Sensory-Based Resources and Lesson Plans for Community Child Development Center: A Doctoral Capstone Project

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Abstract

Sensory processing challenges make it difficult for a child to learn, concentrate, socialize, and engage in daily school-related activities. To effectively understand sensory processing challenges and the impact they may have on academic success, teachers must have a working knowledge of sensory processing. This project aimed to enhance early childhood education teachers' knowledge and understanding of sensory-based topics using a coaching approach. For this project, coaching involved helping teachers develop awareness, knowledge, and skills through the creation of sensory-based resources and the implementation of sensory-based lesson plans. Results from the qualitative data analysis indicated that coaching effectively facilitated learning and increased teachers' awareness of sensory processing differences, knowledge and understanding of sensory-based topics, and implementation of sensory strategies within the classroom. This project adds to the growing body of research to support the use of coaching for professional development in early education settings.

Keywords: sensory processing challenges, sensory-based resources, lesson plans, child development center, teachers, education, coaching

Sensory-Based Resources and Lesson Plans for Community Child Development Center: A Doctoral Capstone Project

This doctoral capstone project was completed in a community child development center located within Flanner House, an organization that is partnered with Indiana University Purdue University Indianapolis. For this project, the capstone student aimed to further early childhood education teachers' knowledge of sensory topics through the creation of sensory-based resources and the implementation of sensory-based lesson plans. The overall purpose of this project was to enhance teachers' knowledge of sensory topics to help them support children's sensory needs and academic success.

Flanner House

Flanner House is a non-profit, community-based organization that serves residents living on the Northwest side of Indianapolis, Indiana. The mission of Flanner House (n.d.) is "to support, advocate for, and empower individuals, children, and families by applying educational, social, and economic resources that move members of the community towards stabilization and self-sufficiency" (About, para. 1). Flanner House features several programs, including Health and Wellness, Food Justice, Economic Development, Community Asset Development, Skills to Success, Seniors Services, and Child and Youth Development. All of these programs are sustained through activity involved community members, including staff and volunteers, as well as grants and donations from funding sources such as United Way.

The Child Development Center at Flanner House is accredited by the National Early Childhood Program Accreditation (NECPA). Child and Youth programs offered in the Child Development Center include an affordable year-round program for children ages one to five, a Five Focus Summer Camp program, and a before and aftercare program for children grades

kindergarten through sixth. These programs provide an inclusive environment for children to learn, explore, and develop physically, intellectually, emotionally, and socially. During this project, there were children with neurodevelopmental differences as well as behavioral and emotional challenges enrolled in the Child and Youth Programs.

Project Need

Children with developmental differences and challenges are more likely to experience sensory processing difficulties that may significantly affect academic participation and performance. Sensory exploration within the Child Development Center at Flanner House is only encouraged to meet educational standards and students with specific sensory needs are not always able to participate or achieve their fullest academic potential due to barriers accessing the curriculum and activities. Teachers only receive sensory processing specific training from outside sources, and it is not a part of their standard training. While there are no full-time employed occupational therapists or other skilled professionals, occupational therapy students supervised by licensed occupational therapists provide developmental screenings and group services in the summer, but they are not sensory specific. Consequently, teachers currently have limited knowledge and understanding of sensory processing, the impact sensory processing difficulties may have on academic performance and participation, and how sensory strategies can be used to support children within the classroom.

Project Purpose

The focus area of this project was education aimed to enhance teachers' overall knowledge of sensory-based topics. Current research suggests that coaching is an effective strategy for helping teachers develop a better understanding of sensory processing challenges (Miller-Kuhaneck & Watling, 2018). Coaching involves helping teachers develop awareness,

knowledge, and skills that allow them to help support children's' sensory needs (Miller-Kahaneck & Watling, 2018). The purpose of this project was to bridge the gaps in the Child Development Center at Flanner House by enhancing teachers' knowledge of sensory topics using a coaching approach. For this project, coaching consisted of providing sensory-based resource packets detailing pertinent information, weekly lesson plans with hands-on sensory activities, and interactive final review sessions. The ultimate goal of this project was to provide teachers with knowledge and resources that would help them support children's sensory needs and overall academic success.

Needs Assessment

The needs assessment for this project was completed using interviews at various points in the process to determine the current gaps of the site and obtain information for tailoring the project. An initial interview occurred prior to the start of the project to develop a deeper understanding of the site and current level of knowledge regarding sensory topics. This interview identified a need for an educational project on sensory topics as there was limited knowledge and understanding of sensory topics. A second interview occurred during week three of the project to determine the best approach for coaching the teachers. A common theme from this interview was that existing barriers at the site would be a hindering factor for certain coaching approaches. Results from this interview indicated that coaching via embedded approaches would be the best fit for the site.

First Interview

The initial needs assessment interview was conducted with the deputy director at Flanner House several months before the project began. The purpose of this interview was to develop a deeper understanding of Flanner House and further assess the gaps within the Child

Development Center. During the interview, information about the teacher's current level of knowledge regarding sensory processing and the current use of sensory strategies was collected to help the student determine how to best bridge the gaps (see Appendix A for interview questions).

An overall theme that was identified following the needs assessment interview was that there was limited knowledge of sensory processing. Teachers working in the Child Development Center had a broad understanding of sensory within normal child development, however, there was a limited amount of understanding of the impacts sensory processing may have on academic participation and performance (D. White, personal communication, March 4, 2021). Further, teachers working in the Child Development Center had a limited understanding of the use of sensory strategies in supporting children's ability to learn and self-regulate (D. White, personal communication, March 4, 2021). It was explained that sensory exploration was only encouraged to meet educational standards (D. White, personal communication, March 4, 2021). Following the interview, it was determined that educational materials on sensory processing and related topics would greatly improve teachers' knowledge while helping the organization excel in its vision to provide high-quality learning environments that support children’s learning, growth, and development.

Second Interview

The student spent the first two weeks of this project getting acclimated to the site and building relationships to further understand the teachers’ and center’s needs. During these two weeks, the student learned of the day-to-day barriers for teachers–from chaotic staffing to busy schedules to difficult children. As the student reflected on these day-to-day barriers, it was determined that the project plan may need to be changed. Using clinical reasoning and in

consultation with mentors, the student decided that a second round of interview questions was necessary for updating the project plan and implementation.

The second interview was conducted during week three of this project with a key stakeholder in the Child Development Center at Flanner House (see Appendix B). The goal of this interview was to gain a deeper understanding of how to effectively coach the teachers. During the interview, it was explained that staffing shortages due to low pay rates, high turnover rates, and the increased spread of the COVID-19 virus were a barrier to holding recurring educational seminars (A. Guynn, personal communication, January 25, 2022). After discussing other coaching strategies, it was determined that educational resources and weekly lesson plans with descriptive information would be the most beneficial for enhancing teachers' knowledge of sensory processing and related topics. The teachers preferred paper educational resource packets versus electronic resources so that they could be easily accessed and referred to while on-site (A. Guynn, personal communication, January 25, 2022). Further, the teachers preferred attending a group presentation at the end of the project to recap the materials and assess learning (A. Guynn, personal communication, January 25, 2022).

Overall, the responses from the second interview showed that the teachers would benefit the most from materials that were practical and hands-on. Due to the day-to-day barriers the teachers were experiencing, it was not feasible to add on additional responsibilities that were time-consuming. However, it was feasible to provide low-stress resources that could easily be built into the teachers' day to day routines.

Literature Review

To support the planning and implementation of this project, the researcher examined current literature regarding sensory processing patterns and strategies. The databases that were

searched included PubMed and OTSeeker. The search terms included sensory, sensory processing disorder, autism spectrum disorder, attention deficit hyperactivity disorder, occupational therapy, schools, low income, poverty, and racial disparities. The literature was limited to articles that included children aged birth to 18 years and articles that were published within the last 5-10 years. All of the articles were screened by the researcher and included in the literature review based on relevance to the project, population, and site. Topics that emerged from the literature review included background and prevalence of sensory processing challenges, common sensory processing challenges, strategies for sensory processing challenges, and coaching for sensory processing challenges.

Background and Prevalence of Sensory Processing Challenges

Current research shows that sensory processing challenges occur in approximately 5-16% of children (Jirikowic et al., 2020). Sensory processing challenges can occur in typically developing children; however, research shows that children with neurodevelopmental differences are often disproportionately affected by these challenges (Jirikowic et al., 2020). Children diagnosed with Autism Spectrum Disorder (ASD), Attention Deficit Hyperactivity Disorder (ADHD), and developmental or learning disabilities are more likely to have sensory integration and processing challenges (Dunn, 2007). In addition to these conditions, recent research has shown that children with Prenatal Alcohol Exposure (PAE) or Fetal Alcohol Syndrome (FAS) are more likely to have atypical sensory integration and processing patterns (Jirikowic et al., 2020).

Racial, Cultural, and Social Differences

Other research has shown that neurodevelopmental differences can occur in all children, including those with racial, cultural, and social differences (Stahmer et al., 2019). However, a study by Stahmer et al. (2019) noted that children of different racial groups and low

socioeconomic households are diagnosed with ASD much later than white children and children of higher socioeconomic households. Children from these groups were additionally less likely to access appropriate services (Stahmer et al., 2019). Stahmer et al. (2019) examined the barriers to recognizing developmental concerns, acquiring a diagnosis, and accessing appropriate services and found that "providers dismissing concerns, difficulty navigating a confusing system, and limited provider availability due to either location or waitlists" were the most common barriers for these populations (p. 15). Similarly, in a study by Donohue et al. (2020), researchers found that black children were diagnosed with ASD nearly one and a half years later than white children. Donohue et al. (2019) explained that when compared to white parents, black parents reported fewer ASD concerns and more concerns about disruptive behaviors, causing frequent misdiagnoses or delays in ASD diagnoses among this population (Donohue et al., 2019). Finally, in a study by Rowland et al. (2018), researchers found that the risk of ADHD is higher among the poor and that the poor generally have less access to ADHD services. All of these findings combined indicate that racial, cultural, and social differences can be a significant barrier to receiving a proper diagnosis and proper services for children with neurodevelopmental and sensory processing differences.

Common Sensory Processing Challenges

Children with sensory processing challenges face difficulties in daily occupations, including education. Research has shown that children with sensory processing challenges are more likely to display symptoms such as excessive movement, inability to sit still, sudden urge to disturb other students, responsiveness to irrelevant stimuli, inability to concentrate on relevant stimuli, and inability to participate in classwork (Lin et al., 2012). All of these symptoms can negatively impact participation, performance, and success within the classroom. In addition to these symptoms, a study by Carpenter et al. (2019) suggests that preschoolers with sensory

sensitivity are at a higher risk for the development of an anxiety disorder. Anxiety disorders may make it difficult for children to learn and socially interact with peers. Further, anxiety disorders may cause sleep disruptions which can result in decreased levels of energy, motivation, and concentration, all of which negatively impact academic success (Carpenter et al., 2019).

Other research has shown that children with sensory processing challenges are more likely to have feeding difficulties due to aversions to certain sensory features of food, including color, smell, taste, and texture (Chistol et al., 2018). In a study by Chistol et al. (2018), researchers found that children with ASD refused more foods, had a limited food selection, and consumed fewer fruits and vegetables than typical children. Further, children with ASD were more likely to "restrict their diet to foods with preferred, tolerable, or manageable sensory features" (Chistol et al., 2018, p. 6). These findings indicate that children with sensory processing challenges may avoid nutritious foods that have unfavorable sensory features, which can increase the risk of being malnourished (Chistol et al., 2018). According to Little et al. (2019), food refusal and limited food selection can additionally contribute to chronic constipation, which is another problem commonly seen in children with atypical sensory processing patterns. Moreover, Beaudry-Bellefeuille et al. (2019), found that children with atypical sensory processing patterns are more likely to have issues with defecation that are unrelated to food selectivity and sensitivity. They suggested that defecation issues within this population may be related to sensitivity to touch, smell, and sound including wiping, hearing the toilet flush, or smelling one's feces (Beaudry-Bellefeuille et al., 2019). They further suggested that these issues may be related to low registration or an overall lack of awareness of the need to defecate, indicating an issue with interoception (Beaudry-Bellefeuille et al., 2019). All of these findings combined indicate that sensory processing challenges can be a significant barrier to a typical school routine that includes eating and using the restroom.

Strategies for Sensory Processing Challenges

One of the most common strategies suggested to address sensory processing challenges is Ayres Sensory Integration (ASI) intervention (Bodison & Parham, 2018). ASI interventions use a restorative approach to challenge problematic sensory areas and build competence to improve participation in daily activities (Bodison & Parham, 2018). ASI interventions are tailored to each unique child, however, some specific sensory techniques might include slow swinging to soothe a child, providing tactile stimulation to soothe or arouse a child, adding resistance to activities to enhance body awareness, or altering the pace and path of a swing to improve postural responses (Bodison & Parham, 2018). Other specific sensory strategies may include intermittently wearing a weighted vest or making modifications to a child's sensory environment by changing elements within the room (Bodison & Parham, 2018). All of the described sensory strategies can be used to support children's ability to learn, socialize, and participate within the classroom.

Compensatory interventions are another common strategy used to address sensory processing challenges (Bodison & Parham, 2018). An example of a compensatory intervention includes having a child sit on a therapy ball at his or her desk to promote attention through vestibular input (Bodison & Parham, 2018). Another example of a compensatory intervention includes using the Wilbarger brushing protocol or Qigong massage to improve a child's tolerance to different textures (Bodison & Parham, 2018). Further, sensory environmental modifications, such as altering lighting and reducing distracting visual or auditory stimuli are compensatory interventions commonly used to optimize learning environments for students with sensory impairments (Bodison & Parham, 2018). According to Bertsch & Brown (2019), desk modifications, such as the use of visual and tactile aids, can additionally be used to optimize learning environments and improve classroom performance. Bertsch & Brown (2019)

additionally suggest implementing movement breaks within the school day to provide vestibular and proprioceptive inputs that can improve a child's behavior and ability to stay on task. An example of a movement break might include an obstacle course that includes jumping, spinning, rolling, and bear walking.

Research further stresses the importance of addressing food selectivity in children with sensory processing challenges. Some strategies for addressing food selectivity include changing the texture and consistency of foods to more tolerable sensory features and using restorative approaches to decrease sensory sensitivities (Chistol et al., 2018). For example, if a child prefers dry, crunchy foods such as potato chips and refuses wet, soft foods such as bananas, food chaining can be done to increase tolerance to new foods and textures. In this example, one may introduce the child to banana chips, followed by banana slices, followed by a whole banana, followed by banana flavored pudding. This process helps the child build an acceptance of new foods that are similar in taste. Social stories and modeling are two other strategies that can be used to decrease food selectivity and sensitivity in children with sensory processing challenges (Clark et al., 2019). Social stories may include talking about a favorite character eating nonpreferred food, whereas modeling may include smelling, touching, and kissing nonpreferred food alongside the child, eventually working up to tasting and eating the nonpreferred food. Social stories can additionally be used to help children with sensory processing challenges successfully interact with peers during lunch, playground, and classroom activities (Clark et al., 2019).

Coaching for Sensory Processing Challenges

Current research suggests that coaching may be an effective strategy for helping parents and teachers develop a better understanding of sensory integration and processing challenges

(Miller-Kuhaneck & Watling, 2018). Coaching involves helping parents and teachers develop awareness, knowledge, and skills that allow them to help children meet their needs (Miller-Kuhaneck & Watling, 2018). In a study conducted by Gee & Peterson (2016), parents or teachers of children exhibiting sensory processing disorders attended a series of group educational sessions that were designed to increase the participants' knowledge, skills, and confidence in interacting with and intervening with children who have sensory processing disorders. The materials that were used in the educational sessions included PowerPoint lectures, discussions, and videos (Gee & Peterson, 2016). Results from this study indicated that the educational sessions and materials were effective in increasing the parents' and teachers' perceived knowledge of sensory processing concepts, actual knowledge of sensory processing concepts, and competence when working with children with sensory processing disorders (Gee & Peterson, 2016). Similarly, findings from a scoping review by Allen et al. (2021), suggested that coaching has the potential to improve parents' sense of competence and reduce parents' levels of stress.

Coaching in an Educational Setting

Though limited, research further suggests that coaching is a promising approach for professional development in early education settings. In a study by Erdoğan et al. (2022), researchers examined the effect of an e-mentoring-based education program on the professional development of preschool teachers. Researchers in this study found that mentoring supported preschool teachers' professional knowledge and learning environments (Erdoğan et al., 2022). In another study by Arteaga et al. (2019), researchers found that classroom coaching for preschool teachers leads to significant gains in child outcomes, including gross motor, language, and social-emotional outcomes. Similarly, in a study by Pianta et al. (2021), researchers found that coaching for preschool teachers helped improve children's school readiness skills. All of these

findings combined indicate that coaching is a promising strategy for enhancing teachers' knowledge and understanding of sensory topics and promoting children's academic success.

Gap Analysis

Broadly, sensory processing challenges may make it difficult for a child to learn, concentrate, participate, socialize, and engage in daily school-related activities such as playing, eating, napping, and using the bathroom. In order to support children's sensory needs within an academic setting, teachers must have a working knowledge of sensory processing. Therefore, the purpose of this project was to bridge gaps in teachers' knowledge of sensory processing and related topics that existed within the Child Development Center with the aim to support children's sensory needs and overall academic success.

Guiding Model and Frame of Reference

Due to the multi-faceted nature of the site, the student used many models and frame of references to best meet both the content and application needs of the site. Dunn's Model of Sensory Processing provided a theoretical basis for interpreting sensory information whereas Sensory Therapies and Research (STAR) Frame of Reference provided a theoretical basis for implementing effective interventions.

Dunn's Model of Sensory Processing

Dunn's Model of Sensory Processing is easily digestible, making it an ideal fit for this project. According to Dunn's Model of Sensory Processing, there are 4 basic patterns of sensory processing: sensation-seeking, sensation-avoiding, sensory sensitivity, and low registration (Dunn, 2007). These 4 basic patterns emerge when 2 constructs, neurological thresholds and self-regulation, intersect with one another (Dunn, 2007). Neurological thresholds are on a continuum from high to low. A person with a high sensory threshold will "miss stimuli that others notice

easily because the nervous system needs stronger stimuli to activate" (Dunn, 2007, p. 85), whereas a person with a low sensory threshold will "notice and respond to stimuli quite often because the nervous system readily activates to sensory events" (Dunn, 2007, p.85). The second construct, self-regulation, is also on a continuum. At one end of the continuum, a person is passive, letting things happen around them before reacting; at the other end, a person is active, controlling the things happening around them (Dunn, 2007). As stated by Dunn (2007), a person with a:

> (a) sensation-seeking pattern represents a high threshold and an active self-regulation strategy; (b) sensation-avoiding pattern represents a low threshold and an active self-regulation strategy; (c) sensory sensitivity pattern represents a low threshold and a passive self-regulation strategy, and (d) low registration pattern represents a high threshold and a passive self-regulation strategy" (p. 85).

The sensory patterns identified in Dunn's Model of Sensory Processing acted as a guide and provided a foundation for the educational materials created for this project. Sensation-seeking, sensation-avoiding, sensory sensitivity, and low registration patterns were explained to teachers to help them understand and interpret children's behaviors from a sensory perspective (see Appendix C for infographic). The teachers were additionally educated on strategies that would help them intervene with children who demonstrate each of these patterns. Further, case examples of children with each of these patterns were provided to promote active engagement.

STAR Frame of Reference

Sensory Therapies and Research (STAR) addresses sensory difficulties by focusing on the parent-child relationship and coaching parents in sensory-based strategies (Kramer et al., 2018). STAR interventions are rooted in Ayres sensory integration principles and individualized to meet each child's unique needs (Kramer et al., 2018). Central to STAR interventions is

playing (Kramer et al., 2018). During a STAR treatment session, therapists and parents use play to help children develop motor confidence, body awareness, impulse control, goal-directed actions, and social success (STAR Institute, n.d.). All of these skills help children thrive both at home and in school (STAR Institute, n.d.).

Core concepts of STAR helped guide and support the interventions and coaching approach used in this project. STAR provided confirmation that coaching was an effective strategy for facilitating learning for both the teachers and children. Further, STAR supported the creation of lesson plans that were collaborative and playful in nature. The lesson plans ultimately helped empower the teachers by giving them knowledge, understanding, and confidence in how to support children's sensory needs within the classroom.

Project Plan and Process

This project was an ongoing process that spanned 14 weeks. Broadly, the student spent these 14 weeks acclimating to the site, understanding the teacher's and center's needs, preparing project materials, completing necessary coursework, implementing project materials, and assessing the effectiveness of the project.

Project Plan

The plan for this project focused on enhancing teachers' knowledge and understanding of sensory topics through the creation of weekly lesson plans, teacher handouts, and educational resource packets describing sensory topics and strategies that can be implemented within the classroom. The original plan for the project was to develop and present educational information to teachers in group seminars. However, due to chaotic staffing and busy schedules, it was determined that group seminars would not be feasible throughout this project. Thus, the updated plan consisted of creating and implementing lesson plans and providing teachers with various sensory-based resource packets–two educational resources that were practical, meaningful, and

beneficial to the site's needs. Resource packets were rooted in evidence, covering the topics of sensory integration and processing, autism spectrum disorder, attention-deficit hyperactivity disorder, and low registration, sensory-seeking, sensory sensitivity, and sensory-avoiding sensory processing patterns. Lesson plans were developed to enhance knowledge and understanding of the eight senses and demonstrate ways to incorporate sensory activities into an educational setting.

The project plan was further updated and refined during week ten of this project in response to the continuous day-to-day barriers experienced by the teachers. The student originally planned to hold a final group presentation during the last week of the project as requested during the second needs assessment interview. However, as the student attempted to arrange the final presentation, it was determined that there was not a time or date that would work for the site due to ongoing staffing shortages. The updated plan consisted of providing student-led final review sessions with available teachers during the lunch and nap hour(s) of the day.

Evaluation Plan

Early on, the student determined that evaluation methods that required a lot of time, energy, and effort would be a barrier for teachers. With this in mind, the student purposefully selected an evaluation plan that was simple and practical to implement while providing rich qualitative data. In order to collect qualitative data, the student spent several hours in the classroom each week of the project conversing with teachers and taking field notes by gathering key observations, key statements of evidence, and examples of learning. The student later coded the key observations, key statements of evidence, and examples of learning to determine patterns and assess the effectiveness of the project.

Project Goals and Objectives

The following goals and objectives were developed to achieve the project and evaluation plan discussed above. The first two project goals aligned with the project plan, whereas the third project goal aligned with the evaluation plan.

Project Goal 1. The student will develop sensory-based educational materials for the teachers in the Child Development Center at Flanner House to increase knowledge and understanding and promote success within the classroom.

Objective 1. The student will collaborate with the teachers to determine what educational materials will best help them in supporting the sensory needs of students.

Objective 2. The student will create a variety of evidence-based educational materials, including resource packets, handouts, and case examples, that can be referenced and utilized by teachers.

Objective 3. The student will take health literacy into consideration while developing educational materials and provide materials that the teachers can read and understand.

Project Goal 2. The student will develop lesson plans for the teachers in the Child Development Center at Flanner House to further knowledge and understanding of how sensory activities can be incorporated into an educational setting.

Objective 1. The student will create eight lesson plans covering the tactile, visual, auditory, olfactory, gustatory, vestibular, proprioceptive, and interoceptive senses.

Objective 2. The student will prepare all necessary materials and provide hard copies of each lesson plan, followed by a brief informational sheet designed to deepen teachers' knowledge of each of the senses.

Objective 3. The student will collaboratively implement each lesson plan in at least two classrooms per week.

Objective 4. The student will provide opportunities for the teachers to ask questions and offer feedback for each lesson plan.

Project Goal 3. The student will collect qualitative data throughout the doctoral capstone to determine the effectiveness of the doctoral capstone project.

Objective 1. The student will spend 15 or more hours in the classrooms each week of the doctoral capstone experience conversing with teachers and collecting qualitative data via field notes.

Objective 2. The student will keep a detailed record of key statements of evidence and examples of learning described by the teachers each week of the doctoral capstone experience.

Objective 3. The student will code key statements of evidence and examples of learning to determine patterns.

Objective 4. The student will assess the collected qualitative data to determine the effectiveness of the doctoral capstone project.

Project Process

The project included a period of acclimation, additional needs assessment, preparation, implementation, and final review. The student spent the first couple of weeks becoming familiar with the culture of the site and fostering relationships with the stakeholders, teachers, and children in the Child Development Center. During this time, the student got a glimpse of the day-to-day barriers experienced by teachers in the Child Development Center and began to recognize the need for refinement of the project plan.

During weeks three and four of this project, the student conducted a second needs assessment interview to determine what educational resources would be the most meaningful and beneficial to the site. Based on feedback from the interview, the project plan was refined. The updated project goals and objectives were reviewed and accepted by the site and faculty mentors.

During weeks five and six, the student prepared project materials. Regular meetings with the site and faculty mentor were held to discuss the content in the project materials. Following the preparation of the materials, the student began the early stages of project implementation.

Weeks seven through thirteen were the primary implementation period for this project. A total of seven educational resource psvkryd were provided to teachers in each of the classrooms in the Child Development Center. The student frequently checked in with the teachers, allowing opportunities for the teachers to ask questions and offer feedback. Further, a total of eight lesson plans were implemented in collaboration with teachers across different classrooms. Throughout the implementation period, the student collected qualitative data via field notes detailing key observations, key statements of evidence, and examples of learning. In the final stages of these seven weeks, the student additionally set aside time for data analysis and planning of the final review.

During the final week of this project, the student led interactive review sessions recapping learning with available teachers in the Child Development Center. These final review sessions provided teachers with an opportunity to assess learning, ask questions, and offer feedback. Following the final review sessions, the student provided the site with a binder composed of all the project materials to promote sustainability and encourage future use.

Project Implementation

To implement the project, intentional recruitment methods were used to include participants who would benefit from the project materials. All participants were encouraged to learn from and implement the project materials when working with children enrolled in the Child Development Center.

Participants and Recruitment Process

A total of 18 participants were included in this study. All participants were teachers or staff members employed in the Child Development Center at Flanner House. Teacher and staff demographics were predominantly female and Black. All participants received access to the educational resource packets and seven participants helped implement lesson plans in collaboration with the capstone student. A total of three participants engaged in a final review session with the capstone student. Approval from the Indiana University Institutional Review Board was needed and obtained for this project under protocol #12666.

Project Components and Methods

Implementation of the project materials occurred during weeks 6-14. During these nine weeks, seven educational resource packets were provided to each classroom, eight lesson plans were implemented, and three final review sessions were provided. Lesson plans and final review sessions primarily involved teachers of children in the two to four-year-old classrooms. The student focused on teachers of children in this age group, rather than infants and one-year-olds, as they would benefit most from the project materials.

Timeline of Events

Week 6. The first lesson plan covering the tactile sense was implemented in one three-year-old classroom. During this lesson, the children worked on tolerance to different textures in a finger painting activity. Throughout the lesson, several textures, including soft, squishy, fuzzy,

pokey, wet, messy, fluffy, and cold, were described by the teacher and children. A brief informational sheet was provided to the teacher following the activity to increase knowledge and understanding of the tactile system. See Appendix C for sample lesson plans and informational sheets.

Week 7. The second lesson plan covering the interoceptive sense was implemented in two three-year-old classrooms. During these lessons, the children worked on understanding and feeling what is going on inside their bodies. Throughout the lesson, the teachers, children, and capstone student collaboratively discussed the feelings and emotions we experience inside our bodies, including when we are happy, sad, scared, angry, hungry, thirsty, hot, cold, need to use the bathroom, and need to take a deep breath. Two brief informational sheets were provided to the teachers following the activity to increase knowledge and understanding of the interoceptive sense. See Appendix C for sample lesson plans and informational sheets.

Week 8. The third lesson plan covering the visual sense was implemented in one three-year-old classroom. During this lesson, the children worked on exploring with their eyes for visual stimulation. Throughout the lesson, the teacher, children, and capstone student collaboratively discussed all of the different colors and reactions they observed while doing a lava lamp experiment. A brief informational sheet was provided to the teacher following the activity to increase knowledge and understanding of the visual sense. See Appendix C for sample lesson plans and informational sheets.

One educational resource packet was provided to the teachers in each of the classrooms. This resource included information on the eight senses, the definition of sensory integration and processing, the sensory processing patterns, and the potential risk factors for sensory processing differences. See Appendix D for sample educational resource packet.

Week 9. The fourth lesson plan covering the auditory sense was implemented in one three-year-old classroom and one four-year-old classroom. During this lesson, the children worked on exploring musical instruments for auditory stimulation. Throughout the activity, the teacher, children, and capstone student collaboratively described all of the different sounds they heard and how those sounds made them feel. A brief informational sheet was provided to the teachers following the activity to increase knowledge and understanding of the auditory sense. See Appendix C for sample lesson plans and informational sheets.

Two educational resource packets were provided to the teachers in each of the classrooms. These resource packets included information about ASD and ADHD, including what these conditions are, common signs and symptoms, potential risk factors, the diagnostic process, and treatment strategies or tips for managing these conditions. See Appendix D for sample educational resource packet.

Week 10. The fifth lesson plan covering the olfactory sense was implemented in two three-year-old classrooms. During this lesson, the children worked on tolerance to different smells. Throughout the activity, the teachers, children, and capstone student collaboratively discussed the properties of each smell and if the smell was tied to any emotions or memories. A brief informational sheet was provided to the teachers following the activity to increase knowledge and understanding of the olfactory sense. See Appendix C for sample lesson plans and informational sheets.

Two educational resource packets were provided to the teachers in each of the classrooms. These resource packets included information on low registration and sensation-seeking sensory processing patterns. Both resource packets provided insight into how a child with low registration or sensation-seeking patterns may present across the gustatory, olfactory,

tactile, visual, auditory, vestibular, and proprioceptive senses. Further, both resource packets included case examples with sensory-specific strategies for helping and supporting these children. A handout listing the strategies included in the resource packet was additionally provided to teachers for quick reference. See Appendix D for sample educational resource packet and Appendix E for sample case example.

Week 11. The sixth lesson plan covering the proprioceptive sense was implemented in two two-year-old classrooms, two three-year-old classrooms, and one four-year-old classroom. During this lesson, the children worked on understanding where and how their bodies are moving while doing an obstacle course that required multiple movements. The capstone student discussed the proprioceptive sense with the teachers and provided them with a few brief informational sheets following the activity to increase knowledge and understanding of the proprioceptive sense. See Appendix C for sample lesson plans and informational sheets.

Week 12. The seventh lesson plan covering the vestibular sense was implemented in two three-year-old classrooms. During this lesson, the children worked on understanding where their body is in space while riding scooter boards. The capstone student discussed the vestibular sense with the teachers and provided them with two brief informational sheets following the activity to further their knowledge and understanding of the vestibular sense. See Appendix C for sample lesson plans and informational sheets.

The remaining two educational resource packets were provided to teachers in each of the classrooms. These resource packets included information on sensory sensitive and sensation-avoiding sensory processing patterns. Both resource packets provided insight into how a child with sensory sensitive or sensation-avoiding patterns may present across the gustatory, olfactory, tactile, visual, auditory, vestibular, and proprioceptive senses. Further, both resource packets

included case examples with sensory-specific strategies for helping and supporting these children. A handout listing the strategies included in the resource packet was additionally provided to teachers for quick reference. See Appendix D for sample educational resource packet and Appendix E for sample case example.

Week 13. The eighth lesson plan covering the gustatory sense was implemented in one three-year-old classroom. During this lesson, the children were encouraged to explore and feel what is going on with their mouth, tongue, and cheeks during a blow paint activity. Throughout the activity, the capstone student explained the difference between the gustatory sense, or sense of taste, and the oral sense which helps us to eat and speak. The teacher was provided with a brief informational sheet following the activity further knowledge and understanding of the gustatory and oral senses. See Appendix C for sample lesson plans and informational sheets.

Week 14. Final review sessions were completed with three teachers. All final review sessions were in-person with individual instruction led by the student. Each review session took approximately one hour. During each final review session, the student emphasized and explained pertinent information from the resource packets that were provided to the teachers throughout the project. Specifically, the student discussed and defined the eight senses, including visual, auditory, olfactory, gustatory, tactile, vestibular, proprioceptive, and interoceptive senses. During this discussion, the student recapped the activities that were implemented to target each of these senses to help the teachers further understand the relationship between the lesson plans and resource packets. Following the discussion on the eight senses, the student defined sensory processing and briefly reviewed sensory processing disorder. The student then explained Dunn's Model of Sensory Processing Patterns to each teacher and walked them through the case examples that were provided for each of the four sensory processing patterns. Throughout this

discussion, the student aimed to simplify the information by helping the teachers understand that children often need either more or less sensory input to meet their sensory needs. The student further aimed to help the teachers realize that the sensory strategies provided in the resource packets could easily be implemented within the classroom. Following the final review session, the student encouraged the teachers to ask questions and provide feedback on the project.

Project Evaluation

Rich qualitative data was collected over the span of this project to determine the effectiveness of the project materials. Themes identified in the qualitative data analysis corresponded with and met all of the project outcomes set by the student.

Methodology

Qualitative research methods were primarily used to collect and analyze data to best understand how each teacher experienced this project and its effectiveness. One of the advantages of qualitative research was that it displayed the voices and perspectives of the participants (Bhandari, 2020). Throughout the project, the student empowered each teacher to share his or her unique experience with the project materials. In doing so, the student was able to seamlessly collect detailed descriptions of the teachers' learning and perceptions of the project materials. Using qualitative research methods, the student was additionally able to remain flexible and make changes to the project as needed.

Data Collection

Each week of the capstone experience, the student spent at least 24 hours in the classrooms observing and conversing with the teachers. The student took field notes via a detailed record of key observations, key statements of evidence, and examples of learning

explicitly stated by the teachers. The student later analyzed key observations, key statements of evidence, and examples of learning through thematic analysis.

Analysis

Thematic analysis began with familiarization of the data set, followed by coding significant phrases and sentences in the data. Next, the student examined the codes to identify patterns and determine broader themes. Finally, the student defined and named each theme. Refer to Table 1 for a sample of the thematic analysis process.

Results

Four main themes emerged from the final coding during thematic analysis: effective project materials; increased awareness of sensory processing differences; increased knowledge and understanding of sensory-based topics; and implementation of sensory strategies.

Table 1

Sample of Thematic Analysis

Initial Codes	Sample Statements	Final Theme
Easy to read and understand	• The resource packets were very easy to read and understand. • The lesson plans were easy to follow.	Effective project materials
Future use	• I plan to continue using the lesson plans in the future. • I plan to use this information to have discussions with parents and help children get the services they need.	
Positive feedback	• The lesson plans were simple, not requiring too many materials or too much time. • It was helpful to see examples of how children are processing different sensory information in the case examples.	

Increased awareness	• I noticed the doesn't like touching things that are wet or messy • I noticed the child always covers his ears when other children are crying loudly	Increased awareness of sensory processing differences
Knowledge and understanding	• I recognize that some behaviors are sensory related rather than pure defiance. • I have a much better understanding of how to incorporate sensory activities into the classroom. • I understand why this child moves his body dangerously.	Increased knowledge and understanding of sensory-based topics
Implementation	• We have done an obstacle course and various running and jumping activities in the gross motor room. • I offered the child play doh to increase his tolerance to unfavorable textures. • I offered the child a straw to drink her applesauce for extra sensory input.	Implementation of sensory strategies

Effective Project Materials

The first theme identified in the thematic analysis indicated that the project materials were effective for the teachers learning. These included phrases, sentences, and specific examples about the creation and implementation of lesson plans, handouts, and resources. Many teachers perceived the project materials to be digestible, stating that the materials were easy to read, understand, and follow. In addition to being digestible, many of the teachers perceived the project materials to be practical, sustainable, and beneficial to their learning. The teachers explained that the overview of the conditions and case examples were really helpful in their learning. Further, the teachers explained that the resources could be used to have tough conversations with parents about getting children the services that they need.

Increased Awareness of Sensory Processing Differences

The second theme identified in the thematic analysis indicated that the teachers had increased awareness of sensory processing differences. Several phrases, sentences, and specific examples were made that conveyed the teachers' recognition of sensory processing differences across the tactile, visual, auditory, olfactory, gustatory, vestibular, proprioceptive, and interoceptive senses.

Increase Knowledge and Understanding of Sensory-Based Topics

The third theme identified in the thematic analysis indicated that the teachers had increased knowledge and understanding of sensory processing and related topics. Several broad statements of learning were made in addition to more specific examples of learning. Teachers demonstrated increased understanding of child behavior and sensory processing needs. Teachers additionally demonstrated increased knowledge of the vestibular, proprioceptive, and interoceptive senses, increased knowledge of sensory sensitivity and sensation-avoiding sensory processing patterns, and increased understanding of how to incorporate sensory activities into the classroom.

Implementation of Sensory Strategies

The fourth and final theme of the thematic analysis was implementation of sensory strategies. Numerous phrases and sentences indicated that the teachers were implementing sensory strategies that were included in the project materials. Many teachers intentionally incorporated activities that targeted and supported the tactile, oral, vestibular, proprioceptive, and interoceptive senses. One of the teachers worked hard to increase a child’s tolerance to different textures, both tactically and orally, by implementing crafts that incorporated unfavorable textures and encouraging the child to smell and taste unfavorable foods during lunch. Another teacher worked hard to provide extra vestibular and proprioceptive to children that sought sensory input,

frequently creating opportunities for movement. Another teacher worked hard to help her children continue learning, exploring, and understanding their internal body sensations. To do so, the teacher incorporated recurring breathing exercises and played music that talked about feelings and emotions.

Discussion

Overall, this project helped to enhance teachers' knowledge and understanding of sensory-based topics. This was the primary objective this project aimed to complete, addressing the gap in teachers' knowledge and understanding of sensory processing identified in the needs assessment. Teachers learned that sensory processing differences affect academic performance and participation, and how to provide sensory strategies and enriched activities to better support children within the classroom.

To address the gap in teachers' knowledge and understanding of sensory processing, coaching, an evidence-based intervention for sensory processing difficulties, was provided to facilitate learning and enhance teachers' overall knowledge. This project provided teachers with meaningful sensory-based educational materials, including lesson plans, handouts, and resource packets that could be referenced and utilized throughout the course of the project and in the future.

All project goals and objectives were achieved through the creation and implementation of project materials. In accordance with the themes generated from the thematic analysis, all educational materials, including the lesson plans, handouts, and resource packets were effective in enhancing teachers' knowledge and understanding of sensory-based topics. Health literacy and the school’s specific barriers and strengths were prioritized, resulting in materials that were useful, easy to implement, and beneficial to learning. By the end of the project, the student was

able to collect rich qualitative data that demonstrated the effectiveness of the project materials. Overall, teachers demonstrated increased awareness of sensory processing differences and challenges, increased knowledge and understanding of sensory-based topics, and increased implementation of sensory strategies within the classroom. These findings aligned with the ultimate goal of this project which was to provide teachers with knowledge and resources that will help them to support children's sensory needs and overall academic success.

It is additionally important to note that as a result of this project, teachers at this site have started to recognize that challenging behaviors are not always rooted in defiance. Teachers have a much better understanding of how sensory processing challenges may impact children and how certain behaviors, such as unruliness and disorder, may be sensory-related. This is significant in regard to current literature suggesting misdiagnoses or delays in proper diagnoses are often due to misinterpretation of children's behavior. These findings indicate that the teachers at this site have taken a step forward in helping the children get the services they need.

Limitations

Limitations of this project include day-to-day barriers experienced by teachers at this site. As previously discussed, common day-to-day barriers include chaotic staffing and busy schedules due to low pay rates, high turnover rates, and absences due to illness. These day-to-day barriers led to a larger barrier in participation in this capstone project. Unfortunately, many of the teachers found it challenging to fully participate in learning and absorbing the information provided in the educational resources due to workload management. Further, teachers day-to-day barriers led to decreased participation in the final review of educational materials. During the later stages of the project, it was determined that a final, group presentation was not feasible due to continuous staffing shortages. The student strove to hold review sessions with as many

teachers as possible, however, only three teachers were available to participate in a final, interactive review of the project materials. In future projects, it would be beneficial to implement several student-led presentations discussing the project materials, specifically the resource packets, if possible. Student-led presentations in a group seminar would allow more opportunity for teachers to actively engage with the materials, problem-solve case examples, ask questions, and provide feedback.

Impact

This project had a positive impact on many different levels. For the site, this project helped educate teachers and staff on sensory-based topics and provided them with resources to better serve their children while excelling in their vision to provide high-quality learning environments that support all children's learning, growth, and development. Hopefully, this project will continue to lead to increased support of children's sensory needs and overall academic success for children enrolled at Flanner House. For the occupational therapy profession, this project helped reinforce the value and importance of providing service to community members and organizations. For the occupational therapy student, this project provided invaluable knowledge, confidence, and skills in an area of interest. The knowledge, confidence, and skills gained from this project will continue to benefit the student in future career endeavors.

Sustainability Plan

To promote sustainability and carryover of this project, the student provided the site with a binder containing all of the project materials including educational resources and lesson plans. The binder was handed off to the deputy director, who plans to continue advocating for the use of this binder and the project materials included within it. The director made it clear that she

would introduce the project materials to all new teachers and encourage continued learning and implementation of the lesson plans. In addition to the binder, each classroom is equipped with all of the project materials to further promote carryover. Having the materials readily available in the classrooms ensures easy access for the teachers–they do not have to leave the classroom or set aside additional time to retrieve the information they are seeking out. Further, they can quickly and easily refer to the resources for activities and strategies that will support them in helping children experiencing sensory differences. Occupational therapy fieldwork students are additionally present every summer and will continue to implement and educate on sensory processing and specific strategies.

Conclusion

Prior to this project, teachers were lacking sensory processing specific training and resources that would help them support children's sensory needs. In result of this project, teachers have demonstrated increased knowledge and understanding of sensory processing and the impact sensory processing may have on academic success. Teachers have provided children with access to sensory-rich activities and have an increased likelihood of implementing sensory specific strategies in the future. Additionally, teachers have an increased likelihood of recognizing and getting services for children who have sensory processing challenges, which will ultimately help children learn and achieve their fullest potential academically.

References

Allen, S., Knott, F. J., Branson, A., & Lane, S. J. (2021, June 17). Coaching parents of children with sensory integration difficulties: A scoping review. *Occupational Therapy International, 2021*. https://doi.org/10.1155/2021/6662724

Arteaga, I., Thornburg, K., Darolia, R., & Hawks, J. (2019). Improving teacher practices with children under five: Experimental evidence from the Mississippi buildings blocks. *Evaluation review, 43*(1-2), 41–76. https://doi.org/10.1177/0193841X19865070

Beaudry-Bellefeuille, I., Lane, S. J., & Lane, A. E. (2019). Sensory integration concerns in children with functional defecation disorders: A scoping review. *American Journal of Occupational Therapy, 73*(3), 7303205050p1-7303205050p13. https://doi.org/10.5014/ajot.2019.030387

Bertsch, B., & Browen, K. (2019). Creating a sensory inclusive classroom: A guide for teachers. *Occupational Therapy Capstones*, 403. https://commons.und.edu/ot-grad/403

Bhandari, P. (2020, June 19). *What is qualitative research? | Methods & examples.* Scribbr. https://www.scribbr.com/methodology/qualitative-research/

Bodison, S. C., & Parham, L. D. (2018). Specific sensory techniques and sensory environmental modifications for children and youth with sensory integration difficulties: A systematic review. *American Journal of Occupational Therapy, 72*(1), 7201190040p1-7201190040p11. https://doi.org/10.5014/ajot.2018.029413

Carpenter, K. L., Baranek, G. T., Copeland, W. E., Compton, S., Zucker, N., Dawson, G., & Egger, H. L. (2019, June 1). Sensory over-responsivity: An early risk factor for anxiety and behavioral challenges in young children. *Journal of abnormal child psychology, 47*(6), 1075–1088. https://doi.org/10.1007/s10802-018-0502-y

Chistol, L. T., Bandini, L. G., Must, A., Phillips, S., Cermak, S. A., & Curtin, C. (2018). Sensory

sensitivity and food selectivity in children with autism spectrum disorder. *Journal of autism and developmental disorders*, *48*(2), 583-591. https://doi.org/10.1007/s10803-017-3340-9

Clark, G. F., Watling, R., Parham, L. D., & Schaaf, R. (2019). Occupational therapy interventions for children and youth with challenges in sensory integration and sensory processing: A school-based practice case example. *American Journal of Occupational Therapy*, *73*(3), 7303390010p1-7303390010p8. https://doi.org/10.5014/ajot.2019.733001

Donohue, M. R., Childs, A. W., Richards, M., & Robins, D. L. (2019). Race influences parent report of concerns about symptoms of autism spectrum disorder. *Autism*, *23*(1), 100-111. https://doi.org/10.1177/1362361317722030

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

Erdoğan, S., Haktanır, G., Kuru, N., Parpucu, N., & Tüylü, D. K. (2022). The effect of the e-mentoring-based education program on professional development of preschool teachers. *Education and Information Technologies*, *27*(1), 1023-1053. https://doi.org/10.1007/s10639-021-10623-y

Flanner House (n.d.) *About.* https://www.flannerhouse.org/about

Flanner House. (n.d.). *Child & youth development center*. https://www.flannerhouse.org/childcare

Gee, B. M., & Peterson, T. W. (2016). Changes in caregiver knowledge and perceived

competency following group education about sensory processing disturbances: An exploratory study. *Occupational therapy international*, *23*(4), 338-345. https://doi.org/10.1002/oti.1435

Jirikowic, T. L., Thorne, J. C., McLaughlin, S. A., Waddington, T., Lee, A. K., & Hemingway, S. J. A. (2020, March 20). Prevalence and patterns of sensory processing behaviors in a large clinical sample of children with prenatal alcohol exposure. *Research in developmental disabilities*, *100*, 103617. https://doi.org/10.1016/j.ridd.2020.103617

Kramer, P., Hinojosa, J., & Howe, T. (2018). *Frames of reference for pediatric occupational therapy*. Wolters Kluwer.

Lin, C. L., Min, Y. F., Chou, L. W., & Lin, C. K. (2012). Effectiveness of sensory processing strategies on activity level in inclusive preschool classrooms. *Neuropsychiatric disease and treatment*, *8*, 475–481. https://doi.org/10.2147/NDT.S37146

Little, L. M., Benton, K., Manuel-Rubio, M., Saps, M., & Fishbein, M. (2019). Contribution of sensory processing to chronic constipation in preschool children. *The Journal of pediatrics*, *210*, 141-145. https://doi.org/10.1016/j.jpeds.2019.03.020

Miller-Kuhaneck, H., & Watling, R. (2018). Parental or teacher education and coaching to support function and participation of children and youth with sensory processing and sensory integration challenges: A systematic review. *American Journal of Occupational Therapy*, *72*(1), 7201190030p1-7201190030p11. https://doi.org/10.5014/ajot.2018.029017

Pianta, R. C., Lipscomb, D., & Ruzek, E. (2021). Coaching teachers to improve students' school readiness skills: Indirect effects of teacher-student interaction. *Child development*, *92*(6), 2509–2528. https://doi.org/10.1111/cdev.13600

Rowland, A. S., Skipper, B. J., Rabiner, D. L., Qeadan, F., Campbell, R. A., Naftel, A. J., &

Umbach, D. M. (2018, March 1). Attention-Deficit/Hyperactivity Disorder (ADHD): Interaction between socioeconomic status and parental history of ADHD determines prevalence. *Journal of Child Psychology and Psychiatry*, *59*(3), 213-222. https://doi.org/10.1111/jcpp.12775

Stahmer, A. C., Vejnoska, S., Iadarola, S., Straiton, D., Segovia, F. R., Luelmo, P., Morgan, E. H., Lee, H. S., Javed, A., Bronstein, B. Hochheimer, S., Cho, E., Aranbarri, A., Mandell, D., Hassrick, E. M., Smith, T., & Kasari, C. (2019). Caregiver voices: Cross-cultural input on improving access to autism services. *Journal of racial and ethnic health disparities*, *6*(4), 752-773. https://doi.org/10.1007/s40615-019-00575-y

STAR Institute. (n.d.). *Occupational therapy for children.* https://sensoryhealth.org/basic/occupational-therapy-for-children

Appendix A

Needs Assessment Interview Questions Part 1

1. Describe the current level of knowledge on sensory processing within the Child & Youth Development Center.
2. Describe the current level of knowledge on sensory inclusive environments within the Child & Youth Development Center.
3. Describe sensory strategies that are currently in place in the Child & Youth Development Programs.
4. Describe the characteristics of the children in the Child & Youth Development Programs.
5. What does a typical day look like for the children in the Child & Youth Development Programs?
6. Would it be beneficial to create educational materials regarding sensory processing and sensory inclusive environments that are tailored for the caregivers of children who attend Child & Youth Development Programs?
7. Do my proposed educational materials seem like a good fit for the Child & Youth Development Center? Would they add value to your services?
8. As an occupational therapy student, are there any other unmet needs within the Child & Youth Development Center that I might be able to consider?

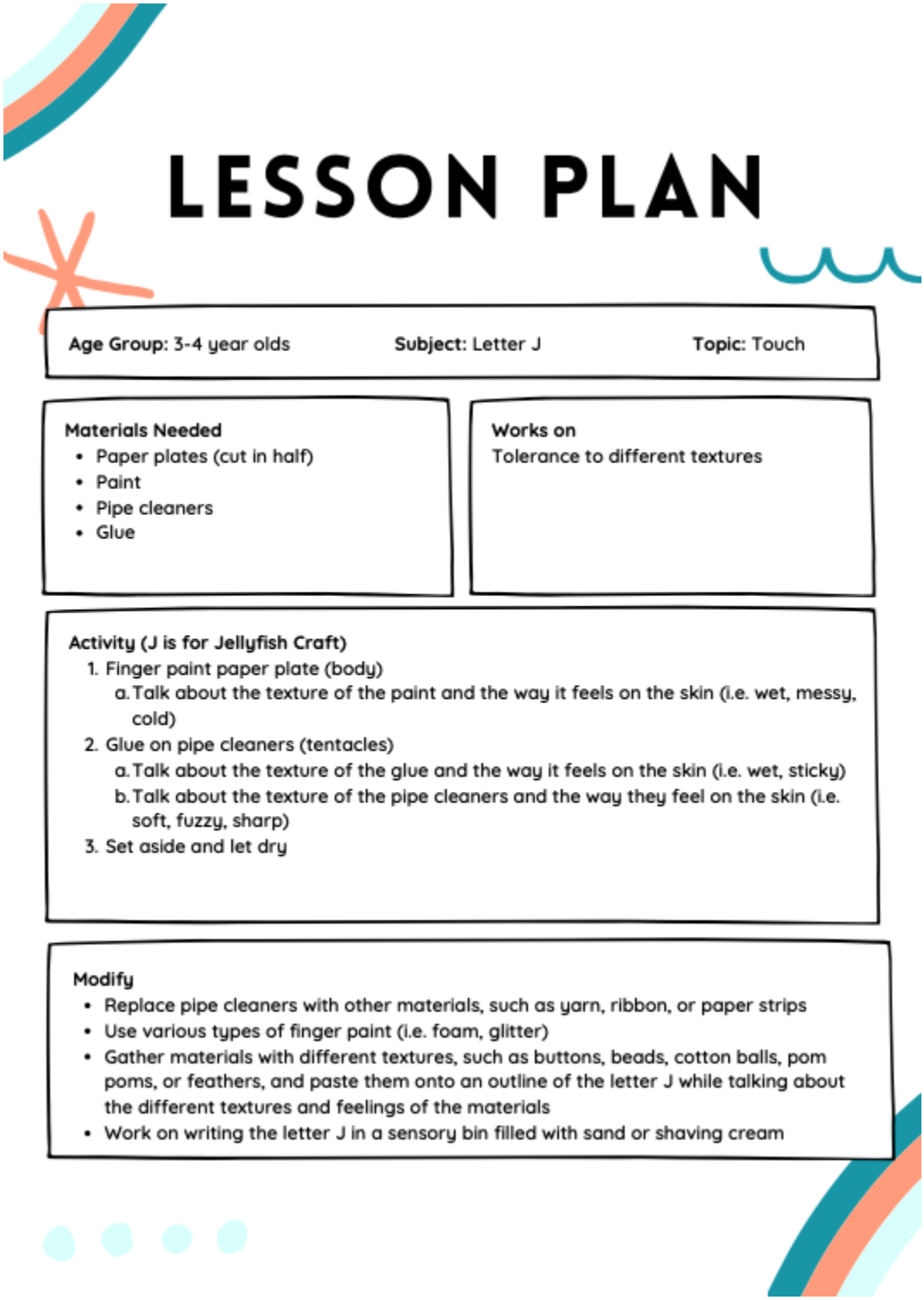
Appendix B

Needs Assessment Interview Questions Part 2

1. What educational materials would be the most beneficial for teachers in the Child Development Center?
2. What is the best way to distribute the educational materials to the teachers in the Child Development Center?
3. What is the best way to assess the teachers' learning of the educational materials provided?

Appendix C

Sample Lesson Plans and Information Sheets



LESSON PLAN

Age Group: 3-4 year olds **Subject:** Letter J **Topic:** Touch

Materials Needed
- Paper plates (cut in half)
- Paint
- Pipe cleaners
- Glue

Works on
Tolerance to different textures

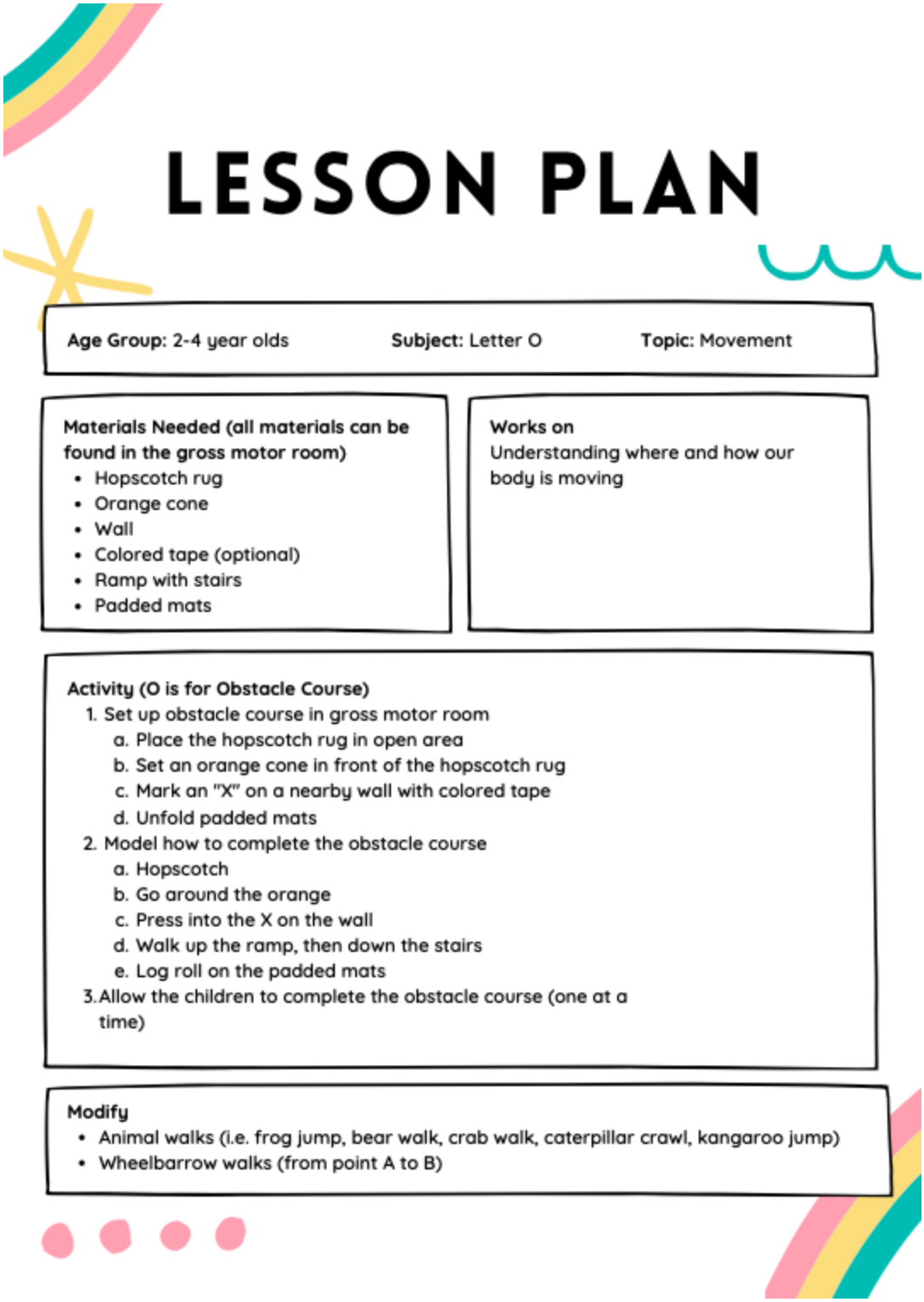
Activity (J is for Jellyfish Craft)
1. Finger paint paper plate (body)
   a. Talk about the texture of the paint and the way it feels on the skin (i.e. wet, messy, cold)
2. Glue on pipe cleaners (tentacles)
   a. Talk about the texture of the glue and the way it feels on the skin (i.e. wet, sticky)
   b. Talk about the texture of the pipe cleaners and the way they feel on the skin (i.e. soft, fuzzy, sharp)
3. Set aside and let dry

Modify
- Replace pipe cleaners with other materials, such as yarn, ribbon, or paper strips
- Use various types of finger paint (i.e. foam, glitter)
- Gather materials with different textures, such as buttons, beads, cotton balls, pom poms, or feathers, and paste them onto an outline of the letter J while talking about the different textures and feelings of the materials
- Work on writing the letter J in a sensory bin filled with sand or shaving cream

TACTILE (TOUCH) SENSE

Our tactile system is responsible for processing information we receive when we physically touch and feel things through our skin.

Our tactile system helps us understand the important sensations of **pressure, vibration, texture, hot and cold, and pain**. This includes discriminating between light touch and firm touch, and textures from dry to wet and messy. Our tactile system is also associated with bonding and relationships.



LESSON PLAN

Age Group: 2-4 year olds **Subject:** Letter O **Topic:** Movement

Materials Needed (all materials can be found in the gross motor room)

- Hopscotch rug
- Orange cone
- Wall
- Colored tape (optional)
- Ramp with stairs
- Padded mats

Works on

Understanding where and how our body is moving

Activity (O is for Obstacle Course)

1. Set up obstacle course in gross motor room
   a. Place the hopscotch rug in open area
   b. Set an orange cone in front of the hopscotch rug
   c. Mark an "X" on a nearby wall with colored tape
   d. Unfold padded mats
2. Model how to complete the obstacle course
   a. Hopscotch
   b. Go around the orange
   c. Press into the X on the wall
   d. Walk up the ramp, then down the stairs
   e. Log roll on the padded mats
3. Allow the children to complete the obstacle course (one at a time)

Modify

- Animal walks (i.e. frog jump, bear walk, crab walk, caterpillar crawl, kangaroo jump)
- Wheelbarrow walks (from point A to B)

PROPRIOCEPTION (MUSCLES & JOINTS) SENSE

This sense processes information that is received from muscle and joint movements. It tells you where your different body parts are and what they are doing, which is why it's known as the body awareness sense. This sense further allows us to detect the force and speed of our movements.

For example, our proprioceptive system allows us to take a drink without having to look at the cup as we move it to our mouth. Our proprioceptive system additionally ensures our hand moves the cup smoothly and slowly so that it doesn't spill or crash into our face.

PROPRIOCEPTION (MUSCLES & JOINTS) SENSE

Proprioceptive input can be regulating, calming, soothing, organizing, and/or alerting, depending on the current state of our nervous system.

For example, if a child is overexcited, finding it hard to concentrate, proprioceptive activities can help them to feel more grounded, enabling them to focus.
If however, a child is feeling drowsy, finding it hard to wake up and concentrate, proprioceptive activities can help them feel more alert, without being overstimulated.

Sensory-rich activities are those which involve the steady stimulation of several senses, including the proprioceptive sense. These will help children to organize their senses. This sensory organization is fundamental for enabling and supporting learning.

PROPRIOCEPTION (MUSCLES & JOINTS) SENSE

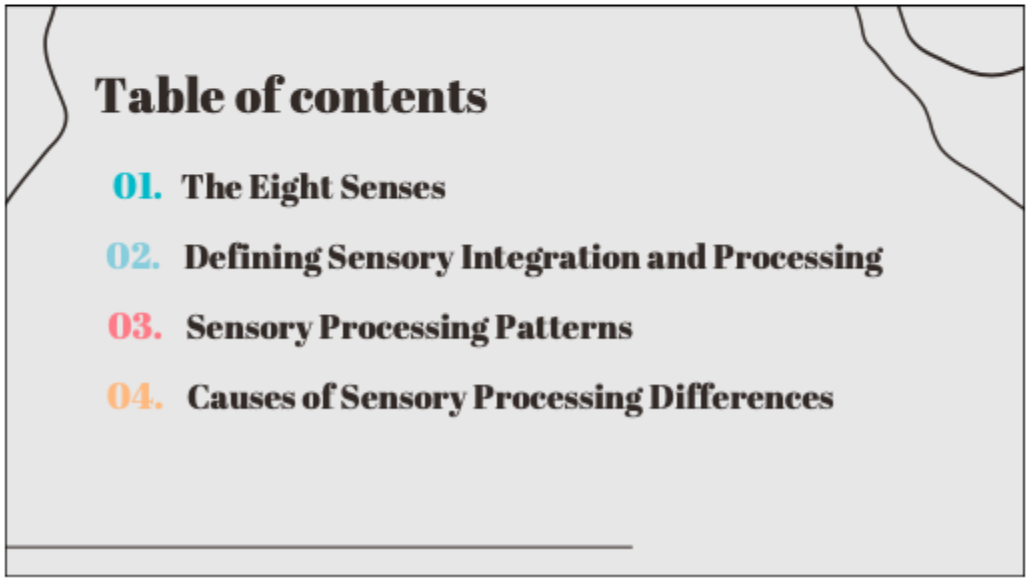
Activities that stimulate the proprioceptive sense:

- Pushing
- Pulling
- Squeezing
- Climbing
- Lifting
- Stretching

Appendix D

Sample Educational Resource Packet

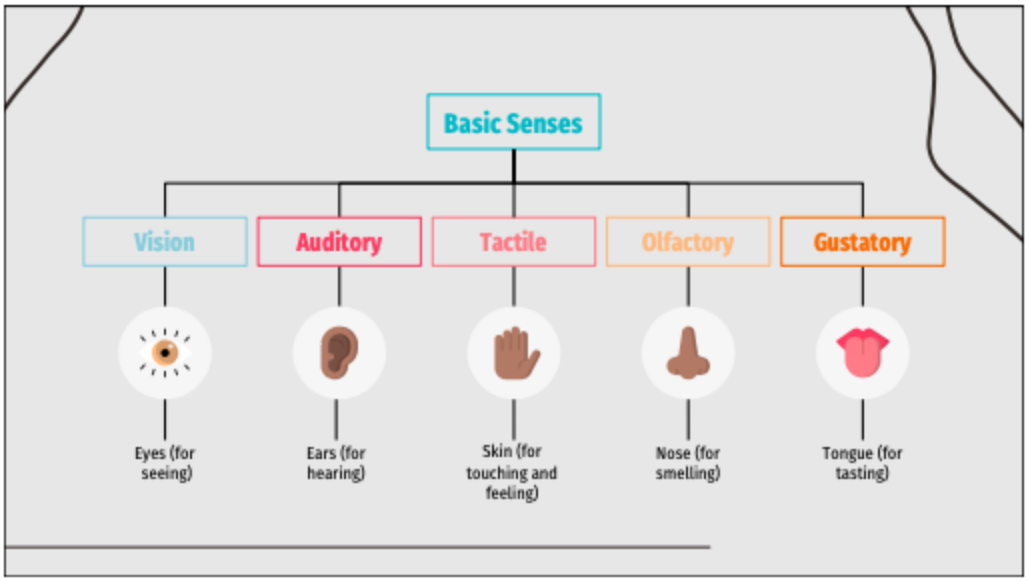
1



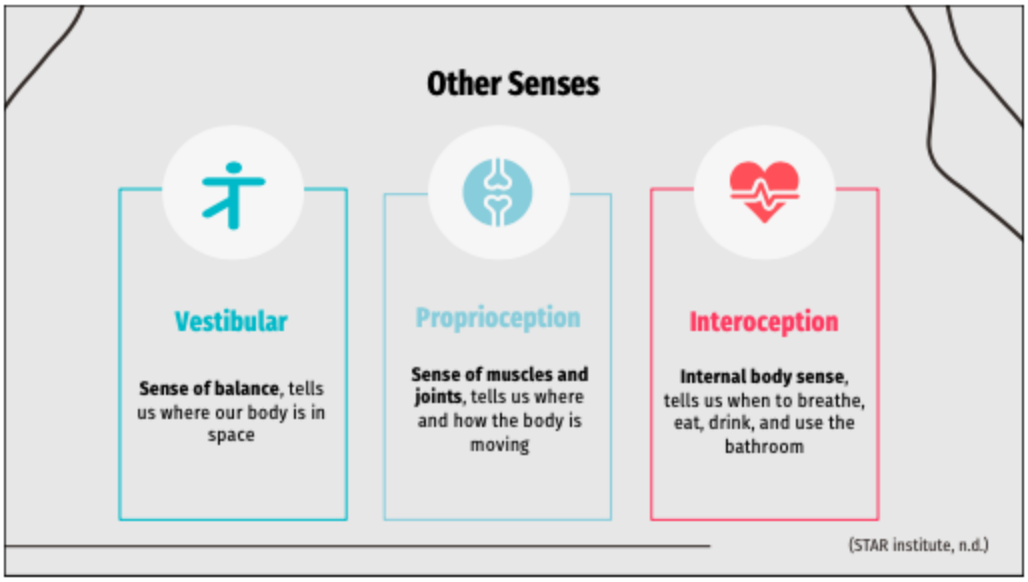
2


01.
The Eight Senses

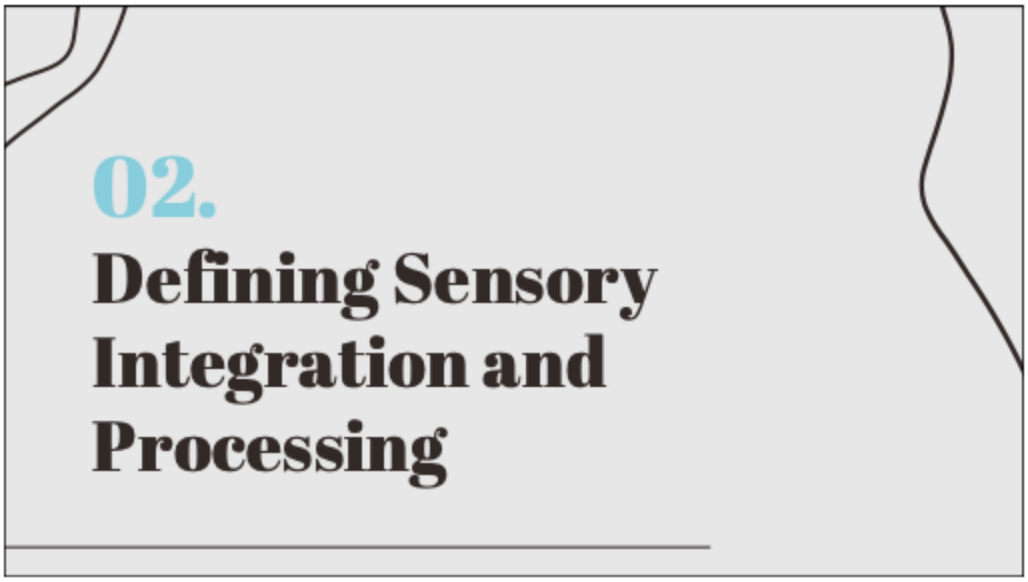
3


Basic Senses
Vision
Auditory
Tactile
Olfactory
Gustatory
Eyes (for seeing)
Ears (for hearing)
Skin (for touching and feeling)
Nose (for smelling)
Tongue (for tasting)

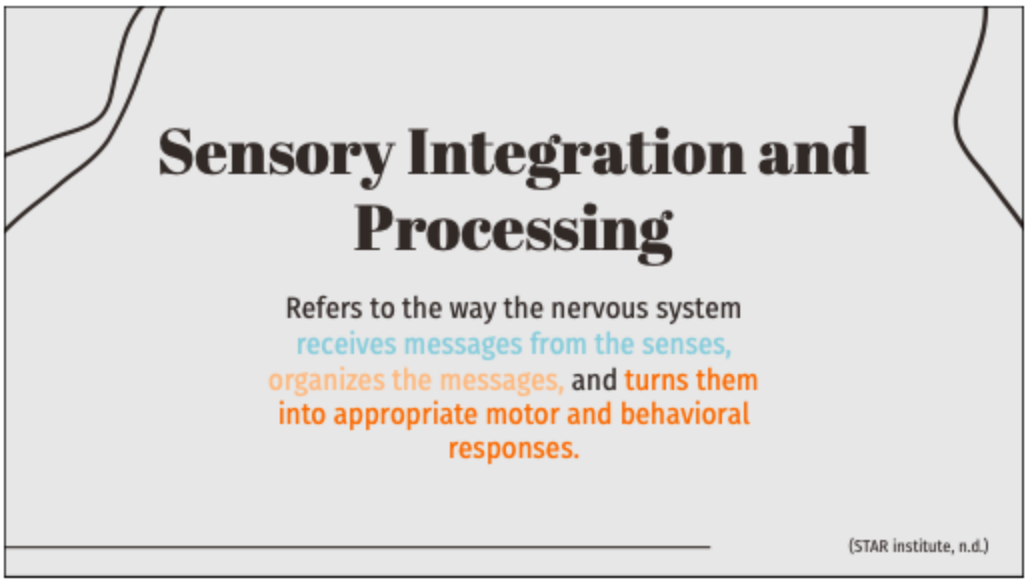
4


Other Senses
Vestibular
Sense of balance, tells us where our body is in space
Proprioception
Sense of muscles and joints, tells us where and how the body is moving
Interoception
Internal body sense, tells us when to breathe, eat, drink, and use the bathroom
(STAR institute, n.d.)

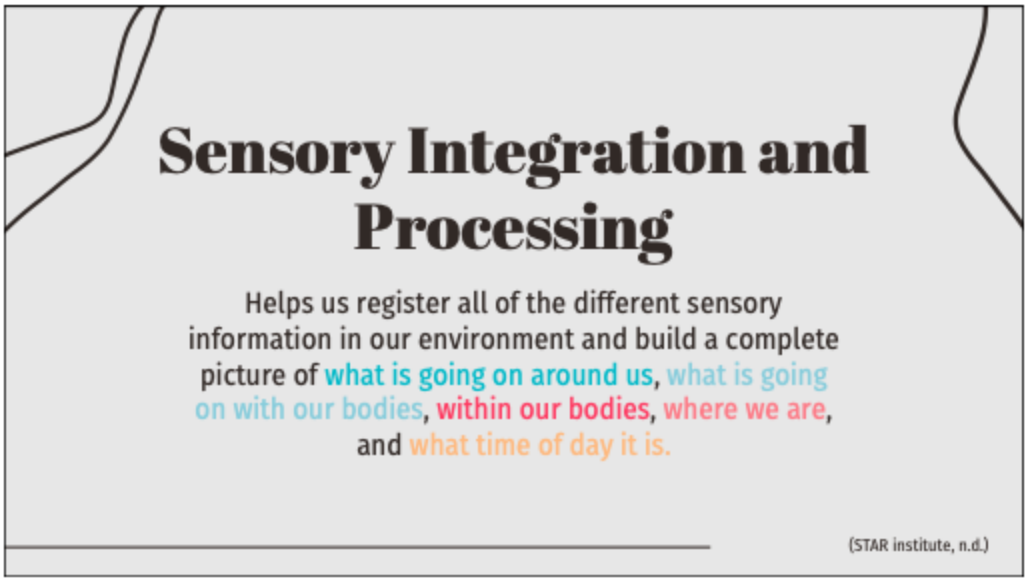
5


02.
Defining Sensory Integration and Processing

6


Sensory Integration and Processing
Refers to the way the nervous system receives messages from the senses, organizes the messages, and turns them into appropriate motor and behavioral responses.
(STAR institute, n.d.)

7


Sensory Integration and Processing
Helps us register all of the different sensory information in our environment and build a complete picture of what is going on around us, what is going on with our bodies, within our bodies, where we are, and what time of day it is.
(STAR institute, n.d.)

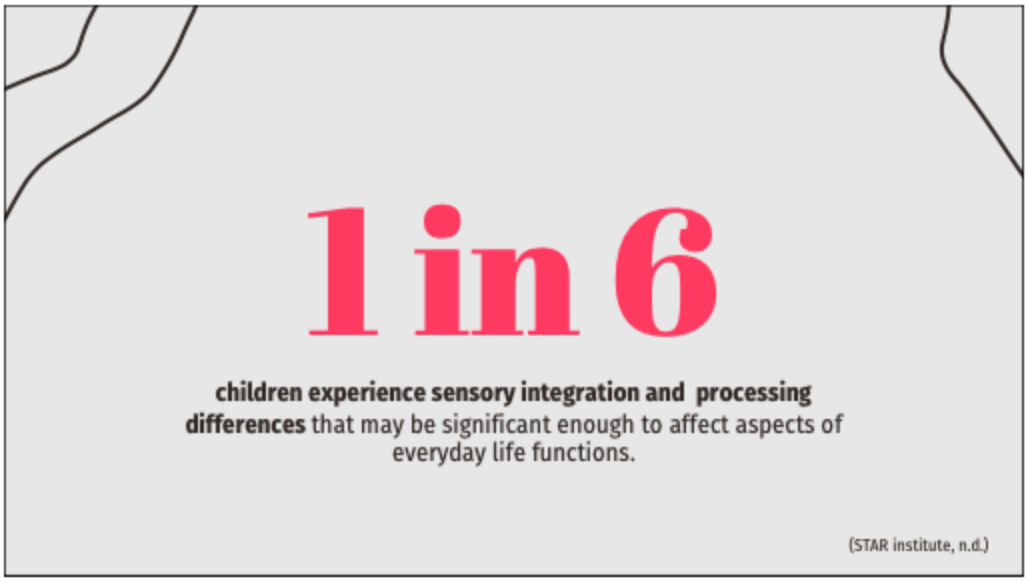
8


Sensory Integration and Processing
Helps us determine how to functionally engage in everyday tasks such as walking, talking, learning, playing, and eating.
(STAR institute, n.d.)

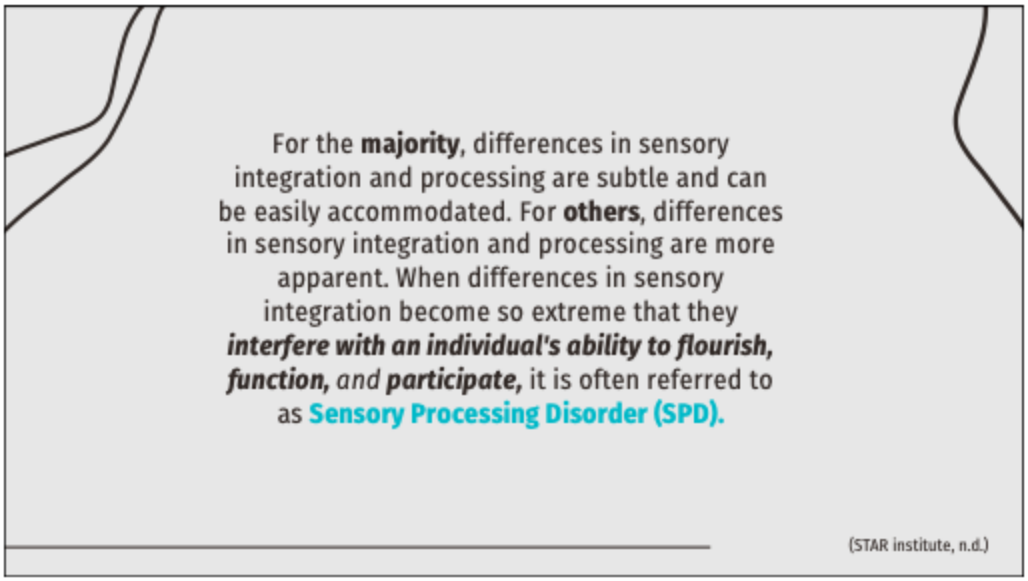
9


Sensory Integration and Processing
Helps us develop resilience, establish a tolerance for stressful situations, learn to be calm under pressure, and process experiences that are challenging or upsetting.
(STAR institute, n.d.)

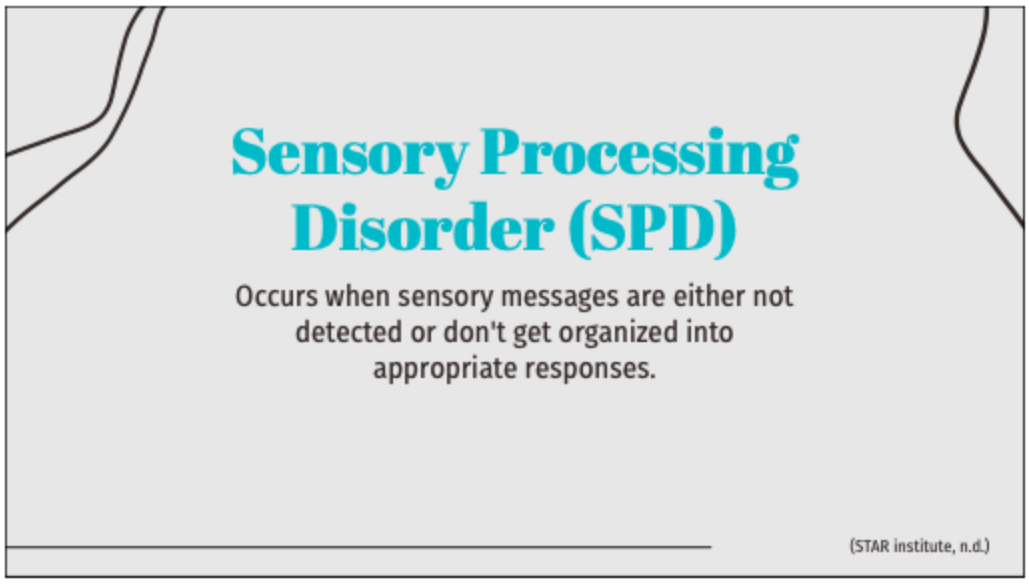
10


1 in 6
children experience sensory integration and processing differences that may be significant enough to affect aspects of everyday life functions.
(STAR institute, n.d.)

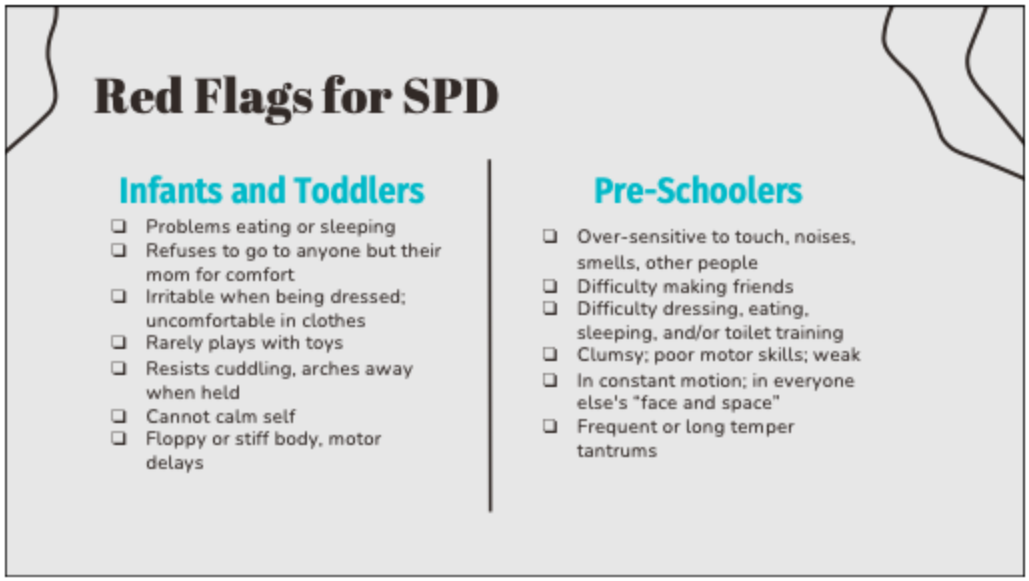
11


For the majority, differences in sensory integration and processing are subtle and can be easily accommodated. For others, differences in sensory integration and processing are more apparent. When differences in sensory integration become so extreme that they interfere with an individual's ability to flourish, function, and participate, it is often referred to as Sensory Processing Disorder (SPD).
(STAR institute, n.d.)

12


Sensory Processing Disorder (SPD)
Occurs when sensory messages are either not detected or don't get organized into appropriate responses.
(STAR institute, n.d.)

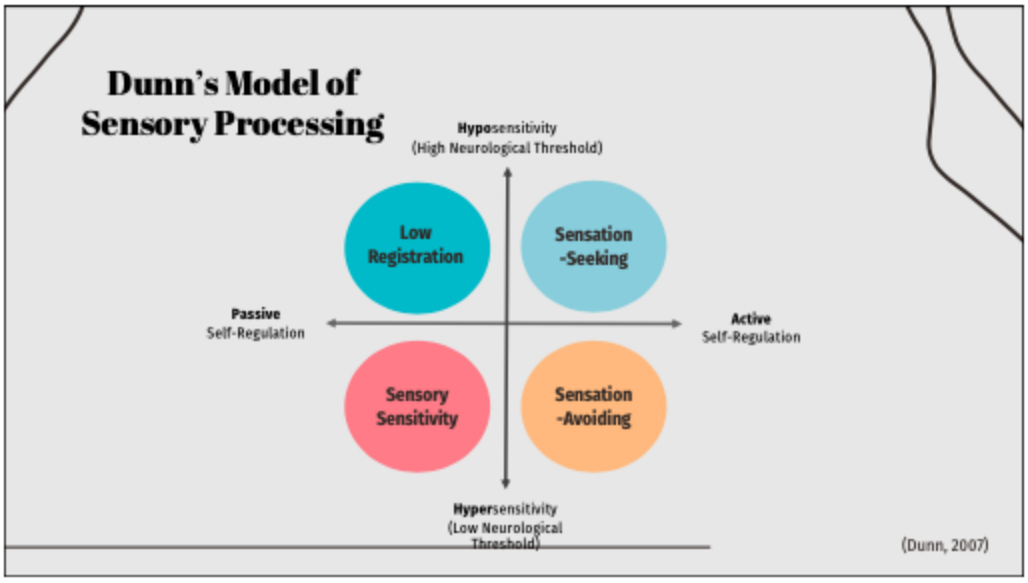
13


Red Flags for SPD
Infants and Toddlers
Problems eating or sleeping
Refuses to go to anyone but their mom for comfort
Irritable when being dressed; uncomfortable in clothes
Rarely plays with toys
Resists cuddling, arches away when held
Cannot calm self
Floppy or stiff body, motor delays
Pre-Schoolers
Over-sensitive to touch, noises, smells, other people
Difficulty making friends
Difficulty dressing, eating, sleeping, and/or toilet training
Clumsy; poor motor skills; weak
In constant motion; in everyone else's "face and space"
Frequent or long temper tantrums

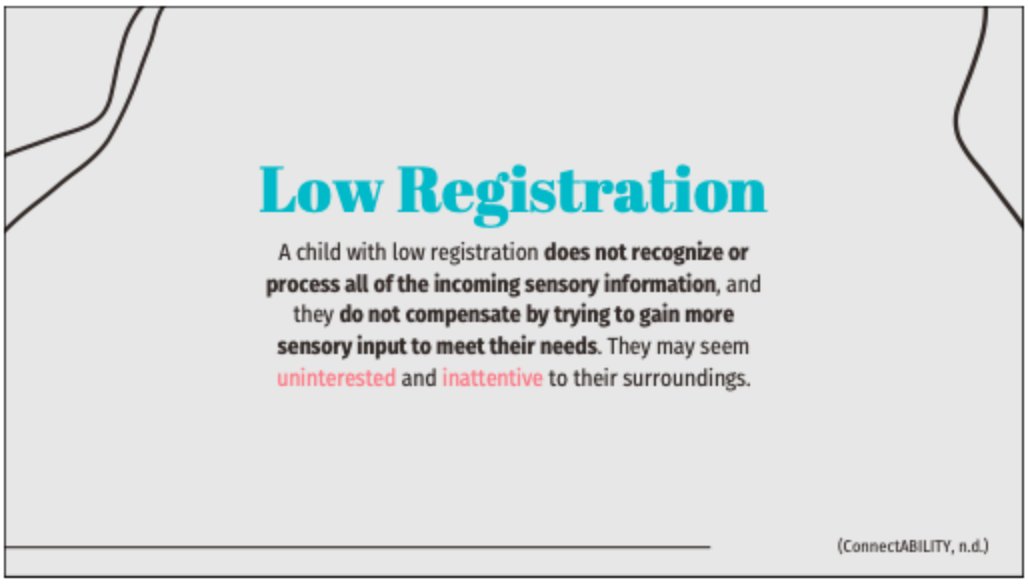
14


03.
Sensory
Processing
Patterns

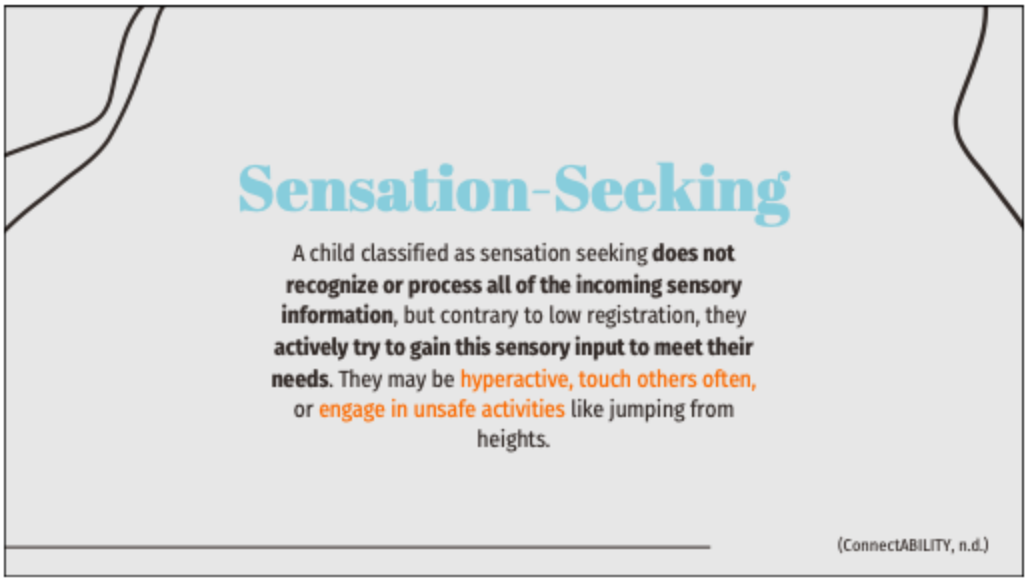
15


Dunn's Model of
Sensory Processing
Hyposensitivity
(High Neurological Threshold)
Low
Registration
Sensation
-Seeking
Passive
Self-Regulation
Active
Self-Regulation
Sensory
Sensitivity
Sensation
-Avoiding
Hypersensitivity
(Low Neurological
Threshold)
(Dunn, 2007)

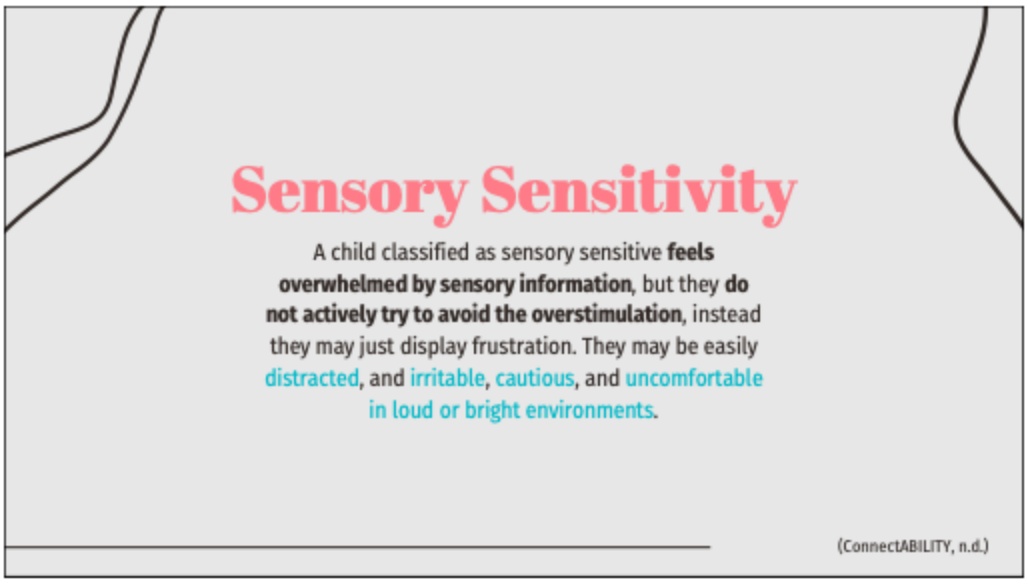
16


Low Registration
A child with low registration does not recognize or process all of the incoming sensory information, and they do not compensate by trying to gain more sensory input to meet their needs. They may seem uninterested and inattentive to their surroundings.
(ConnectABILITY, n.d.)

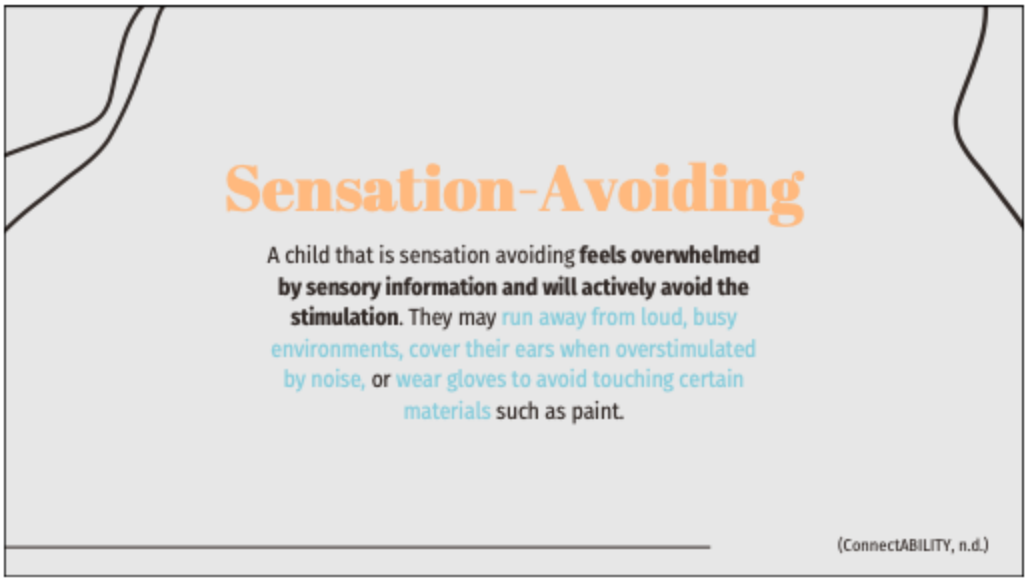
17


Sensation-Seeking
A child classified as sensation seeking does not recognize or process all of the incoming sensory information, but contrary to low registration, they actively try to gain this sensory input to meet their needs. They may be hyperactive, touch others often, or engage in unsafe activities like jumping from heights.
(ConnectABILITY, n.d.)

18


Sensory Sensitivity
A child classified as sensory sensitive **feels overwhelmed by sensory information**, but they **do not actively try to avoid the overstimulation**, instead they may just display frustration. They may be easily distracted, and irritable, cautious, and uncomfortable in loud or bright environments.
(ConnectABILITY, n.d.)

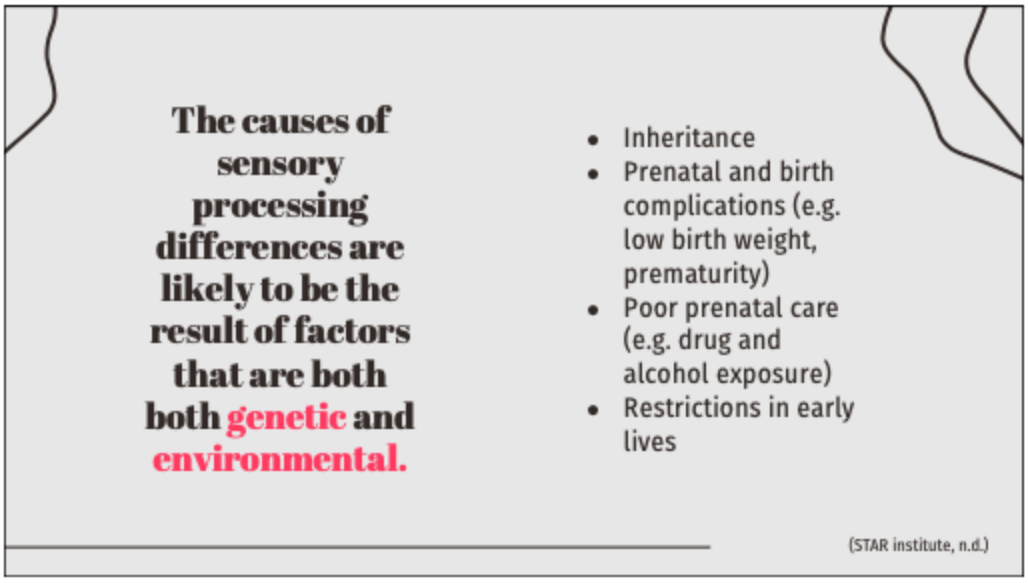
19


Sensation-Avoiding
A child that is sensation avoiding **feels overwhelmed by sensory information and will actively avoid the stimulation**. They may run away from loud, busy environments, cover their ears when overstimulated by noise, or wear gloves to avoid touching certain materials such as paint.
(ConnectABILITY, n.d.)

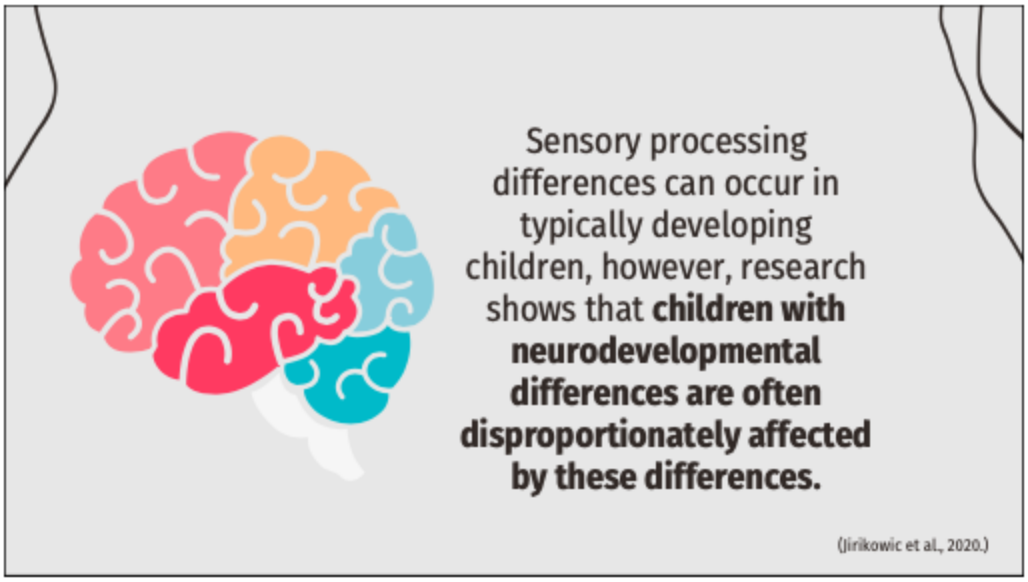
20


04.
Causes of Sensory Processing Differences

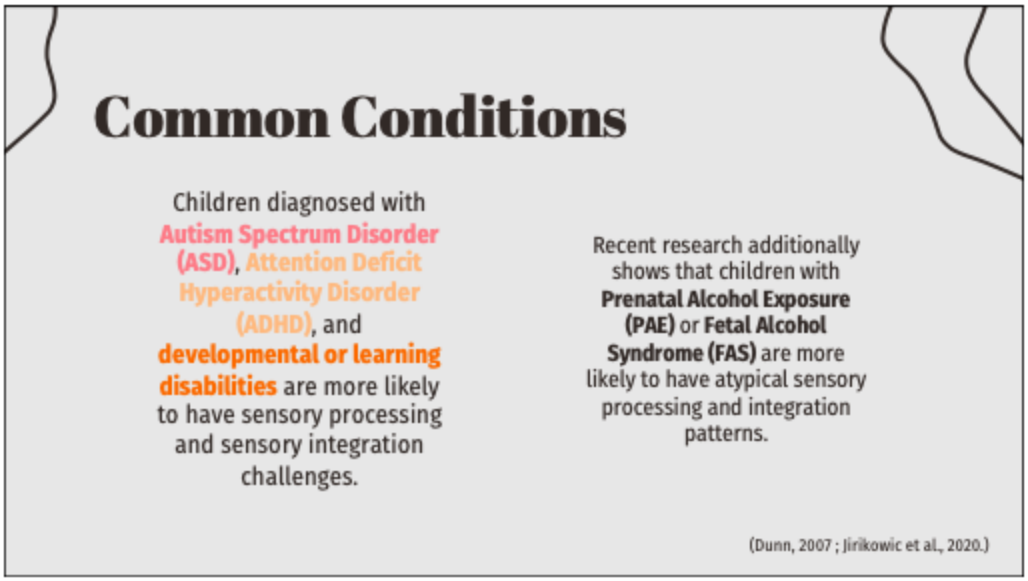
21


The causes of sensory processing differences are likely to be the result of factors that are both both genetic and environmental.
Inheritance
Prenatal and birth complications (e.g. low birth weight, prematurity)
Poor prenatal care (e.g. drug and alcohol exposure)
Restrictions in early lives
(STAR institute, n.d.)

22


Sensory processing differences can occur in typically developing children, however, research shows that **children with neurodevelopmental differences are often disproportionately affected by these differences.**
(Jirikowic et al., 2020.)

23


Common Conditions
Children diagnosed with Autism Spectrum Disorder (ASD), Attention Deficit Hyperactivity Disorder (ADHD), and developmental or learning disabilities are more likely to have sensory processing and sensory integration challenges.
Recent research additionally shows that children with **Prenatal Alcohol Exposure (PAE)** or **Fetal Alcohol Syndrome (FAS)** are more likely to have atypical sensory processing and integration patterns.
(Dunn, 2007 ; Jirikowic et al., 2020.)

24

Resources

- ConnectABILITY. (n.d.) *Four patterns of sensory processing.* https://connectability.ca/2020/07/14/four-patterns-of-sensory-processing/
- Dunn, W. (2007). Supporting children to participate successfully in everyday life by using sensory processing knowledge. *Infants & Young Children, 20*(2), 84-101. https://doi.org/10.1097/01.IYC.0000264477.05076.5d
- Jirikowic, T. L., Thorne, J. C., McLaughlin, S. A., Waddington, T., Lee, A. K., & Hemingway, S. J. A. (2020, March 20). Prevalence and patterns of sensory processing behaviors in a large clinical sample of children with prenatal alcohol exposure. *Research in developmental disabilities, 100*, 103617. https://doi.org/10.1016/j.ridd.2020.103617
- STAR Institute. (n.d.). *About SPD.* https://sensoryhealth.org/basic/about-spd
- STAR Institute. (n.d.). *Red flags for SPD.* https://sensoryhealth.org/basic/red-flags-for-spd
- STAR Institute. (n.d.). *Understanding sensory processing disorder.* https://sensoryhealth.org/basic/understanding-sensory-processing-disorder
- STAR Institute. (n.d.). *Your 8 senses.* https://sensoryhealth.org/basic/your-8-senses

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Thanks!

Do you have any questions?

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Doctoral Capstone Project / 2022

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Appendix E

Sample Case Example