve, the DT Trainer will increase in difficulty. The program teaches the students by displaying the problem with choices for an answer. If the student

chooses the incorrect answer, the program will show the correct answer and prompt the student again. If the student chooses incorrectly again, the answer will be shown and when the prompt is displayed again with the answers, the correct answer will be larger than the other answer(s). When a child chooses the correct answer, the student will earn a token. Each student has to earn a certain number of tokens, based on their individual level, to earn a visual reward. An example of a visual reward is a film of a train going down the track. The final piece of reading instruction is using books or Leap Pad learning centers. Here the students look at and read books or use a Leap Pad learning center to have a book read to them. I only took data on each student during the reading instruction on IEP goals because I was not thinking about the impact using sensory integration techniques would have on my students during the other three areas of reading instruction.

During my first round of baseline data, I found my data to be non-reflective of some of my students. Just looking at on task behavior, I found the following:

Mickey	on task	56%*
Nicholas	on task	81%
Siyavash	on task	17%
A.J.	on task	81%*

Kazz	on task	100%
Emily	on task	81%*
Noah	on task	97%.

I believe the data for Mickey, Emily, and A.J. is inaccurate. Just from my knowledge of the students and working with them, I know that their off task percentages are high. The percentages for Nicholas, Siyavash, and Kazz are accurate from the knowledge I have of these students and working with them. Due to these beliefs, I decided to re-do my baseline data and attempt to find out why I felt that my current data was inaccurate.

I did a further two week data collection using the same measure of 3 minute samples during reading instruction using the same 4 measures of attending behavior, on task, noise, motor, and off task. This time however, I took the attending data during each of the four settings during reading instruction, IEP, work system, computer, and books or Leap Pad learning centers. The data this time provided me with a better and more realistic view of each of my students attending. During this baseline data collection, I found:

Mickey	on task	17%*
Nicholas	on task	65%
Siyavash	on task	17%

A.J.	on task	52%*
Kazz	on task	100%
Emily	on task	49%*
Noah	on task	100%.

As you can see, from the first baseline to the second, there is a significant difference for each of the students with * by their names. Mickey was originally at 56% on task when actually a more accurate measure is 17%. A.J. went from 81% to 52%, which is also more representative of his on task behavior. Finally, Emily went from 81% to 49% on task, this is also more representative of her on task behavior.

I realized that there are two major differences between the first sample of baseline data and the second. During the first sample, I only took attending data during IEP instruction with me. Also, during the first sample, I was already using interventions for my students to improve their attending. I was using sensory integration techniques during instruction with my students out of instincts that I had developed from working with this special population of students. During the second sample, I increased my samples to include all four reading instruction settings and became more aware of what I was doing to improve attending. At the same time, I refrained from providing sensory integration techniques during instruction and instead,

provided the students with sensory breaks which removed them from instruction. In other words, I provided a baseline situation similar to that which would be used in most special education classrooms serving children with ASD.

The sensory integration techniques I have used for my intervention data collection are, weighted vests, deep pressure holds, a bumpy inflated disk for the students to sit on, and chew toys. My initial findings are quite positive for each of my students. I took my data randomly during different aspects of reading time. Data collection days were chosen randomly and not every student was observed each data collection day because my students have other classes they attend to serve their needs. This preliminary data was collected for 3 weeks and I observed my students ability to attend in all 4 reading centers. While my students were in their independent working centers, I would sit and observe their attending behavior and when a sensory issued occurred, I would provide one of the sensory integration techniques used in this research. My preliminary findings are:

Mickey	on task	32%
Nicholas	on task	96%
Siyavash	on task	84%
A.J.	on task	43%

Kazz	on task	97%
Emily	on task	92%
Noah	on task	96%.

I found that implementing sensory integration techniques during instruction over the 3-week period has significantly increased attending for Mickey, Siyavash, Nicholas, and Emily. A.J.'s attending has decreased by 9 percentage points, I believe this is due to him being frustrated by his new toilet training program. He has to go to the restroom more frequently to attempt using the toilet and he is no longer wearing pull-ups, but real underpants. Given this change, I believe he is adjusting and continued data collection and use of interventions will increase his attending also. Any decrease in attending for Kazz, and Noah are just natural changes in their abilities to attend on a given day and you can see they both still maintain high percentages in their ability to attend to task.

Further data collection will be necessary to determine if the sensory integration techniques do increase attending or if the implementation of these techniques has only a short-term effect due to the change in instruction. Further data collection will provide me with the necessary knowledge to see if sensory integration techniques do in fact impact attending positively or if they were just a temporary improvement from non-

sensory integration techniques, for example; verbal reminders, positive praise, and rewards, which are consistently given to the students for making good choices. Further data collection might also show whether or not there is improvement in learning.

My preliminary findings are positive. I think that looking at the first baseline sample appears to be a predictor of what may happen when interventions are introduced. Two of the three students whose percentages were higher than I expected during the first sample, but were what I expected in the second, increased their on task percentages during initial intervention. One of the three students attending actually went down 9 percentage points. I believe the reason for this was that the student had begun toilet training.

The interventions introduced were a weighted vest, bumpy inflated disk, deep pressure holds, and chewy toys. In my preliminary findings, they seem to be effective. The increase in student attending could be caused by one of two factors. First, the inclusion of sensory integration techniques during instruction in all four reading areas could have promoted the increase in attending. It could mean that actually providing the students with sensory integration techniques, during instruction helps the students to maintain on task behavior. Second, there may be a honeymoon effect, which implies that

the change in technique is new and provides a temporary increase in on task behavior. To better understand this issue, more data will be collected over a longer period of time to see what is causing the increase in attending. In the future, longer samples will be collected to see if the sensory integration techniques help the students stay on task for a longer duration. I would also like to see if the same positive effect occurs in other areas of instruction, for example, Math, science, and social studies.

My final data analysis and interpretation showed that in fact, student on task behaviors improved when sensory integration techniques were used. This final data is a combination of the three-week preliminary data and three additional weeks of data collection showing a total of six weeks of data, in other words, all the data collected on their behavior while using sensory integration techniques. The final data shows:

Mickey	on task	72%
Nicholas	on task	98%
Siyavash	on task	82%
A.J.	on task	73%
Kazz	on task	90%
Emily	on task	93%
Noah	on task	98%.

Looking specifically at Mickey and A.J.'s percentages, I have found a significant increase in their attending, when compared to preliminary findings. The rest of the percentages were either the same or very close to the percentages in the preliminary findings. As a result, I find that the use of sensory integration techniques during instruction improved student on task behaviors during reading instruction.

It is important for me to elaborate on some of the experiences I observed from my students. Emily has become more aware of her sensory needs. She now will not sit down at the worktable until she finds the inflated bumpy disk. She knows she is able to stay on task longer if she uses the disk. I also have students who are requesting sensory interventions during their instruction before they have a sensory melt down. Siyavash now will ask for "squeeze" which is when I apply deep pressure to his forearm. He likes this intervention and I can see the relief on his face and body when this intervention is used. These interventions help the students sort out all of the sensory input that comes at them and they are much more calm and attending is much easier for them. My little guy who was toilet training, made it through the process and is toilet trained. He also requests "squeezes" by placing his arms on the table and moving them close to my hands. He is non-verbal and this gesture is his way of saying, "Help me". Another gesture

he makes is, he places his arm in my hand and moves it up and down so I hit the area he needs the most pressure. He likes his upper arms and elbows squeezed the most. It is exciting to see my students become more aware of their own sensory needs and begin to make requests to have these needs met or seek out positive ways of having these needs met. I am so proud of my students for being able to help themselves learn better.

My findings are exciting, not only are my students wanting sensory integration used during instruction, they are asking and looking for it. The looks on their faces tells the story when relief is in their eyes and their body language. To watch a struggling child take a breath, relax, and be able to function in order to attend to tasks is beautiful. The data shows that on task behavior does improve when sensory integration techniques are used during instruction. It is valuable and necessary for their success both academically and socially. Using these techniques will help with inclusion with regular education classes. Students being aware of their sensory needs and knowing how to address these needs, will take the burden off the teacher to develop sensory integration techniques because the student will be able to take care of these needs on his or her own. Teachers will only need to provide the sensory menu for children with Autism Spectrum Disorders to have access to.

Policy Implications

1. These children are a part of our schools and need the necessary support to learn and be included with their regular education peers. This means more funding for sensory integration materials, teacher assistants to help students integrate, and more training for teachers in the area of Autism Spectrum Disorders and sensory integration.
2. 1 out of every 166 children will be labeled on the Autism Spectrum Disorder spectrum. This means that classrooms, teachers, speech pathologists, occupational therapists, and classroom aides are needed in every school that serves children with Autism Spectrum Disorders. Many of these services in the private sector are extremely expensive and not available to most families. Public schools must provide for these families.
3. Many health insurance programs will not pay for outside services for these children and it is important that early interventions be put in place as soon as a diagnosis is given. This shows that there is need for early childhood classrooms designed to meet the needs of these children and their families.

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