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Creating a Sensory Friendly Classroom

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A Scholarly Project

Occupational Therapy Doctorate

APPROVAL

This scholarly project submitted by **Kaitlynn Stearns** in partial fulfillment of the requirement for the Degree of Occupational Therapy Doctorate from the University of North Dakota, has been read by the Faculty Advisor under whom the work has been done and is hereby approved.

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4/15/2022 Date

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Sensory Friendly Classroom
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ABSTRACT

Purpose: Children's primary occupations are centered around engagement in their education through interaction with their learning environment and academic pursuits. In the school season months, children in Minnesota are spending roughly 935 hours at school annually (MARSS, 2020). The student's environment in school provides a number of sensory experiences that can either support or inhibit a student's ability to succeed in school. Many research studies have shown that children who have sensory needs that go unmet can display disruptive behaviors and will typically withdraw from engagement in their education (Dean et al., 2017). The purpose of creating the *Sensory Friendly Classroom* is to ensure that sensory needs of all students are met to ensure that they are reaching their full potential in their educational pursuits.

Methods: In order to create the *Sensory Friendly Classroom,* an in-depth literature review was completed to ensure that all relevant information pertaining to children's environments in school, the role of occupational therapy in school, and sensory needs of children was gathered prior to development of the project. Main findings supported the idea that creating a more inclusive sensory experience in the general education classroom not only aligned with the language written into the Individuals with Disabilities Education Act, but also would provide higher engagement and success for all students [(Bar-Shalita et al., 2008) (Kinnealey et al., 2012)]. The project was guided by the Ecology of Human Performance (EHP)which describes the interaction between the person, their context, and the tasks they need and/or wish to engage in (Dunn, 2017).

Conclusion: Overall the *Sensory Friendly Classroom* was developed in collaboration with a midwestern elementary school classroom to ensure that all students have the opportunity to reach their full potential in the educational setting. Through allowing children to have their sensory

needs met in each context of their education that they engage in on a daily basis, children are better prepared to reach their full individual and academic potential.

CHAPTER I

INTRODUCTION

Children who are elementary aged spend a majority of their day in schools and within the walls of classrooms. This means that one of their primary occupations is participation in education. However, this concept does not solely relate to education in the sense of academic-related task, it also describes their ability to simply be within the classroom and engage with their teachers, peers, and their environment. The actual classroom environments provide a wide variety of sensory experiences for students or sometimes, lack thereof. When children who have differences in sensory processing are placed in such an environment with overstimulating sensory experiences in one sensory system and under-stimulating sensory experiences in another sensory system, their sensory needs can go unmet and the child may therefore demonstrate disruptive behaviors (Mills et al., 2016).

Based on the language written into the Individuals with Disabilities Education Improvement Act (IDEA) which was revised in 2004, it is required that students receive supports that allow them to participate in their education in the "least restrictive environment" (Kinnealey et al., 2012). This reiterates the importance of providing modifications-including sensory modifications-and helping students learn strategies so that they are able to participate in their education within the classroom alongside their peers.

The wide variety of sensory processing needs that any one individual may have is often times too complex and time consuming to address in depth with each individual. Therefore, the purpose of creating a sensory friendly classroom is to provide teachers with a guide to help them understand behaviors that are related to unmet sensory needs, and how they can provide these

students with opportunities to engage in sensory based strategies to achieve an optimal level of arousal in order to be a successful student.

The variety of sensory experiences that children engage with in the physical, social, cultural, and temporal contexts within the school setting presents an opportunity for modifications to be made to each context to further enhance student's abilities to succeed. The focus of this product was on developing potential options to modify or enhance each context in order to increase the performance range of students using the lens of the EHP model. Through understanding each context that a child interacts with during the day, combined with knowledge of how sensory processing can affect learning, modifications that can easily be implemented by teachers will enhance student success in the classroom. Collaboration between educators and OT practitioners falls within the scope of OT practice (AOTA, 2014). Therefore, by educating teachers on occupational therapy-based strategies in addition to the recognition of sensory processing difficulties, teachers are able to recognize and remediate possible unmet sensory needs of their students. Not only does this broaden the scope of the OT within the school setting, but it also allows for an ongoing collaboration between the educator and the occupational therapist.

Through the creation of a *sensory friendly classroom,* student's learning and ability to accurately and actively participate in their education would be enhanced. Evidence from the University of California San Francisco suggests that approximately 5-16% of school aged children have sensory processing patterns that differ from their neurotypical peers (Bunhim, 2013). This means that a much larger percentage of students than simply those who fall under the requirements for Individualized Education Plans (IEPs) or Section 504 accommodations, are being impacted by sensory needs. Because of this data combined with the requirements as stated within IDEA, it is appropriate that sensory needs for children be addressed in the least restrictive

environment which, in this case, is their general education classroom. Additionally, in-depth research studies such as that completed by Mills et al., have concluded that there is a relationship between disruptive behaviors and unmet sensory needs (Mills et al., 2016). Mills et al., (2016) found that when sensory modifications are allowed in the classroom as well as incorporation of sensory diet type activities, sensory seeking behaviors, which are often disruptive to the classroom environment, were decreased. In addition, the child's ability to sustain attention to adult directed learning increased (Mills et al., 2016). This information supports the concept that with increased sensory engagement opportunities as well as sensory modifications made to the general education classroom, students will better be able to participate in their learning and overall increase their engagement in their education.

The following chapters will assist the reader in developing a greater understanding of the purpose behind creating a *Sensory Friendly Classroom* and present the product itself. Chapter II provides a comprehensive literature review that was used to create the product itself. The literature review covers topics relating to, elementary aged children as learners, legislation that is in place to support this product, the role of occupational therapy in the school setting and the necessity of interprofessional collaboration, overall sensory experiences, and each context (physical, social, cultural, and temporal) as it relates to the school environment. The methodology behind creating the *Sensory Friendly Classroom* is outlined in Chapter III. Chapter IV describes the product itself giving an in-depth description of each component within the booklet as well as how it can be used by educators to enhance the student's performance range in the classroom. Chapter V provides a summary including implications for occupational therapy practice, strengths and limitations of the project, and recommendations for further study. The product itself, *Creating a Sensory Friendly Classroom,* can be found in Appendix A.

CHAPTER II

REVIEW OF LITERATURE

Elementary Aged Children as Learners

All humans engage in a variety of occupations every day that are necessary to bring meaning and value to their lives. Children's primary occupations center around their development into unique, independent, and successful individuals. These occupations fall into categories such as education, playing, social interaction, and self-care skills (AOTA, 2014). In the school season months, children in Minnesota spend roughly 935 hours at school annually where a majority of their time is spent engaging in the occupation of education (MARSS, 2020). Based on different states, children are required to meet different benchmarks and follow certain curriculum sequences. A majority of their day is spent learning different subjects including math, social studies, language arts, writing, science, and specialist activities including arts and physical education (Scherr & Morin, 2021).

Supportive Legislation

In order to ensure the success and engagement of all learners, there are numerous pieces of legislation in place. The Individuals with Disabilities Education Act (IDEA) was enacted in 1975 and sought to ensure that all students, regardless of ability, had access to free and appropriate public education, special education, and related services (Lipkin & Okamota, 2015). IDEA is broken down into four distinct portions that outline the specific guidelines found within this act. Part A outlines the general guidelines of IDEA as well as an extensive purpose and list of definitions found within the act (US Department of Education, 2020). Part B describes the portion of this act that pertains to providing children with disabilities access to "free and appropriate education in the least restrictive environment for all students aged 3 through 21

years" (US Department of Education, 2020). The third part of IDEA, or Part C, outlines the provisions for allowing infants and toddlers with disabilities to receive early intervention services for the child and their family from birth through age 2 (US Department of Education, 2020). The final component of IDEA is set in place to ensure that there is a constant means to improve education and training related to providing necessary services to both the children and their families in support of their academic pursuits (Lipkin & Okamota, 2015).

Within the guidelines of IDEA, schools are required to identify, locate, and evaluate children's potential need for services provided under IDEA guidelines (Lipkin & Okamota, 2015). If a child is evaluated and meets the requirements to qualify for special education services, an individualized education plan (IEP) is developed to ensure that all needs of the child are described in depth to ensure that they are met in their education and support services. The IEP is evaluated frequently by an interprofessional team composed of all staff members at the school who support the student as well as the student and their family to ensure that there is collaboration between all parties to support the student in the most extensive and helpful manner (Lipkin & Okamota, 2015). In 2004, IDEA was improved and reauthorized as the "Individuals with Disabilities Education Improvement Act" and reasserted the portion of IDEA that outlined the "least restrictive environment" (Kinnealey et al., 2012). Specifically, it defined the importance of "main-streaming" student learning experiences so that they are able to spend more time in the general education classroom with their peers (Smith, 2005).

A more broad act called Section 504 of the Rehabilitation Act was enacted prior to IDEA that sought to protect rights of those individuals who are disabled; specifically this act outlines that a student is considered disabled if they fall under any of the following criteria: "any individual who (i) has a physical or mental impairment which substantially limits one or more of

such person's major life activities, (ii) has a record of such impairment, or (iii) is regarded as having such an impairment" (Moses et al., 2005). Overall, this act provides assistance and reasonable accommodations to the classroom setting to any students meeting the aforementioned criteria to ensure that the student can participate in all learning and school-based functions (Moses et al., 2005).

Interprofessional Collaboration and OT's Role in Education

The role of occupational therapy in the school setting is to provide interventions that support engagement in occupations that are essential to the learning experience and promote engagement in education (AOTA, 2014). Under IDEA Part B, occupational therapy is considered a related service and therefore services are guaranteed to all children who qualify (Lipkin & Okamota, 2015). However, because the main role of occupational therapy in the school setting is promoting participation and engagement in education, this service cannot stand alone. There is a clear need for collaboration between occupational therapists and all other staff in the educational setting to best support student success. Information gathered in a systematic review addressing current best practice for collaboration between health professionals and education professionals in the school setting suggests that it is essential that the two areas of expertise work in conjunction with one another (Hillier et al., 2010). Due to the distinct difference between the two areas, it is essential to approach collaboration interactions as opportunities to provide perspective from each area of expertise rather than instruction. This method allows all professions to gain a more in depth understanding of a student from more than one professional background which ultimately leads to more comprehensive support available to the student to promote success (Hillier et al., 2010). Not only is it essential for all professionals to collaborate and keep open lines of communication regarding students, but it is also important to provide collaboration with,

and coaching to, parents/caregivers as well (Miller-Kuhaneck & Watling, 2018). Inclusion of the parents into the care plan not only provides students with comprehensive and relevant care, but also promotes carry over of skills and interventions used in school to the home setting (Miller-Kuhaneck & Watling., 2018). Ensuring communication and collaboration between all parties involved in a child/student's life allows the child to receive the most accurate and in-depth care possible.

Based on a survey of current school-based occupational therapy practitioners, 63.53% of practitioners continue to widely use nonintegrated, pull-out models of service delivery (Seruya & Garfinkel, 2020). This differs from the definition found within the American Occupational Therapy Association regarding the role of OT's in education in the sense that there is a collaborative component regarding general education classrooms that is often overlooked. The definition from AOTA is as follows "Conducting activity and environmental analysis and making recommendations to improve the fit for greater access, progress, and participation" (AOTA, 2014). This ensures that the elements within this product, though designed more directly toward teachers, falls under the scope of practice for OTs in the collaborative component including recommendations for educators to improve student success.

The Sensory Experience

Regardless of ability, all individuals have unique sensory processing patterns; understanding these unique patterns provides insight as to how sensory input impacts their daily functioning and engagement in occupations, what their needs are, and how to best meet their sensory needs to allow full engagement in both meaningful and preferred occupations (Dunn, 2001). The sensory experience includes input collected by the following systems: tactile (touch),

olfactory (smell), gustatory (taste), auditory (hearing), visual, proprioception (body awareness) and vestibular (balance and body orientation) (Chia-Ting & Parham, 2014).

As outlined by Dunn's model of sensory processing, various external stimuli provide each person with internal information as the stimuli interacts with their sensory system. Additionally, based on Dunn's model, there are four major processing patterns for external sensory input; 1) low registration; 2) sensory avoiding; 3) sensory seeking; and 4) sensory sensitivity (Dunn, 2001). *Low registration* describes the experience of individuals who have a high threshold for sensory stimuli combined with passive self-regulation which ultimately means that these individuals require more input to elicit a response to sensory stimuli though their nature is to respond passively if at all (Dunn, 2001). *Sensory avoiding* refers to the experience of individuals who have a low threshold for sensory input and actively self-regulate by avoiding sensory input all together (Dunn, 2001). *Sensory seeking* occurs when individuals have a high threshold for sensory input and actively self-regulate through seeking out sensory input (Dunn, 2001). Finally, *sensory sensitivity* refers to the experience of individuals who have a low threshold for sensory input though do not actively seek out self-regulation strategies to avoid sensory stimuli (Dunn, 2001). Any of these patterns may be prevalent in any child regardless of whether or not they have a diagnosed disability, and these patterns can present themselves in any number of disruptive behaviors or attitudes by an individual with different sensory processing patterns (Kinnealy et al., 2012). Therefore, a student who has difficulty navigating their sensory experience based on external stimuli within the classroom setting, may demonstrate disruptive or negative behaviors that inhibit their ability to engage in necessary tasks for learning (Kinnealy et al., 2012).

Arky (2018) stated that children who are experiencing sensory overload as a result of different sensory processing patterns, are having a neurological panic response to sensations that are perceived as normal by other individuals. This concept is essential to understanding that behaviors resulting from sensory overload elicit a panic response and therefore the behavior is not voluntarily disruptive when it is exhibited as a result of sensory overload (Arky, 2018). Furthermore, a study by Chia-Ting and Parham explains that difficulties with sensory processing patterns, and subsequently, regulation techniques, may affect social participation in classroom tasks in addition to engagement in academic tasks (Chia-Ting & Parham, 2014).

Dean, Little, Tomchek, and Dunn (2017) outlined evidence supporting the concept that sensory processing difficulties produce challenging behaviors and thus, reducing external stimuli that negatively impacts sensory processing in children, challenging behaviors can be diminished. More specifically, the study outlines the concept that sensory avoiding tendencies predict externalizing behaviors, depression, resiliency, and adaptability, while sensory seeking is related to depression and resiliency, and sensory sensitivity is related to externalizing behaviors (Dean et al., 2017). Overall, this study supports the concept that environmental modifications to support children's sensory needs can decrease disruptive and challenging behaviors in the classroom (Dean et al., 2017).

Sensory Processing Impact on Learning

Sensory modulation is a term often used when understanding patterns of individuals with sensory processing differences. As defined by Bar-Shalita, Vatine, and Parush (2008), this term refers to the intricate process of receiving sensory input, comprehending the sensory input in a neurological sense, and developing a response based on the input. Individuals who are able to successful in sensory modulation are able to organize and attend to relevant sensory input, filter

out unnecessary stimuli, and develop appropriate responses to stimuli while simultaneously maintaining an optimal level of arousal (Bar-Shalita et al., 2008). Those who are unable to successfully engage in sensory modulation have atypical reactions to sensory stimuli and are unable to filter out unwanted stimuli to maintain optimal arousal are referred to as having sensory modulation disorder (SMD) (Bar-Shalita et al., 2008). A study that examined the correlation between behavior and sensory processing found that individuals may demonstrate challenging or defensive behaviors as a result of typical sensory stimuli being perceived as unpleasant or painful (Gourley et al., 2014). Overall, this impacts individual's level of participation, enjoyment, and frequency of participation in their daily occupations meaning that their overall health/well-being is impacted by their sensory processing (Gourley et al., 2014).

The Physical Context of Classrooms

More specifically, the physical environment within a classroom can impact a child's ability to engage in their education. Classrooms can contain sensory stimuli that is distracting for children who have sensory processing differences. Fisher, Godwin, and Seltman (2014)), found that there was a relationship between visual displays within the classroom and a child's ability to sustain instruction and retain curricular content. Based on the results of the study, when children were in a visual stimulating environment, they were more likely to be distracted by their visual environment while when they were in the less stimulating environment, they were more distracted by themselves and others. However, the learning scores were higher in the sparse classroom than in the visually stimulating classroom (Fisher et al., 2014). This supports the idea that while it is true that children are easily distractable by anything, the students who were less overstimulated with visual input demonstrated higher retention of information taught in class (Fisher et al., 2014).

Barrett, Zhang, Moffat, and Kobbacy (2013) aimed to explore environmental impacts on learning beyond solely visual stimuli; this study considered variables in the categories of naturalness (light, sound, temperature, air quality, and links to nature), individualization (ownership, flexibility, and connection), and stimulation (complexity and color of visual stimulation). The observed results of the study demonstrated negative impacts of electrical lighting, while cooler temperatures improve performance on learning assessments, allowing students to easily adapt to temperature improved performance, an appealing visual environment decreases behavior outbursts, and student artwork on display improved the student's sense of ownership over the learning process. Barrett et al., (2013) found that window size does not impact overall participation though increase of natural light in the environment does and allowing students to use furniture that was ergonomic and comfortable significantly increased the student's ability to learn and focus on tasks in the classroom.

The Social Context of Classrooms

There are numerous components of the classroom that involve social interaction. These components come together to create the social context found within classrooms. Children are expected to interact with their peers, their teachers, and other professionals in the building in an appropriate and positive manner (Obaki, 2017). In the earlier years of elementary school, children are developing their social skills through social interaction with their peers and classmates through classroom tasks and through play (Cosbey et al., 2010). Coseby, Johnston, and Dunn studied the correlation between sensory processing difficulties and social participation. Cosbey et al., (2010) found that when a child has sensory needs that are not addressed, they may withdraw from their social environment due to the sensory processing difficulties making engaging in play and other tasks too challenging Therefore, a child who is experiencing sensory

processing differences that are unaddressed may not be able to accurately and fully engage in their social environment within the school setting.

The Cultural Context of Classrooms

The culture of classrooms varies depending on the teacher within the classroom, the culture of the entire elementary school, and a variety of other factors. Factors that influence the culture of a classroom include the expectations of the students regarding their behaviors, what they are supposed to complete, and how they are supposed to learn, act, and communicate with one and other as well as with their teacher (Kane, 2016). Additionally, the classroom culture is shaped by the norms found within the classroom regarding what items and behaviors are considered safe and appropriate to enhance learning (Kane, 2016). Because the community of any given elementary school classroom is heavily dependent upon the teacher setting expectations and establishing boundaries, sensory modifications can easily be introduced and implemented as an essential part of the overall classroom cultural context.

The Temporal Context of Classrooms

Information from the Early Childhood Learning and Knowledge Center states that children feel most confident and secure when they are able to engage in a consistent and predictable daily schedule (Responsive Classroom, 2010). Having a consistent schedule allows children to feel in control of their environment and therefore prevent challenging behaviors by fostering stability in the child's life (Responsive Classroom, 2010). This information can be translated into the classroom setting through the idea that through keeping a consistent schedule of daily classroom tasks/activities, students can feel more in control of their learning and therefore, their overall engagement in their academic pursuits is increased. In elementary settings especially, students typically engage in the following tasks throughout the day: large group learning activities,

specialist classes including music, art, physical education, and computer classes, small group or individual learning pursuits, and free choice time (Responsive Classroom, 2010). Watson et al., (2017) explored the relationship between physical activity and learning outcomes. The authors found that combining physical activity breaks with structured learning tasks can enhance student attention to instruction and improve retention of information (Watson et al., 2017).

Strategies to Support Sensory Processing Needs in the Classroom

In order to support students with sensory processing difficulties, there are a number of modifications to the environment as well as instruction strategies that have been researched. Currently, research supports that idea that rather than using specific sensory integration interventions, especially in general education settings, it is more beneficial to use multisensory integration through offering a variety of sensory regulation strategies (Camarata et al., 2020). There are numerous physical modifications that have proven to be effective in supporting students with sensory processing differences in their academic pursuits. One tool that has recently been developed specifically for occupational therapists to use in a consultative manner as a method of evaluating the current environment of classrooms is the Classroom Sensory Environment Assessment (Miller-Kuhaneck & Kelleher, 2015). While this assessment is newer and not yet meant to be used as a stand-alone assessment, it has been studied as an effective tool to use in conjunction with other occupational therapy based assessments such as the Sensory Processing Measure (SPM), Sensory Profile-2 (SP-2), or the Sensory Integration and Praxis Test (SIPT) in order to identify areas of crossover between the stimuli in the environment and the child's sensory processing patterns to help better suit that child for the classroom (Miller-Kuhaneck & Kelleher, 2015). The CSEA is a tool that measures the five primary sensory experiences in most classrooms including fluorescent lights, use of primary colors, use of

patterns, use of multiple storage bins, and seating in close proximity to other children. High levels of noise and visual stimulation were also noted (Miller-Kuhaneck & Kelleher, 2015). Knowledge of these items as determined through the CSEA can be helpful in determining how the environment is interacting with any given student's needs. Kinnealy et al., (2012) studied whether or not classroom modifications were in fact effective in improving engagement. The results demonstrated that the lighting and sound modifications increased the frequency and stability of attention/engagement and improved overall classroom performance, comfort, and moodIn regard to a more generalized checklist that can be used by both teachers and therapists alike, an occupational therapist from the Neurological and Physical Abilitation (NAPA) organization, developed a basic checklist than can be used to determine sensory processing patterns based on what physical behaviors a child is displaying (Rodil, 2020). This checklist provides more specific behaviors that are associated with each sense and the various patterns of processing. This tool helps to more directly address what sensory needs may be unmet in a child and can provide better insight as to how to help that child use modifications to learn best.

Physical Context Modifications. There are specific modifications that can be made to the visual component of the classroom environment**.** Most classrooms use fluorescent lighting due to the ease of installation and cost effectiveness that they provide. However, this type of lighting has been proven to be detrimental to student's ability to maintain focus on classroom tasks as well as decreasing student comfort (Kinnealey et al., 2012). Using alternative lighting options such as lamps, open windows, or light covers help to improve the quality of the light which directly correlates to decreased stress of students and increase in ability to retain information presented by teachers (Kinnealey et al., 2012). Another visual modification that can be implemented in the classroom environment is using student artwork or student pictures as room décor. Barrett et al.,

(2013) found that there was an impact of classroom design on learning. This demonstrated the correlation between display of student artwork/pictures and student's overall sense of autonomy and importance in their learning pursuits (Barrett et al., 2013). These feelings allow students to be more engaged in their learning and all other education related tasks (Barrett et al., 2013).

Social and Cultural Context Modifications. An increasingly popular tool for addressing sensory needs in children is the use of fidget toys. There are a variety of tactile and visual fidgets that can be used to help children self-regulate and therefore increase their ability to maintain focus on education related tasks. This regulatory ability of fidgets is a result of stimulation to the primary motor cortex and somatosensory cortex of the brain which integrate tactile information from the hands and regulate arousal which subsequently improves attention and focus (Schecter et al., 2017). However, because of the distracting nature of fidget toys in general, it is essential to establish clear expectations for appropriate use in the classroom setting and use such tools only for regulatory purposes (Schecter et al., 2017). An accommodation that can be useful in the same manner through addressing proprioceptive and vestibular input to regulate arousal is alternative seating options. Because of some children's sensory seeking tendencies, they may seek out proprioceptive or vestibular input through means of running around the classroom, laying their heads on their desk, or appearing to need physical activity (Child Mind Institute, 2022). Current evidence suggests that one of the most effective alternative seating strategies is use of a therapy ball (Bagatell et al., 2010). Sitting on a therapy ball can provide consistent sensory input that allows children to maintain regulated and increases their ability to stay seated for longer durations of time without displaying disruptive sensory seeking behaviors (Sadr et al., 2017). An additional alternative seating option that has been studied is allowing children to use standing desk/tabletop options for completing classwork. Information from the Mayo Clinic states that too

many episodes of prolonged seated tasks can have adverse health effects on people (Laskowski, 2020). Because of this information, many teachers have begun to implement stretch breaks throughout their day to ensure that kids are not sitting for extensive periods of time per recommendations from the Mayo Clinic (Laskowski, 2020). This means that because children spend so much of their day completing coursework, it can be helpful to offer standing options for children who need additional physical activity in addition to the provided rest breaks. Allowing children to have the option to stand allows them to receive additional sensory input and muscle activation to help regulate arousal in preparation for attending to learning tasks (Hinckson et al., 2016). One way to enhance the culture of classrooms specifically to ensure that students who are identified as needing more sensory input throughout their day is to incorporate a "sensory diet" or, specific sensory activities to meet their individual needs(Kumari-Sahoo & Senapeti, 2014). Development of and engagement with a sensory diet in the classroom can help students to maintain an optimal level of arousal and calm which leads to a decrease in distracting behaviors and outbursts. Implementation of sensory diets can be an easy tool for occupational therapists to develop based on any given child's individual needs and educate teachers on how to use these strategies in conjunction with instruction in the classroom (Kumari-Sahoo & Senapeti, 2014).

Temporal Context Modifications. Another set of strategies to implement into the classroom other than solely using objects or physical modifications is to implement scheduled engagement in sensory tasks or techniques. Some types of sensory stimuli can have a calm and regulating effect on students (Kumari-Sahoo & Senapeti, 2014). A specific program titled "BrainWorks" was studied to determine the impact it had on overall classroom engagement and attention (Wild, 2018). The BrainWorks program requires educator training and includes Brain breaks taken periodically throughout the day to move the whole body, sensory breaks twice per day for

sensory input and movement, use of sensory equipment brought by the OT researcher to be used as needed, and modifications/adaptations as recommended by the OT researcher such as dim lights, playing modulating music, and preferential seating (Wild, 2018). This program was proven to be effective in increasing attention and engagement in the classroom as measured by pre-/post-test scores on two standardized assessments as well as being effective in helping students develop self-regulation strategies to use independently (Wild, 2018). An option for incorporating similar strategies for the entire class comes from a study that was completed by Mills, Chapparo, and Hinitt (2016) which addressed implementation of a sensory schedule concept. The results demonstrated that per teacher's perception, having a consistent and predictable schedule with expected physical activity breaks increased attention and decreased disruptive behaviors (Mills et al., 2016). Paired with the overall concept of sensory breaks is the idea of the regulating effects of physical activity (Harris et al., 2018). Pingale, Fletcher, and Candler, looked specifically at the impact of sensory diets on children's sensory processing, psychosocial skills, and classroom engagement behaviors within the classroom/school environment (Pingale et al., 2019). The authors of this study implemented controlled sensory input in the context of daily routine activities that have sensory input components embedded within. Each intervention lasted 5-7 minutes and provided 3 multisensory activities relating to vestibular, proprioceptive, or tactile stimuli (Pingale et al., 2019). Results demonstrated that sensory diets that are included in brief sessions throughout the child's day in the classroom appear to demonstrate effectiveness in improving children's sensory processing, psychosocial, and classroom engagement behaviors and diminish problematic behavior outbursts within the classroom (Pingale et al., 2019).

Another strategy to support more independence in self-regulation regarding sensory needs is through providing students with education on the Zones of Regulation Program (Kuypers, 2011). The Zones of Regulation is a tool that helps teach self-regulation skills through using cognitive behavioral therapy techniques to categorize different feelings and states of arousal into four different colored zones (Kuypers, 2011). The Zones of Regulation in order from highest level of arousal to lowest are as follows: Red, Yellow, Green, and Blue, with Green being the optimal level of arousal. This tool can be useful to be used in conjunction with other sensory regulation techniques to help students identify their own states of arousal and develop independence in self-regulation through using sensory tools to get back to the "green zone" (Kuypers, 2011).

One testimony that accurately describes the importance that providing opportunities for individuals with different sensory processing needs comes from an article in the *Occupational Therapy Practice* Journal (Sood et al., 2018). This article followed the qualitative experience of families who were invited to attend a museum on a day where a variety of sensory modifications were implemented. Some of the strategies used included: loud noises and bright lights were temporarily turned off, sensory accessibility maps were used, museum social stories were available, sunglasses/headphones/theraputty were available for all available. Additionally, there was a cool-down space as an option for all overstimulated children to have access to. Trained OTs were on site to facilitate all interactions with sensory friendly spaces and equipment. The themes that emerged from this article highlight the importance and vast impact that making modifications to ensure accessibility to typical settings for those who have different sensory needs (Sood et al., 2018).

Conclusion

Overall, based on the combination of children's sensory experiences, the contexts that they engage in on a daily basis, and their need to engage in their education provides a clear rationale for the need of implementing sensory friendly experiences in the classroom setting in order to ensure that children reach their full academic potential. Current legislation supports the need for appropriate modifications to assist children in their learning in the least restrictive environment. Keeping children in the least restrictive environments, combined with the supportive and collaborative role of occupational therapists with teachers in the school setting, presents a prime opportunity to address sensory needs that may potentially be going unmet in the school setting and therefore, impeding children's ability to reach their full potential. The variety of sensory experiences that children engage with in their classroom context in social, physical, cultural, and temporal manners presents an opportunity for modifications to be made to each context to further enhance student's abilities to succeed. Through understanding each context that a child interacts with during the day, combined with knowledge of how sensory processing can affect learning, modifications that can easily be implemented by teachers will enhance student success in the classroom.

CHAPTER III

METHODOLOGY

The *Sensory Friendly Classroom* was created in collaboration with an elementary school in a suburban setting in the Midwest. An in-depth literature review was completed with the purpose of understanding what the expectations are for elementary aged students, how the student's environment impacts their learning, and how personal sensory processing differences may impact a student's ability to learn. In addition, the overall role of occupational therapy in the school-based setting was analyzed to understand how to ensure that this product was able to be successful.

The literature review was completed using a variety of databases from the University of North Dakota School of Medicine and Health Sciences Library including CINAHL, PubMed, AJOT, ERIC, NCES, and AOTA. Search terms within each of the aforementioned resources included phrases such as, ""occupational therapy" AND "school-based," "best practices" AND "school OT," "sensory environments" AND "elementary school", "sensory needs" AND "elementary school," "occupational therapy" AND "sensory integration," "fostering sensory needs," "number of kids with sensory needs," and "number of children in public schools with 504 plans or IEPs." Inclusion criteria for the articles used to complete the literature review required that the articles were from 2010 or more recent, that the information within the articles related mainly to the general population rather than specific populations with disabilities, and that the type of article used was a CAT, systematic review, scoping review, or research study. The one exception to the inclusion criteria was the information regarding sensory processing that came from Winnie Dunn in 2001 as this continues to be the most current research on the topic and therefore is relevant to the development of the product. The articles that were within the

parameters of the search terms were used in conjunction with information from textbooks to organize the findings into the three categories of person, context, and task from the EHP theory that was used to guide the product.

In addition to an in-depth literature review, a continued needs assessment of a kindergarten classroom within a midwestern elementary school in a suburban setting was completed through interaction with students, teachers, administrators, and general classroom observation to gain a holistic and deep understanding of the community within the classroom. The behaviors of students, responses of teachers, daily expectations for students, and the physical environments were all observed to understand what the culture of the classroom currently looks like. In addition to these observations, the teachers also engaged in an informal interview to better understand the needs of the classroom from the teacher's perspective. This information was combined with the information gleaned from the literature review to determine the needs of the site based on the gap between what is considered "best practice" and what is actually being needed and implemented in the classroom settings.

The theory used to guide this project is the Ecology of Human Performance (EHP) (Dunn 2017). This theory will be used to better describe the connection between the child (person), the different contexts that the child is in, and the tasks that children need to complete on a daily basis. This theory describes occupational engagement based on three components including the person, the context, and the task. The person is composed of their past experiences, personal values/interests, sensorimotor abilities, cognitive abilities, and psychosocial skills (Dunn 2017). The person interacts and is embedded with their context which consists of components such as temporal context, chronological age, physical environment, social environment, and cultural environment (Dunn 2017). As described by EHP, both of these constructs are impacted by the

tasks that any individual needs and/or wants to perform. Their ability to engage in preferred or necessary tasks is determined by the interaction between the person and their context which determines their performance range, or, the scope of available engagement for any person within their context. Additionally, within this theory, there are a set of therapeutic strategies that can be used to enhance or improve performance range. These strategies include, establish/restore, alter, adapt, prevent, or create which all interact with the person and/or the context to enhance performance range for the individual based on their unique needs, abilities, and contexts.

This product was created using the sensory processing frame of reference by Winnie Dunn (2001). The sensory processing frame of reference provides an explanation of each kind of sensory processing behavior: sensory-seeking, sensory-avoiding, sensory-sensitive, and low registration. The processing patterns can vary based on each individual person's sensory system and can also vary between senses. For example, a person may be sensory-seeking in the proprioceptive sense, but may demonstrate sensory-avoiding in the auditory sense, Through gaining a more in depth understanding of each type of processing as defined by this frame of reference, the teacher can gain a more comprehensive image of what the needs of their students may be and therefore can provide more accurate and useful accommodations.

CHAPTER IV

PRODUCT DESCRIPTION

The role of occupational therapy in school is to ensure that all students are able to engage in their education and be successful in their academic pursuits (AOTA, 2014). Based on the language within IDEA, this means that all students should be given the opportunity to reasonable accommodations and support services in the least restrictive environment (Kinnealey et al., 2012). Evidence from recent research studies supports the idea that sensory dysregulation can present itself in students through a variety of disruptive behaviors (Sadr et al., 2017). However, evidence shows that not only do sensory modifications remediate disruptive behaviors, but they also enhance overall student achievement and engagement (Mills et al., 2016). The purpose of *The Sensory Friendly classroom* was to increase occupational performance in educational tasks across contexts within the school setting. This in turn will result in students maintaining an optimal level of arousal to reach their highest potential in all contexts of their educational pursuits

The design of the *Sensory Friendly Classroom* was completed using the Ecology of Human Performance (EHP) model. EHP was selected due to the emphasis of the interaction between the context, person, and task, and how that determines any individual person's performance range. Regarding the school setting, the person, including cognitive, sensory, and affective variables, interact with the variety of contexts (physical, social, cultural and temporal) to determine the student's performance range based on the tasks that are expected of them in the school setting. This concept is further explained in the chart below:

Context & school related sensory experiences within the context	Strategies to enhance performance range in each context
Physical o Classroom wall décor o Orientation of the room o Lighting o Temperature of the room o Desks and chairs o All items within the classroom that children engage with on a regular basis (school supplies, calm down spaces/tools, books, toys, etc.)	o Use lamps or natural light, when possible, to avoid fluorescent lighting
Social & Cultural *Social* o Any interaction with another individual or group o Groupwork completed in classes where interaction is required o Communicating with the teacher and other staff/school professionals *Cultural* o Daily classroom operations o Academic expectations o Problem solving expectations o Overall classroom norms	o Allow alternative seating options o Allow use of fidget tools with clear expectations of use o Incorporate individual sensory diets for specific students
Temporal o Time spent listening to instruction o Individual versus group learning o Transitions between tasks/specialists o Length of the school day o Length of lessons o Breaks for movement o Play versus learning balance	o Stretch breaks prior to being seated for long periods of time o Scheduled movement breaks prior to more formal learning periods of time

Initially, each component of EHP, the students as the person, the contexts within the classroom setting, and the task of education was analyzed to determine current performance range relating to how well students are able to engage with their variety of contexts to engage in their education. Each context of physical, social, cultural, and temporal plays a role in the relationship between the student and their engagement in their education. The focus of this product was on

developing potential options to modify or enhance each context in order to increase the performance range of students.

The product that was created for the *Sensory Friendly Classroom* is meant to be used as a guide for educators to enhance the student experience through sensory based modifications and accommodations. This product is organized first with an education component regarding the 7 senses; auditory, visual, olfactory, gustatory, tactile, proprioceptive, and vestibular, followed by a description of typical sensory processing patterns as defined by Winnie Dunn. Additionally, there is a short section describing how dysregulation in each sensory area can impact learning is included for each sense.

Following the introduction of senses, the concept of Sensory Processing as defined by Winnie Dunn is explained. A diagram depicting the four processing patterns of sensory seeking, sensory avoiding, sensory sensitive, and low registration is shown followed by a more in-depth description of each of the patterns and how each one may present itself in student's behavior in the classroom. In order to ensure that the teachers understand the concept of regulation versus dysregulation, there is a definition of each included along with examples of behaviors associated with each state.

After the section outlining sensory processing, a checklist regarding typical Sensory Processing Disorder behaviors, obtained from the Neurological and Physical Abilitation center, is included and was modified to describe behaviors that are more relevant to what would typically be displayed in the classroom. The behaviors are organized by each sense and then further broken down to include hyper-/hyposensitivity inclinations.

Because this product was created using the EHP model, the context that students engage with on a daily basis as a heavily influential factor on their ability to engage in their occupation

of education. In conjunction with the EHP model, the performance range, or the ability for students to successfully engage in their occupation of education, of students is meant to be determined by their contexts in school, their personal qualities and abilities regarding sensory processing. Therefore, the checklist is followed by a description of each context that each student engages with in a typical school day through the lens of EHP. The contexts described include physical, temporal, social, and cultural contexts. For purposes of how classrooms operate, the cultural and social contexts are explained together as they are closely intertwined in this setting. Following each context description, potential tools and strategies are suggested for options to enhance each context form a sensory processing standpoint.

This product was meant to be created as a guide for teachers to use to enhance their classroom atmosphere through addressing the sensory needs of their students. Through implementation of the sensory based strategies that are suggested in the *Sensory Friendly Classroom* booklet, educators have the opportunity to not only educate themselves on sensory processing and how it impacts learning, but also to have a set of sensory based tools to use to help students succeed.

CHAPTER V

CONCLUSION

Implications for practice of occupational therapy This project was created to address the unmet sensory needs of students in the school setting. Sensory needs that are not addressed can have a negative impact on student success through challenging behavior and a lack of engagement in their education (Mills et al., 2016). Through remediation of the behaviors that are associated with a state of dysregulation due to sensory needs, the student is better prepared to engage in their education and the overall culture of the classroom is enhance (Dean et al., 2017 The Ecology of Human Performance model was used to guide this project. Through the lens of EHP, this product aims to increase performance range through modifications and enhancements to the context in order for the sensory needs of the student to be met which in turn impacts their ability to meet the task demands that are associated with being a student. Additionally, the current role of occupational therapists in the school setting focuses more on individualized intervention with students that have Individualized Education Plans (IEP) or Section 504 plan modifications. Therefore, the needs of students who do not technically qualify for individualized services are often overlooked solely because the therapists cannot meet the needs of all of those students. This guide is meant to work as a Tier I intervention to ensure that the teachers are more educated on sensory processing needs and how they may present themselves through student's disruptive behaviors as well as providing some options for teachers to implement interventions to assist students in better engagement in their educational pursuits. The *Sensory Friendly Classroom* is meant to enhance student success through sensory-based strategies. Additionally, because it is only a guide, it can be used in collaboration with both educators and occupational therapy practitioners to enhance the overall engagement of a classroom while keeping in mind the needs

of the students, the feasibility of implementing strategies for teachers, and the expertise of the onsite occupational therapist.

Future recommendations for project sustainability. Because of the components related to educating the teachers themselves on sensory needs and sensory processing, it can be used for many years to come as a guide to enhance the student experience in a variety of ways such as:

- **To be used exactly in the manner in which it was created-by an educator in their own classroom.** The educator that consulted with the student in the creation of the product expressed interest due to the atypical behaviors of several students within the class. Through the implementation of the sensory based strategies outlined in the product, the disruptive behaviors of the students decreased while the overall engagement and success of students increased.
- **To be used as a tool to be recommended for use by the Social Emotional Learning Committee.** In order for this product to continue being used, it is likely that a presentation to the school's Social Emotional Learning Committee will take place and therefore can be used as a tool by those professionals to be recommended to teachers in the future when concerns regarding behaviors arise.
- **To enhance early recognition and understanding of sensory needs and sensory-based strategies.** Additionally, because of the educational component regarding sensory processing in general, once each teacher is educated on the concept in general, it is likely that sensory processing needs will be recognized quicker rather than assuming students simply are disruptive and problematic. This guide may be used as a reference that is readily available to use to meet the student's sensory needs and therefore enhance overall student success.

Strengths and limitations of project. One of the main limitations of this project is that it was created solely in collaboration with one kindergarten classroom. This means that the theoretical sample size of this project is quite small. This may cause a necessity for alterations and modifications if used for a larger population. However, because this product is meant to be used as a guiding tool rather than a set of specific requirements, it can be used such that only select portions that are relevant and helpful are actually implemented. A key strength of this project is that it was designed in collaboration with an actual educator and therefore, certain parts of the product were able to be implemented in a real setting. This means that instead of the concepts solely being theoretical, the strategies have truly been tested and per the report of the collaborating educator, have provided a beneficial impact on student's success. Additionally, because an educator helped to develop the product, it is relevant to what would actually be helpful in the classroom setting from an educator's perspective rather than from the outside standpoint of only a student or any other supportive staff member in the school setting. Because of the collaborative nature, it is meant to be used as a guide and preferably in collaboration with the practicing occupational therapist in the school rather than a stand-alone reference. However, it can be used to educate the educators as to why a certain student may be acting in a certain manner, and to take small portions of the product to implement to assist the student in succeeding in the classroom. In order to enhance continued use and development of the *Sensory Friendly Classroom* it is recommended that the product continue to be implemented and tested in a variety of classrooms at a variety of age levels. Because this product was developed in conjunction with only one classroom, the specific needs of kindergarten age children are addressed. In order to increase use and overall success of this product, it should continue to be implemented and modified to fit the sensory needs of a broader range of students.

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APPENDIX

Creating a SENSORY FRIENDLY Classroom

TABLE OF CONTENTS

WELCOME TO CREATING A SENSORY FRIENDLY CLASSROOM

What is a sensory friendly classroom?

- A sensory friendly classroom is a space that allows children with various sensory needs to have access to sensory based modifications, strategies, and tools to ensure that they are achieving their full potential as students.

Why do sensory needs matter?

- Research studies have shown that students who have sensory needs that are currently going unmet are more likely to exhibit disruptive behaviors and withdraw from academic related tasks. Through the implementation of regulating strategies, students are better prepared to learn, interact, and be the best students possible.

THINGS TO KEEP IN MIND

- **Set clear expectations**
  - In order for the implementation of tools to be successful, it is essential that clear expectations are set regarding appropriate use of sensory tools/strategies.
  - Some things to consider include but are not limited to:
    - Appropriate times to use fidgets.
    - Appropriate manners to use sensory tools/strategies (keeping in mind "toy versus tool" expectation).
    - What the consequences are if tools/strategies are used inappropriately.
- **Remember each child is different**
  - What works for one child will not always work for another child!
  - This guide is meant to be used as such--trial certain tools/strategies with children and modify to both the teachers AND the student's needs .

WHAT ARE THE SENSORY SYSTEMS?

- AUDITORY
- VESTIBULAR
- PROPRIOCEPTION
- TACTILE
- VISUAL
- GUSTATORY
- OLFACTORY

AUDITORY

Auditory system description:

The auditory system is everything that people hear. While hearing happens through the use of ears, it is ultimately up to the brain to determine, decipher, and interpret any sounds gathered by the ear.

How does our auditory sense impact learning?

Classrooms by nature tend to be loud environments with a variety of different sounds. There are children talking, videos to listen to, teacher's verbal instruction, and any number of unexpected sounds such as fire alarms, loudspeaker announcements, etc. Too much auditory input can inhibit some student's ability to learn, while some students may create loud, disruptive noises to meet their craving for more auditory input.

VESTIBULAR

Vestibular system description:

The vestibular system is the explanation of people's bodies in relation to gravity, movement, and balance. It allows people to determine their acceleration, body movements, and head position. It also allows people to use both sides of their body together.

How does our vestibular sense impact learning?

The vestibular system gives individuals input as to where their body is in relation to gravity meaning that students who are lacking in vestibular input may display behaviors that are distracting to others such as spinning and preferring to be upside down. Those who have difficulty with their vestibular sense may also have difficulty copying information from the board to their desk.

7 Senses Street Day [Fact Sheet]. 2013. 7senses.org. Retrieved from: http://www.7senses.org.au/wp-content/uploads/2013/09/7-Senses-Street-Day-What-are-the-7-Senses_.pdf

PROPRIOCEPTION

Proprioceptive system description:

The proprioceptive system describes the position of people's body in space and relation to other people and/or other body parts. The proprioceptive system is activated through push/pull type activities, jumping and activities that involve weight and deep pressure or firm touch.

How does our proprioceptive sense impact learning?

Those who are not getting enough proprioceptive input may demonstrate disruptive behaviors in the classroom such as running around the classroom, standing up when they are not asked to, and other movement seeking behaviors. Additionally, students who are seeking proprioceptive input may wrap their legs around the legs of their chairs and/or lay their heads down on their desk when completing fine motor tasks.

7 Senses Street Day [Fact Sheet]. 2013. 7senses.org. Retrieved from: http://www.7senses.org.au/wp-content/uploads/2013/09/7-Senses-Street-Day-What-are-the-7-Senses_.pdf

TACTILE

Tactile system description:

The tactile system describes any sensory information or stimuli that is gathered through touch. Touch can be experienced in a variety of ways such as touching people and things, or any sensations that happen to the skin.

How does our tactile sense impact learning?

While tactile sensation is not always considered a large component in a student's school day, rooms that have fluctuating temperatures and/or are too hot/cold can inhibit a child's ability to learn. Additionally, some students may seek out tactile input through a variety of ways such as always needing items in their hands or touching peers constantly.

7 Senses Street Day [Fact Sheet]. 2013. 7senses.org. Retrieved from: http://www.7senses.org.au/wp-content/uploads/2013/09/7-Senses-Street-Day-What-are-the-7-Senses_.pdf

VISUAL

Visual system description:

The visual system consists of all input that we gather with our eyes. The brain then interprets this information to determine our perception of our environment.

How does our visual sense impact learning?

Each child is unique in their sensory needs. For some children, too much visual input can be distracting for students and can lead to sensory overload; while other children can be stimulated and prefer busy visual environments to reach an optimal level of arousal to learn. Additionally, if students have difficulty with vision, any tasks involving reading/writing may be a challenge- especially in the midst of a busy visual environment.

GUSTATORY

Gustatory system description:

The gustatory system is everything that we taste through putting things/food in our mouths. The mouth provides one of the largest sensory experiences of all the sensory systems and can be a useful tool in regulation.

How does our gustatory sense impact learning?

Those who are seeking out gustatory experiences outside of eating, may put non food items in their mouths or demonstrate chewing on pencils, clothes, erasers, etc. Allowing children to have items that they are allowed to put in their mouths can be useful in achieving regulation as well as avoiding placing inappropriate and potentially dangerous items in their mouth.

7 Senses Street Day [Fact Sheet]. 2013. 7senses.org. Retrieved from: http://www.7senses.org.au/wp-content/uploads/2013/09/7-Senses-Street-Day-What-are-the-7-Senses_.pdf

OLFACTORY

Olfactory system description:

The olfactory system describes any information that is gathered through the nose and, like vision and hearing, must be interpreted by the brain.

How does our olfactory sense impact learning?

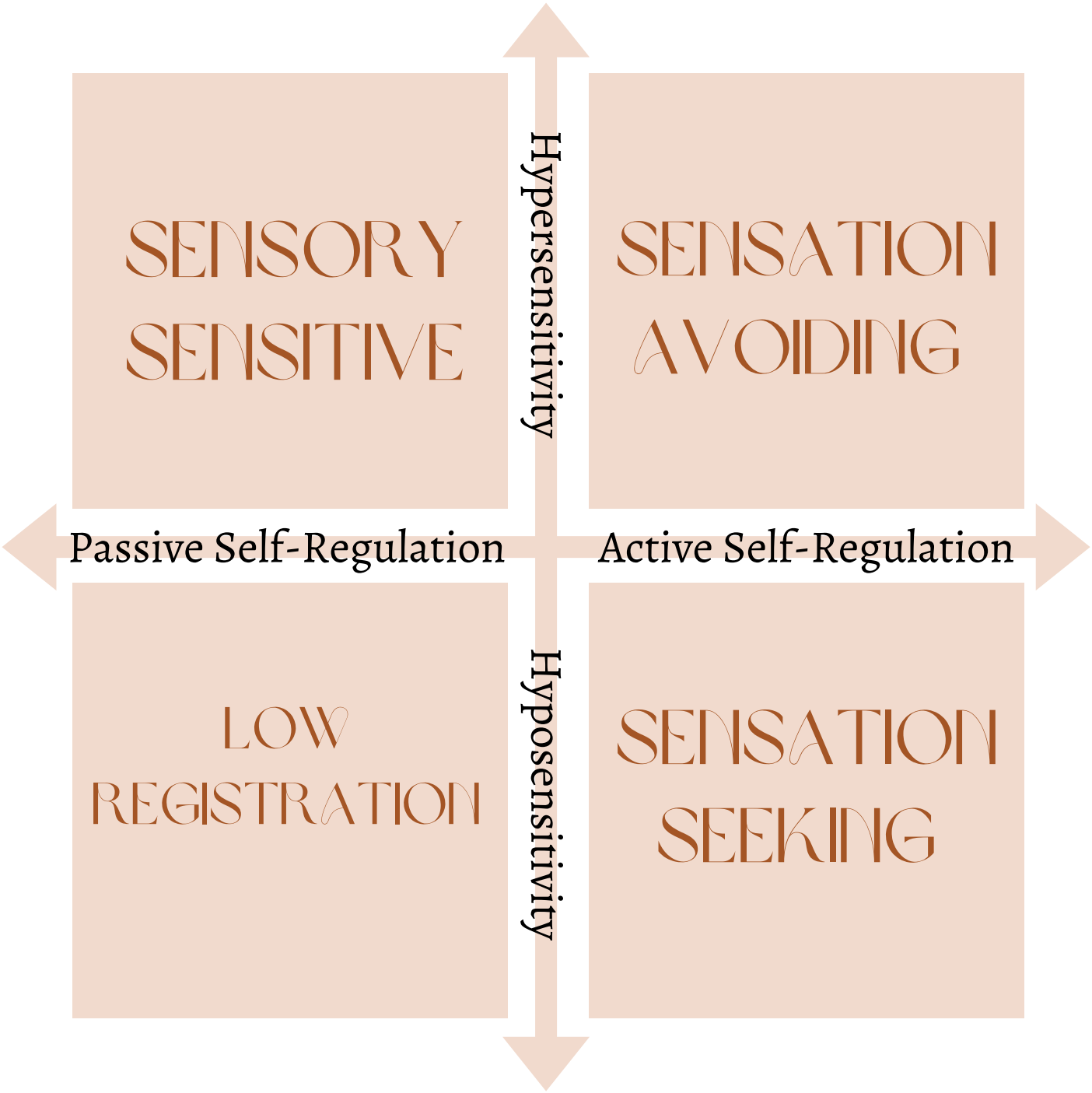
Olfactory input is not always a major component in student's sensory experience in the school. However, strong perfumes or cleaning agents can be distracting to some students while more calming scents can be used as an aromatherapy tool to calm the sensory systems of all children pending that there is no allergy concerns within the class.

WHAT IS SENSORY PROCESSING?

Sensory processing describes the relationship between each individual's nervous system operations stimulated by sensory input and self-regulation strategies to create sensory processing patterns unique to each individual. More specifically, this concept looks at the interaction between how a person is able to respond to sensory stimuli through organization of the input in a neurological sense and, in turn, respond to sensory stimuli. Sensory processing patterns are organized into four categories, keep in mind that any individual can have any pattern in each of their 7 senses.

Information retrieved from: Dunn, W. (2007). Supporting children to participate successfully in everyday life by using sensory processing knowledge. Infant and Young Children, 20, 84-101.

WHAT ARE THE DIFFERENT SENSORY PROCESSING PATTERNS?



Information retrieved from: Dunn, W. (2007). Supporting children to participate successfully in everyday life by using sensory processing knowledge. Infant and Young Children, 20, 84-101.

SENSORY SEEKERS

HYPOsensitive ~ Active Self-regulation

Explanation:

Those who are sensory seekers enjoy sensory input.They have HIGH thresholds for sensory stimuli meaning that they need MORE sensory input to satisfy their needs. Sensory seekers also demonstrate high self-regulation meaning that they create and/or seek out sensory experiences to satisfy their need for input.

Dunn, W. (2007). Supporting children to participate successfully in everyday life by using sensory processing knowledge. Infants and Young Children. 20(2), 84-101. doi:10.1097/01.IYC.0000264477.05076.5d

SENSORY SEEKERS

HYPOsensitive ~ Active Self-regulation

Common behaviors of sensory seekers include:

- Stand too close to others and have difficulty with concept of personal space
- Walk with loud, heavy steps
- May appear clumsy
- Enjoy jumping, hopping, and crashing into people/things *sometimes to the point of being unsafe
- Prefer rough play with peers
- Seek out or make loud noises
- Touch people/objects almost constantly
- Demonstrate need to keep their bodies moving constantly

SENSORY AVOIDERS

HYPERsensitive ~ Active Self-regulation

Explanation:

Those who are sensory avoiders do NOT enjoy sensory input. Their sensory thresholds are met quickly though they do not enjoy the sensation and actively withdraw or avoid situations that may be overstimulating.

Dunn, W. (2007). Supporting children to participate successfully in everyday life by using sensory processing knowledge. Infants and Young Children. 20(2), 84-101. doi:10.1097/01.IYC.0000264477.05076.5d

SENSORY AVOIDERS

HYPERsensitive ~ Active Self-regulation

Common behaviors of sensory avoiders include:

- Demonstrate sensitivity to the clothes they wear
- Don't enjoy being touched or hugged
- Demonstrate big reactions to unexpected lights/sounds
- Hear noises and demonstrate reactions to noises that other people may not notice
- Prefer quiet and predictable environments

SENSORY SENSITIVE

HYPERsensitive ~ Passive Self-regulation

Explanation:

Those who are sensory sensitive are similar to those who are sensory avoiders. The key difference is that those who are sensory sensitive, while they demonstrate the same hypersensitivity to input that sensory avoiders do, they do not actively self-regulate. Instead they say in the non-preferred environment and demonstrate negative reactions to their sensory environment.

Dunn, W. (2007). Supporting children to participate successfully in everyday life by using sensory processing knowledge. Infants and Young Children. 20(2), 84-101. doi:10.1097/01.IYC.0000264477.05076.5d

SENSORY SENSITIVE

HYPERsensitive ~ Passive Self-regulation

Common behaviors of those who are sensory sensitive include:

- Demonstrate irritable, short-tempered, or demanding behavior
- May cover their ears or yell at others to "be quiet"
- Demonstrate constant fidgeting
- Display negative outbursts to overstimulating environments and/or scenarios

LOW REGISTRATION

HYPOsensitive ~ Passive Self-regulation

Explanation:

Those who have low registration, have a high threshold for sensory stimuli though do NOT actively seek out opportunities to satisfy their sensory needs due to passive self-regulation.

Dunn, W. (2007). Supporting children to participate successfully in everyday life by using sensory processing knowledge. Infants and Young Children. 20(2), 84-101. doi:10.1097/01.IYC.0000264477.05076.5d

LOW REGISTRATION

HYPOsensitive ~ Passive Self-regulation

Common behaviors of those who are sensory sensitive include:

- May require additional instruction or even touch to get their attention on adult directed tasks
- May appear to have a flat affect in situations where others are demonstrating big emotional responses
- May miss warning signs of potentially dangerous scenarios

REGULATION VS. DYSREGULATION

Dysregulation:

When the central nervous system, aka your brain, is in a state of imbalance due to excess sensory input or a lack of sensory input.

What this looks like:

- Temper tantrum like behavior or melt downs
- Uncontrollable laughter
- Fast/hard movements
- Speaking fast
- Excess saliva
- Unable to follow simple instructions
- Difficulty attending to any task
- Impulsive behaviors
- Shrieking or high-pitched yelling

REGULATION VS. DYSREGULATION

Regulation:

When the central nervous system is balanced and functioning at an optimal level.

What this looks like:

- Have a conversation
- Attend to tasks
- Follow instructions
- Sit calmly
- Have safe/just right body movements

CLASSROOM BEHAVIOR & SENSORY DYSREGULATION CHECKLIST

TACTILE

Tactile Defensiveness:

- Becomes dysregulated, upset, or anxious with light and unexpected touch
- Can be distracted by their clothing/mentions excessive issues with clothing
- Exhibits dysregulation when engaging in messy play; i.e. using finger paints in art class
- May demonstrate a need to always keep hands clean through washing/wiping hands frequently

Adapted from: Rodil, J. (2020). Sensory processing disorder checklist and symptoms. Neurological and Physical Abilitation Center.Retrieved from: https://napacenter.org/spd-checklist/

TACTILE

Tactile Seeking:

- Demonstrates a need to touch and feel everything within their environment
- Touches impulsivity toward touching others and touching objects within reach
- Demonstrates a lack of awareness when their face is messy after eating lunch or snack
- Shows little to no reaction to painful stimuli
- Seeks out opportunities to engage in wet/messy play such as using lotion or soap in excessive amounts

Adapted from: Rodil, J. (2020). Sensory processing disorder checklist and symptoms. Neurological and Physical Abilitation Center.Retrieved from: https://napacenter.org/spd-checklist/

PROPRIOCEPTION

Proprioceptive Seeking:

- Pursues movement to the point where it interferes with function or engagement in classroom tasks (fidgeting, rocking, not being able to sit still)
- Becomes overly excited during movement breaks in the day to the point that it interferes with function (ex-movement breaks, physical education class)
- Takes frequent movement or climbing risks that are unsafe
- Falls down or jumps on to ground
- Prefers that their clothing is as tight as possible
- Frequently hits, pushes, or bites other children

Adapted from: Rodil, J. (2020). Sensory processing disorder checklist and symptoms. Neurological and Physical Abilitation Center.Retrieved from: https://napacenter.org/spd-checklist/

PROPRIOCEPTION

Proprioceptive Difficulties:

- Demonstrates difficulty with being able to produce the appropriate amount of force when writing, drawing, or coloring (breaks lead when using pencils, pushes too hard when using markers or pens)
- Breaks items frequently
- May bump into objects/desks/other children frequently
- May have difficulty understanding and discriminating between items that are light versus items that are heavy

Adapted from: Rodil, J. (2020). Sensory processing disorder checklist and symptoms. Neurological and Physical Abilitation Center.Retrieved from: https://napacenter.org/spd-checklist/

AUDITORY

Auditory Defensiveness:

- Reacts strongly to unexpected of loud noises (i.e. other children yelling, fire alarms, crashes in classroom, etc)
- May frequently hold hands over ears to protect from sounds
- May have difficulties being productive/staying focused on academic tasks with background noise present
- May demonstrate difficulties with certain frequencies of a sound
- May avoid situations where there is an influx of loud sounds

Adapted from: Rodil, J. (2020). Sensory processing disorder checklist and symptoms. Neurological and Physical Abilitation Center.Retrieved from: https://napacenter.org/spd-checklist/

AUDITORY

Auditory Hyposensitivity:

- Does not respond to their name being called
- Enjoys making sounds themselves
- Needs verbal directions repeated frequently
- Can be confused when attempting to localize a sound
- Turns up sound settings on a screen device to their max capacity

Adapted from: Rodil, J. (2020). Sensory processing disorder checklist and symptoms. Neurological and Physical Abilitation Center.Retrieved from: https://napacenter.org/spd-checklist/

OLFACTORY

Olfactory Hyposensitivity:

- Does not register odors that would typically be considered unpleasant
- Smells objects or people as a means of interacting with them

Adapted from: Rodil, J. (2020). Sensory processing disorder checklist and symptoms. Neurological and Physical Abilitation Center.Retrieved from: https://napacenter.org/spd-checklist/

OLFACTORY

Olfactory Hypersensitivity:

- Is easily bothered by food smells of other student's or teacher's lunches/snacks
- May register a small that is faint or hard for others to pick up
- Reacts negatively to smells that would otherwise not bother anyone else

Adapted from: Rodil, J. (2020). Sensory processing disorder checklist and symptoms. Neurological and Physical Abilitation Center.Retrieved from: https://napacenter.org/spd-checklist/

VISUAL

Visual Hypersensitivity:

- Sensitivity to bright lights
- May retreat to darker settings in order to engage in activities (through placing hood up, putting head close to desk)
- Avoids eye contact
- Can be distracted by subtle visual details in the classroom (i.e. things on the walls, lights, visual items on desk, etc)

Adapted from: Rodil, J. (2020). Sensory processing disorder checklist and symptoms. Neurological and Physical Abilitation Center.Retrieved from: https://napacenter.org/spd-checklist/

VISUAL

Visual Hyposensitivity:

- May have difficulty identifying differences in puzzles, pictures, words, or objects
- May have trouble locating specific items amongst other items
- Demonstrates difficulty visually tracking items
- Has trouble visually attending to written information or instructions
- May have depth perception difficulties
- Can have difficulty visually attending to items with little or no contrast

Adapted from: Rodil, J. (2020). Sensory processing disorder checklist and symptoms. Neurological and Physical Abilitation Center.Retrieved from: https://napacenter.org/spd-checklist/

VESTIBULAR

Vestibular Hyposensitivity:

- Can spin for a prolonged period of time without ever getting dizzy
- Can swing intensely for a prolonged period of time
- Enjoys being in an upside-down position
- Rocks in place wherever they are sitting
- May love being tossed in the air
- Enjoys rocking or nodding their head back and forth

Adapted from: Rodil, J. (2020). Sensory processing disorder checklist and symptoms. Neurological and Physical Abilitation Center.Retrieved from: https://napacenter.org/spd-checklist/

VESTIBULAR

Vestibular Hypersensitivity:

- Avoids swings ladders slides at recess or in gym class
- May lose balance easily and can appear to be clumsy
- Demonstrates difficulties with activities that requires good balance and postural control
- Avoids spinning
- May be fearful anytime their feet leave the ground

Adapted from: Rodil, J. (2020). Sensory processing disorder checklist and symptoms. Neurological and Physical Abilitation Center.Retrieved from: https://napacenter.org/spd-checklist/

HOW DOES SENSORY PROCESSING IMPACT LEARNING?

IMPACT ON LEARNING

Children engage in a variety of contexts when they attend school as students. Each context contains a variety of sensory stimuli than can impact children's ability to learn.

The context areas are as follows:

- Physical
- Social
- Cultural
- Temporal

PHYSICAL CONTEXT

What is it?

The physical context within a classroom includes all of the *physical components* within the classroom, more specifically, any object or physical property of the classroom.

What things are found in this context?

- Classroom wall décor
- Orientation of the room (how desks are aligned, where teacher's desk is, what direction they face when they receive instruction)
- Lighting (fluorescent lights, lamps, screens of smartboards/projectors)
- Temperature of the room
- Desks (theirs and the teacher's)
- Chairs (any alternative seating options as well)
- All items within classroom that children engage with on a regular basis (school supplies, calm down spaces/tools, books, toys, etc.)

SOCIAL CONTEXT

What is it?

The social context within a classroom includes the *social interactions* that are necessary within the school setting. For example, this includes interactions with peers, interactions with teachers/staff, and emotional reactions to scenarios throughout the day.

What things are found in this context?

- Any interaction with another individual or group
- Groupwork completed in classes where interaction is required
- Communicating with teacher and other staff/school professionals

CULTURAL CONTEXT

What is it?

The culture of a classroom is shaped by a number of things. The children in the class as well as the teacher develop *norms* solely based on the typical interactions that occur in the school setting. Additionally, any *expectations* of the teacher regarding daily operations and academic performance are included in the cultural context of the classroom.

What things are found in this context?

- Daily classroom operations
- Academic expectations
- Problem solving expectations
- Overall classroom norms

TEMPORAL CONTEXT

What is it?

The temporal context refers to the *timing and routine* components found within the classroom.

What things are found in this context?

- Time spent listening to instruction
- Individual versus group learning
- Transitions between tasks/specialists
- Length of the school day
- Length of lessons
- Breaks for movement
- Play versus learning balance

SENSORY STRATEGIES TO ENHANCE EACH CONTEXT

PHYSICAL CONTEXT STRATEGIES

- **Use lamps (or natural light when possible) instead of fluorescent lights**
  - Studies show that students tend to maintian focus better and longer when light systems other than fluorescent lights

- **Use student artwork as wall decor in classrooms**
  - Research has shown that when student's work is displayed in the classroom, they feel more involved in their classroom environment and are therefore more likely to engage in their learning environment

CULTURAL & SOCIAL CONTEXT STRATEGIES

- **Allow alternative seating options**
  - Tools such as wobble seats*, seat cushions*, standing desks, lap desks*, and lower tables to use while seated on the floor can be an extremely useful tool in helping students maintain focus on learning

- **Use of fidget tools**
  - Fidgets* can be useful tools to help children keep their hands busy in order to sustain attention during listening tasks. Expectations need to be made clear regarding use of tools in order to avoid them becoming a distraction
- **Sensory Diets**
  - Sensory diets are specific sensory strategies/plans for individual students who display a need for more sensory intervention to prepare for learning
  - This concept is further explained on the following page

*Examples can be found in appendix A

SENSORY DIETS

- **Sensory diets explained ...**

Sensory diets are tools that are meant to be individualized sensory strategies for specific students that show they may need more regulation. From a teacher standpoint, this may look like giving the student consistent tasks or breaks to give them more opportunities for sensory interactions.

- **This can include, but is not limited to, things such as...**
    - Allowing a student to do 5 jumps prior to joining the rest of the class for large group learning (vestibular and proprioceptive input)
    - Having a student always be the designated "helper" to push desks around when rearranging classroom (proprioceptive input)
    - Having a student assist with reaching high to point to words/pictures on the board when the teacher is learning (vestibular input)

Sensory diets truly include any individualized sensory breaks/strategies that work for a student to enhance their learning!!

TEMPORAL CONTEXT STRATEGIES

- **Stretch breaks**
  - Allowing children to have consistent stretch breaks throughout their day can assist with improving focus on tasks through increasing blood flow and circulation throughout the body and to the brain

- **Scheduled movement breaks prior to seated/more formal learning sessions**
  - Allowing children to engage in movement breaks helps to regulate arousal prior to beginning adult directed tasks and in turn improve information retention from instruction by the teacher

CALM DOWN CORNER

Purpose of calm down corner:

A calm down corner can be used for a variety of reasons. This can be a place to go for children who are demonstrating any number of difficult or disruptive behaviors as a place to go and regulate themselves using sensory and social emotional based strategies.

CALM DOWN CORNER

Things to put in the calm down corner include but are not limited to:

- Zones of Regulation Poster
  - The zones of regulation program can be used as a tool to allow children to become more in touch with their bodies and determine what they need in order to be in the "green zone" and be their best. **details included in appendix B**

- Sensory/fidget tools including but not limited to:
  - Pop its/fidget spinners
  - Bean bags or comfortable seating
  - Weighted blankets or vests
  - Visual fidgets
  - Breathing ball
  - Body sock

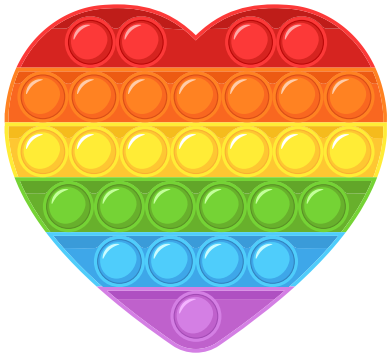
APPENDIX A: PHYSICAL MODIFICATION STRATEGIES

Wobble Stool: alternative seating option for being seated at a desk, offers consistent proprioceptive and vestibular input (can be found on Amazon)

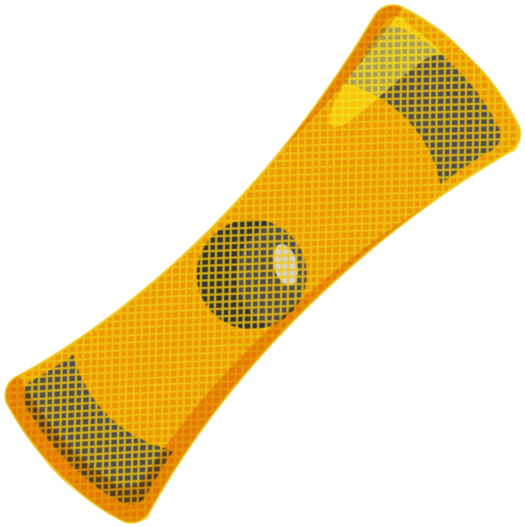
Seat cushion: alternative seating option for being seated at a desk while still using chair, offers consistent proprioceptive and vestibular input (can be found on Amazon)

Lap Desk: alternative seating option for being seated on the floor, offers consistent proprioceptive input (can be found on Amazon)

APPENDIX A: PHYSICAL MODIFICATION STRATEGIES



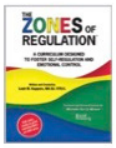
Pop it: fidget tool to keep hands busy for tactile seekers to enhance attention specifically when receiving verbal instruction (can be found on Amazon)



Marble Fidget: another example of a tactile fidget-- this is less well known and therefore may be better suited for less possibility of becoming a toy (can be found on Amazon)

Lava lamp visual fidget: visual fidget for students who tend to be visual seeking, can be helpful in enhance attention when receiving verbal instruction (can be found on Amazon)

APPENDIX B: ZONES OF REGULATION TOOL



To be used with *The Zones of Regulation*™ curriculum
Reproducible A

Information About The ZONES of Regulation™

_____ will be participating in *The Zones of Regulation*™ curriculum (or "The Zones" for short), which are lessons and activities designed by Leah Kuypers, licensed occupational therapist, to help him/her gain skills in the area of self-regulation. Self-regulation can go by many names, such as self-control, self-management, and impulse control. It is defined as the best state of alertness of both the body and emotions for the specific situation. For example, when a student plays on the playground or in a competitive game, it is beneficial to have a higher state of alertness. However, that same state would not be appropriate in the library. The lessons and learning activities are designed to help the students recognize when they are in the different Zones as well as learn how to use strategies to change or stay in the Zone they are in. In addition to addressing self-regulation, the students will gain an increased vocabulary of emotional terms, skills in reading other people's facial expressions, perspective about how others see and react to their behavior, insight into events that trigger their behavior, calming and alerting strategies, and problem solving skills.

A critical aspect of this curriculum is that all team members know and understand The Zones language. This creates a comfortable and supportive environment for the student to practice his or her self-regulation skills. It also helps the student learn the skills more quickly and be more likely to apply them in many situations. You can support the student during this process by doing the following:

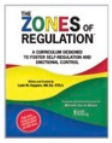
- Use the language and talk about the concepts of The Zones as they apply to you in a variety of environments. Make comments aloud so the student understands it is natural that we all experience the different Zones and use strategies to control (or regulate) ourselves. For example, "This is really frustrating me and making me go into the Yellow Zone. I need to use a tool to calm down. I will take some deep breaths."
- Help the student gain awareness of his or her Zones and feelings by pointing out your observations.
- Validate what Zone your students are in and help them brainstorm expected ways to self-regulate so their behavior is expected for the context.
- Share with the student how his or her behavior is affecting the Zone you are in and how you feel.
- Help the student become comfortable using the language to communicate his or her feelings and needs by encouraging the student to share his or her Zone with you.
- Show interest in learning about the student's triggers and Zones tools. Ask the student if he or she wants reminders to use these tools and how you should present these reminders.
- Ask the student to frequently share his or her Zones Folder with you and talk about what he or she has learned.
- Make sure to positively reinforce students for recognizing their Zone and managing their behaviors while in it, rather than only pointing out when students are demonstrating unexpected behaviors while in a Zone.

It is important to note that everyone experiences all of the Zones—the Red and Yellow Zones are not the "bad" or "naughty" Zones. All of the Zones are expected at one time or another. The Zones of Regulation is intended to be neutral and not communicate judgment.

Sincerely,

_____ _____

(name) (role on team)



To be used with *The Zones of Regulation*™ curriculum
Reproducible B

The ZONES of Regulation™ Glossary

Self-regulation: The ability to achieve the preferred state of alertness for the given situation. This includes regulating one's body's needs as well as one's emotions.

The Zones: A concept used to help students learn how to self-regulate. The Zones of Regulation creates a system to categorize how the body feels and emotions into four colored Zones with which the students can easily identify.

Blue Zone: Used to describe a low state of alertness. The Blue Zone is used to describe when one feels sad, tired, sick, or bored.

Green Zone: Used to describe the ideal state of alertness. A person may be described as calm, happy, focused, or content when he or she is in the Green Zone. The student feels a strong sense of internal control when in the Green Zone.

Yellow Zone: Used to describe a heightened state of alertness. A person may be experiencing stress, frustration, anxiety, excitement, silliness, or fear when in the Yellow Zone. The student's energy is elevated yet he or she feels some sense of internal control in the Yellow Zone.

Red Zone: Used to describe an extremely heightened state of alertness. A person may be experiencing anger, rage, explosive behavior, panic, extreme grief, terror, or elation when in the Red Zone and feels a loss of control.

Toolbox: A collection of calming and alerting strategies a student can pull from depending on the present need.

Tools or strategies: Used interchangeably to refer to a calming or alerting technique that aids the student in self-regulation.

Trigger: An irritant that causes a student to become less regulated and increases the likelihood of going into the Yellow or Red Zone.

Stop, Opt, and Go: A concept used to aid students in controlling impulses and problem solving better solutions. This phrase is paired with a stoplight to provide additional cues for students.

Expected behaviors[1]: Behaviors that give people around you **good or comfortable thoughts** about you.

Unexpected behaviors[1]: Behaviors that give people **uncomfortable thoughts** about you.

Doer: The person or persons doing the expected or unexpected behavior in a situation.

What is the size of the problem? and Is this a Big or Little Problem?[1]: Questions posed to help students measure the size of the problem they are experiencing (Big Problem, Medium Problem, or Little Problem).

Big Problems: Problems that many people share and that have no easy, quick, or pleasant solution.

Medium Problems: Problems some people share that are able to be resolved in an hour to a couple of days.

Little Problems: Problems that only affect one to two people and can be ignored or solved in a matter of minutes.

Inner critic: Used to describe negative, self-defeating thoughts.

Inner coach: Used to describe positive thoughts.

Superflex thinking[2]: A flexible thinking pattern in which a person is able to consider different points of view or ways to do something.

Rock Brain thinking[2]: A rigid thinking pattern in which a person gets stuck on an idea and has difficulty considering other options or ways to do something.

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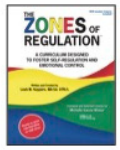
1 Social Thinking vocabulary developed by Michelle Garcia Winner, *Thinking About YOU Thinking About ME* (2007)

2 Social Thinking vocabulary developed by Stephanie Madrigal and Michelle Garcia Winner, *Superflex: A Superhero Social Thinking Curriculum* (2008)



To be used with *The Zones of Regulation*™ curriculum
Reproducible E

The ZONES of Regulation™

BLUE ZONE	GREEN ZONE	YELLOW ZONE	RED ZONE
Sad	Happy	Frustrated	Mad/Angry
Sick	Calm	Worried	Terrified
Tired	Feeling Okay	Silly/Wiggly	Elated/Ecstatic
Bored	Focused	Excited	Devastated
Moving Slowly	Relaxed	Loss of Some Control	Out of Control

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