

**Best Practices for Visual Processing Deficits in Early Intervention Identified Through  
Advancement of Clinical Skills and Dissemination of Information**

Zoe Brubaker

Department of Occupational Therapy

Indiana University Indianapolis

**Author Note:**

There are no conflicts of interest to disclose.

Correspondence concerning this paper should be addressed to Zoe Brubaker, Indiana University Department of Occupational Therapy, 1050 Wishard Boulevard, Indianapolis, IN 46202, United States. Email: [zbrubake@iu.edu](mailto:zbrubake@iu.edu)

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### **Abstract**

Vision plays a critical role in a child's learning and engagement with their environment, daily activities, and play. Occupational therapists contribute to visual processing in early intervention by addressing sensory processing through education, intervention, and collaboration. Research has shown that children with visual processing difficulties often experience developmental delays that affect their occupational performance. Barriers to identifying these difficulties include a lack of parental education on vision-specific skills and limited occupational therapy training on visual processing conditions, symptoms, treatment options, and referral processes. This capstone project involved collaboration with two sites to connect the expertise of teachers of blind and low-vision students with occupational therapy outreach in Indianapolis. The project aimed to educate caregivers and providers on visual processing in early intervention and foster relationships between organizations for improved collaboration. Results indicate that mentors were satisfied with the implemented handouts and recognized the value of making these resources accessible within the site's virtual platform.

*Keywords:* visual perception, sensory processing, early intervention, developmental delay

## **Introduction**

Children who experience brain damage or dysfunction early on may face the potential of developing visual processing dysfunctions (VPD) and cortical/cerebral visual impairment (CVI). Both of these conditions often go unnoticed and untreated. Both causing visual perceptual implications that can create many barriers to functional occupations among young children, and if they remain untreated, they can lead to difficulties that significantly impact cognitive and motor development later on. While some at-risk children receive treatment on general health and development, functional impact is typically not addressed (Kooiker, et al., 2020; Kooiker, et al., 2021).

Due to the lack of functional treatment, visual perceptual deficits often begin to affect social interactions and learning in school, around children at five to six years old. Functional implications of VPD or CVI can be lasting if not addressed in early intervention. According to the evidence, it appears researchers and clinicians agree that screening and interventions for these conditions should ideally occur during early years when neuroplasticity is high (Fazzi, et al., 2021). In current practices, many children are missing this critical time frame for treatment. Due to the impact these of these functional deficits, occupational therapy treatment would be an effective method to address developmental delays in this population. Increased knowledge of CVI, awareness of referral option, and education on occupation-based intervention for visual processing challenges conducted by occupational therapists could target this gap (Kooiker, et al., 2020; Kooiker, et al., 2021).

## **Needs Assessment**

For the needs assessment, the doctoral capstone student participated in a multi-step process. First, the student conducted secondary research on target sites for their capstone and

presented their project concepts. Next, they created a semi-structured interview guide to explore potential needs at the chosen sites. For this project, the student conducted interviews with two separate sites, Children's Therapy Connection and Vision Interventions and Parental Support, with the hope of bridging the needs between the two. Then, the student continued their research on the sites and examined literature that pertained to their project. Lastly, they identified the gap the project will focus on within the gap analysis.

### **Community Profile and Service Profile**

The student completed a site profile that examined both of the desired sites for this project. The first site, Children's Therapy Connection (CTC), a First Steps organization in order for the student to gain knowledge on how occupational therapy best target sensory processing deficits in early intervention. First Steps agencies utilize occupational therapists to broadly address functional vision rehabilitation if needed in early intervention. These services focus more on sensory and motor integration and assess deficits that interfere with desired occupations. Interventions are typically implemented through play and other functional activities that promote participation in occupations (Family and Social Services Administration, n.d.).

The second site, Vision Interventions and Parental Support (VIPS) offers a range of programs to assist children who are blind or visually impaired in learning and navigating their world. The services provided include evaluations, interventions during home visits, interventions at their community-based office locations in Indianapolis, IN, and Louisville, KY, and both resources and support for caregivers. VIPS provides an opportunity for children to explore and play in a safe and enjoyable environment. These services are dedicated to helping children with vision loss reach developmental milestones and ease their transition from home to the classroom. VIPS recognizes the critical role of early intervention and strives to utilize vision-specific

activities in a developmentally appropriate setting, introducing preschool routines to foster growth and learning. VIPS currently provides services for visual processing in children with either CVI and/or VPD condition(s). VIPS has noted this as an emerging condition within their caseload (Vision Interventions and Parental Support, n.d.).

### **Interview Results**

For the interview process, the student began by creating a list of questions outlining what they deemed necessary to identify the major need in their capstone project. After engaging in an initial interview and site observation with VIPS, the student had to pivot due to the limited clinical availability that VIPS presented for this project. VIPS indicated they would be able to aid in advancing the doctoral capstone student's clinical skills only one day a week. This information, coupled with research, led the student to recognize the need for expanding the services that VIPS offered through early intervention programs in Indiana.

The student then participated in an interview regarding the advancement of clinical skills and exposure to sensory processing intervention in early intervention with a secondary site, CTC. Through this secondary interview, the First Steps provider expressed interest in receiving educational materials regarding these visual processing challenges and engaging in this collaborative process with the initial site and the doctoral capstone student. Once the sites and site coordinators were confirmed, the student created a list of questions to better understand how their project could aid both organizations and bridge the services they offered. In summary, these questions explored current challenges, typical sessions, existing practices, roles and responsibilities, necessary materials, potential barriers, as well as the success and sustainability of the project. Additionally, logistical questions about working with both sites were addressed.

From both interviews, the direction of the project became clear. VIPS identified a need for educational opportunities related to the dissemination of knowledge on CVI, described as medical health crisis during the interview. They also expressed interest in offering advanced clinical skills training and receiving support in expanding their community connections through knowledge dissemination. The student received information about specific treatment tools and condition-specific insights to enhance their research and better outline the project. CTC expressed interest in supporting the student in gaining advanced clinical skills, improving knowledge of sensory processing, and applying occupation-based treatment in early intervention. They also emphasized how they would benefit from provider and family handouts.

Logistically, the student determined a schedule of three days per week at CTC, one day per week at VIPS, and one day per week working from home on continued research. This process was collaborative and required constant communication to ensure best practices were being implemented.

### **Gap Analysis**

As identified in the gap analysis, a growing number of children are experiencing visual impairments or dysfunction due to brain damage, often associated with extended stays in the NICU. Many of these children go unevaluated and untreated for visual processing deficits. Limited availability of services is one of the key reasons these conditions remain underdiagnosed and undertreated (Dutton et. al., 2006). VIPS is currently the only vision-specific early intervention service targeting this population in Indiana. As this condition continues to emerge, spreading awareness and education about its signs, symptoms, referral options, and treatment methods is essential. Occupational therapists could benefit from increased education on these conditions and current best practices, while parents could also be informed to advocate for early

identification and intervention. Through clinical reasoning and occupation-based interventions, functional deficits in this population could be addressed within practitioners' existing caseloads. With increased awareness and education, all children receiving early intervention services could be screened and treated if necessary. The existing overlap between VIPS and First Steps early intervention programs presents an opportunity to bridge this gap. Occupational therapists have the ability to conduct functional vision assessments and interventions while also observing for visual processing deficits, further enhancing early intervention efforts (Family and Social Services Administration, n.d.; Fazzi et al., 2021; Kooiker et al., 2020; Kooiker et al., 2021).

### **Purpose**

CVI and VPD are visual processing disorders that are increasingly being identified in young children. These conditions have lifelong effects that could be addressed through early intervention; however, current treatment efforts remain limited (Kooiker et al., 2021). The capstone student primarily focused on cortical/cerebral impairment due to key differences in terminology. While CVI and VPD share similarities, "visual processing dysfunction" is a term more commonly used for school-aged children (4-5 years and older), whereas "CVI" is typically used within early intervention settings (0-3 years) (Kooiker et al., 2021). Additionally, terminology varies by region—"cortical/cerebral impairment" is widely recognized in the United States, while "visual processing dysfunction" is a more familiar term in the Netherlands. Locally, VPD remains an unfamiliar term among providers, despite its presence in relevant research explored in the literature review.

The purpose of this project was to strengthen the connection between the occupational therapy services offered within First Steps and the expertise of Teachers of Blind and Low Vision (TBLV) professionals at VIPS. Through the dissemination of additional knowledge,

children in Indiana who may not currently be receiving specialized services could benefit from increased support. Increased awareness of the signs and symptoms of these conditions could empower families to seek diagnoses, enable providers to facilitate referrals, and equip existing care teams with the tools to implement targeted interventions. The overarching goal was to improve occupational participation in children diagnosed with these conditions. This project was carried out through the development of advanced clinical skills, ongoing research, and the creation of educational materials for both sites to expand visual processing services within early intervention.

### **Literature Review**

This literature review explores the impact of cortical/cerebral visual impairment (CVI) and visual processing dysfunctions (VPD) on occupational engagement, particularly in children. Evidence for this review was gathered using search engines such as PubMed and Google Scholar, with primary search terms including “cerebral visual impairment”, “visual processing dysfunction”, “children”, “visual perception”, and “occupational engagement”.

### **Prevalence and Etiology**

Vision impairments, particularly in children, are prevalent yet often underdiagnosed and untreated. These impairments can significantly affect daily functioning and occupational engagement. CVI and VPD are two conditions that frequently occur due to early brain damage. CVI, caused by damage to the brain's visual processing centers, leads to challenges ranging from basic visual sensory deficits to difficulties with higher-level visual perception and information processing (Kooiker et al., 2021). VPD, on the other hand, impacts the detection and interpretation of visual stimuli impacting attention and perception. VPD is caused by impairments in subcortical and cortical areas central to the damage seen in CVI, involving the

intermediate visual processing stages of the brain (Kooiker et al., 2020; Kooiker et al., 2021; Fazzi et al., 2021). Together, these conditions can disrupt attention, perception, and ultimately, a child's ability to engage in meaningful activities.

### **Visual Processing**

Visual processing is the brain's ability to interpret visual information and make sense of that information from the eyes. It involves skills such as visual discrimination, visual memory, visual sequencing, visual figure-ground perception, visual closure, visual-spatial awareness, and visual-motor integration. Visual discrimination helps recognize differences in shapes, letters, and patterns. Visual memory allows for recalling visual details. Visual sequencing aids in recognizing the order of symbols and words. Figure-ground perception distinguishes objects from their background. Visual closure helps identify incomplete objects. Visual-spatial awareness is the ability to understand object positioning. Lastly, visual-motor integration coordinates visual input with movement for tasks like writing and catching (Interaction Design Foundation, 2016).

When visual processing is impaired, it can impact daily activities (Koller, 2012). Visual processing deficits in young children are becoming more common due to several factors, primarily advancements in neonatal care and the increased survival rate of premature infants (Leung et. al., 2018). Premature birth can result in underdeveloped or impaired parts of the brain. At times affecting the visual processing center, like the occipital cortex and the areas responsible for visual attention and interpretation (Graven et. al, 2011). Research indicates that critical visual development occurs between 20 and 40 weeks' gestational age, a period often disrupted in preterm infants (Graven et. al, 2011). If these brain structures are not fully developed in utero or are damaged, it can lead to significant deficits in processing visual stimuli (Dutton et. al., 2015)

## **Impact on Occupational Engagement and Treatment**

The symptoms of CVI and VPD create significant barriers to functional occupations among young children. If left untreated, these challenges can impact cognitive and motor development, affecting critical activities such as play, self-care, and school participation. For instance, visual perceptual deficits often begin to affect social interactions and learning by the time children reach school age (around 5–6 years old), ultimately effecting their ability to engage in classroom activities and peer relationships (Kooiker et al., 2020; Kooiker et al., 2021).

Children with disabilities have a significantly higher prevalence of visual deficits during development (Salt et al., 2014). This highlights the need for occupational therapists to assess vision-based development in order to identify and address any deficits. Without proper evaluation and intervention, visual processing impairments can disrupt a child’s ability to effectively interact with their environment, impacting their performance across daily occupations. As Clifford O’Brien and Kuhaneck (2020) note, “Children with undetected and untreated vision problems may have difficulty participating in occupations such as reading, copying from the board, writing, playing, and sports, which creates a need for occupational therapists to have a comprehensive understanding of vision” (p. 2979).

Visual processing is a complex interaction between cognitive and sensory systems. It involves both the reception and interpretation of visual stimuli, which are essential for children to participate in everyday occupations (Interaction Design Foundation, 2016). These effects can appear in several domains of occupational engagement, including activities of daily living (ADLs), such as dressing, grooming, and feeding. Instrumental activities of daily living (IADLs), including meal preparation, managing toys and personal belongings, and navigating the environment (American Occupational Therapy Association, 2020). In addition to ADLs and

IADLs, play, the primary occupation seen in children at this age, is also affected. Visual impairments interfere with motor planning, spatial awareness, and engagement with toys or peers. Social participation presented as another area of concern, vision and visual perceptual deficits can create barriers to interacting with peers, understanding social cues, and participating in group activities. Lastly, functional vision is essential for school-based tasks like reading, copying from the board, handwriting, and organizing materials (Clifford O'Brien & Kuhaneck, 2020).

### **The Role of Occupational Therapy in Functional Vision and Visual Processing**

Occupational therapy plays an essential role in addressing functional vision and visual processing challenges in children, particularly in early intervention. Occupational therapists use occupation-based strategies to assess and manage vision related issues that affect daily activities and developmental milestones.

Developmental milestones are standardized markers used by clinicians to assess child development and identify delays, guiding early interventions. Indiana's First Steps program and VIPS utilize the Assessment, Evaluation, and Programming System for Infants and Children (AEPS-3), an evidence-based tool that evaluates developmental progress, sets goals, and plans interventions. Occupational therapists play a critical role in milestone observation and the detection of the delays. Functional vision and protentional delays can be observed through, age-appropriate activities like mentioned previously ADLs, IADLs, and play. Integrating these developmental milestone charts supports targeted interventions for all sensory processing challenges and broader developmental outcomes.

The Occupational Therapy Practice Framework, 4<sup>th</sup> edition (OTPF-4), identifies visual functions such as acuity, clarity of vision, stability, control of gaze, field perception, and visual

awareness as key client factors necessary for participating in everyday tasks. When children experience deficits in these key client factors, occupational therapists can analyze how these impairments impact their ability to function and provide targeted support (American Occupational Therapy Association, 2020). In clinical practice, occupational therapists (OTs) implement a wide range of evidence-based interventions based off of these observations. In order to support children with visual deficits, OTs will design and implement a variety of evidence-based activities to improve processing skills. OTs also focus on environmental modification by contrast, lighting, or reducing clutter to help children engage more effectively with their surroundings. (Clifford O'Brien & Kuhaneck, 2020).

### **Assessments for CVI Utilized in Current Practice**

VIPS in their current practice utilize the CVI Range assessment tool, created by Christine Roman-Lantzy and described in her book *Cortical Visual Impairment: An Approach to Assessment and Intervention* (2nd ed., Roman-Lantzy, 2018). This tool is designed to evaluate a child's functional vision by determining the severity of CVI through a combination of observations, parent reports, and structured assessment activities. Scores range from 0 to 10, with 10 indicating functional vision and 0 reflecting the most severe level of impairment. The results from The CVI Range, along with a developmental and compensatory skills checklist completed during evaluation, are used to create a comprehensive functional vision profile tailored to each individual (Roman-Lantzy, 2018).

An occupational therapist can administer the CVI Range assessment tool if they have received appropriate training in its use and understand CVI. Christine Roman-Lantzy emphasizes the importance of proper training to ensure the assessment is conducted accurately and consistently. This training helps therapists develop more effective, individualized strategies to

support a child's development and collaborate with families and other professionals to meet the child's unique needs. To become certified to administer this assessment tool, an occupational therapist can participate in an online course, in-person workshop, or formal endorsement program, each varying in cost and duration (Roman-Lantzy, 2018). VIPS provides a training program known as the Vision Impaired In-Service of America (VIISA) at the family resource center in Indianapolis. According to their website, the purpose of this program is "for participants to gain and develop skills in understanding the unique needs of infants and toddlers who experience blindness or low vision" (Vision Interventions and Parental Support). There are two separate VIISA training tracks currently offered. The first option is a half-day course designed to educate participants on how vision impacts learning and development to enhance current practice. This training would be effective for occupational therapists seeking additional education without transitioning into a new career path. The second option is a multi-week experience for individuals interested in becoming a contractor or employee of VIPS (Vision Interventions and Parental Support, n.d.)

In current practices within First Steps, there is no standard of care for screening tools to evaluate visual processing deficits. In addition, evidence reveals various limitations for OT treatment for impaired visual processing in pediatrics. These limitations include lack of intervention studies, inconsistent outcome measures across the literature, and low critical appraisal scores in available research (Delay et al., 2023). Despite limited research on functional interventions for CVI or VPD, current occupational therapy practice utilizes an occupation-based approach to address functional vision deficits (Family and Social Services Administration, n.d.; Kooiker et al., 2020; Kooiker et al., 2021).

Although occupational therapists can undergo training in CVI interventions, it is not always necessary due to the increasing number of Teachers of Students with Blindness and Low Vision (TBLV) specializing in this area. With the growing prevalence of CVI diagnoses, it is essential for occupational therapists to recognize the signs and symptoms to ensure timely referrals and appropriate interventions (Roman-Lantzy, 2018). Collaboration between professionals is a highly effective approach for treating children receiving services, as it allows for a more comprehensive and holistic intervention.

Co-treatment, in particular, is a valuable method in this setting, as it enables both an occupational therapist and a TBLV to work simultaneously with the child. This dual approach ensures that interventions address both functional occupational performance and vision-specific needs in an integrated manner. For example, while the occupational therapist focus on fine motor skills, sensory processing and daily living tasks, the TBLV can provide strategies to enhance visual access, optimize the child's visual environment, and implement vision-specific adaptations. By working together, these professionals can modify activities in real time, ensuring that therapeutic interventions are both accessible and effective for children with CVI. Co-treatment also fosters interdisciplinary communication, leading to more cohesive and individualized care plans that maximize the child's engagement and overall progress (Slater et al., 2024).

### **Synthesis**

The literature highlights the immense impact of CVI and VPD have on children's occupational engagement. Across multiple articles, researchers emphasize that these impairments affect various domains, including ADLs, IADLs, and play (Kooiker et al., 2020; Clifford O'Brien & Kuhaneck, 2020). A recurring theme is the importance of early identification and

early intervention, due to the barrier visual processing deficits can have on a child's development. However, despite the literature available highlighting these key points, there is limited research providing evidence in regard to how these conditions are assessed and addressed with occupational therapy.

One major gap in the research is the lack of standardized occupational therapy screening tools for visual processing deficits in early intervention settings. While tools such as the CVI Range are utilized in specialized vision services like VIPS, they are not widely integrated into occupational therapy practice due to the need for additional training and certification. In addition to screening tools, intervention studies with an occupational therapy focus remain limited, making it difficult to establish best practices (Kooiker et al., 2021). These gaps highlight the need for further development on assessment standardization, research on intervention efficacy, and general advocacy and information for these conditions in early intervention.

The implications for occupational therapy practice are significant. Given the integral role of visual processing in daily activities, occupational therapists are well equipped to address these deficits through occupation-based interventions. Strategies such as modifying the environment, incorporating sensory integration, and utilizing visual-motor activities can support children with visual processing deficits. Additionally, increased collaboration between early intervention occupational therapy practitioners and teachers of the visually impaired could aid early detection and intervention outcomes. Lastly, expanding training opportunities or providing continuing education material for occupational therapists could also enhance their ability to identify and treat visual processing dysfunctions more effectively (Clifford O'Brien & Kuhaneck, 2020).

## **Implications**

Cortical/Cerebral visual impairment and visual processing dysfunction are lifelong challenges that impact development but can improve with early intervention. This collaboration aimed to address visual processing deficits more effectively by connecting Vision Interventions and Parental Support with early intervention occupational therapy practitioners at Children's Therapy Connection. Since visual processing is a key component of sensory processing (an area occupational therapist address), this collaboration provided support towards the integration of vision-focused, occupation-based strategies into early intervention programs. By focusing on the role of visual processing in daily activities, occupational therapists can enhance participation in play, learning, and self-care.

### **Theoretical Foundation**

The doctoral capstone project was guided by the Person-Environment-Occupation (PEO) Model and Ayres' Sensory Integration (ASI) to inform the development and implementation of training modules and educational resources. The PEO model emphasizes the dynamic interaction between the person, environment, and occupation, highlighting how disruptions in these domains can impact occupational performance. This model provided a framework for addressing sensory processing deficits including vision by offering sensory supports, environmental modifications, and regulation techniques to improve participation in children's desired occupations (Law et. al., 1996).

Ayres' Sensory Integration (ASI) theory further guided the project. ASI theory emphasizes how the brain processes sensory input to generate responses necessary for development and participation. This theory was critical in designing educational resources for both parents and practitioners, as well as, recommendations to encourage optimal engagement and independence in occupations (Ayres, 2005).

### **Capstone Project Plan and Process**

In collaboration with the site mentor and the VIPS providers the primary goal of the project was determined to be advancement of clinical skills and the creation of education material about visual processing deficits for parents and occupational therapist that work at Children's Therapy Connection to have access to. Information gathered via the initial need's assessment, literature review, and on-site observations guided the creation of goals and objectives for the desired educational resources. An evaluation plan was created through subjective report to assess the efficacy of the project.

Collaboration between occupational therapy services at Children's Therapy Connection, a First Steps program, and Visually Impaired Preschool Services (VIPS) was determined as essential for improving outcomes for children with CVI and VPD in Indiana. VIPS is already making a significant impact by identifying functional vision issues and using targeted strategies to help children succeed. However, expanding their reach is necessary due to the emerging diagnosis of CVI. As part of their work, the doctoral capstone student learned from VIPS's practice methods in order to see how First Steps can better support children with visual processing challenges. By observing their TBLV, the capstone student gained knowledge to strengthen occupational therapy services for this specific sensory processing deficit. To spread this knowledge, the doctoral capstone student then provided resources for occupational therapists at the Children's Therapy Connection. These resources included early signs of visual processing issues that can be shared with parents and practitioners, interventions to target perceptual skills, and strategies to enhance collaboration across the therapy community.

### **Project Goals and Objectives**

The following goals were created following the knowledge gained through the literature review and needs assessment prior to the student starting on site:

Project Goal 1: To enhance clinical skills during the Doctoral Capstone project, particularly in managing a caseload within early intervention.

Objective 1: Create and implement individualized treatment sessions for children in early intervention, aligning interventions with developmental milestones and family-centered goals.

Objective 2: Demonstrate the ability to manage a diverse caseload by applying evidence-based practices in compliance with early intervention protocols.

Objective 3: Collaborate with interdisciplinary teams, including families and caregivers, to effectively communicate, coordinate, and provide services.

Project Goal 2: To develop evidence-based research for my doctoral capstone project by using relevant and up-to-date studies that will effectively enhance the long-term impact of the project.

Objective 1: To finalize a needs assessment with both of the site's in order to best understand the population/project outline.

Objective 2: To research best-practices regularly and compare recent evidence.

Objective 3: To effectively synthesize information for provision of evidence-based materials.

Project Goal 3: To provide the FS agency with comprehensive educational materials for ongoing use after the completion of the project research.

Objective 1: To create an educational resource on CVI/VPD and best occupational therapy practices for applying the OT process to these conditions.

(Add resources to shared google drive to make available OTs that currently work with Children Therapy Connections for sustainability)

Objective 2: To develop and implement a pre/post survey tool to provide for an in-service educational presentation about CVI/VPD in order to measure effectiveness of outcomes.

Objective 3: To create resources that help caregivers understand developmental milestones related to visual processing, with the inclusion of home recommendations to continue working to achieve milestones at home.

### **Capstone Process**

The capstone experience was designed as a 14-week program spanning from January 13 to April 18, 2025. The student began on-site work with both capstone sites during the week of January 13, 2025. In the first two weeks, they familiarized themselves with both sites, reaffirmed their goals and desired outcomes with the site mentor, and incorporated additional resources into their original literature review provided by VIPS. Additionally, they participated in direct patient care and facilitated communication between teams to share learned information.

During weeks three and four, the student focused on reviewing the signs and symptoms of CVI, including color preference, downward gaze, and latency. They also gathered information on effective interventions through direct observation of TBLV during sessions, such as using a "busy board" and incorporating 3D objects that were easy to interpret, as animated or cartoon books were often difficult for children with CVI to process visually. Other interventions explored included the use of black backgrounds, light, and shiny or glittery objects to enhance visual attention, as well as engaging activities like the "Achoo game" to emphasize object tracking. Additional tools like a light board, 3D objects paired with songs, storybook boxes, object

identification exercises, and mobility/balance activities were also considered. To support practitioners, the student created pre- and post-surveys for those utilizing a shared Google Drive resource.

In weeks five and six, they began developing provider resources and educational materials, continuing CVI-specific research to inform their work. They reviewed key literature, including *Vision and The Brain: Understanding Cerebral Visual Impairment in Children* by Amanda Hall Luek & Gordon N. Dutton, *Babies with CVI: Nurturing Visual Abilities and Development in Early Childhood*, and *My Brain Can't See: Cortical Visual Impairment in Children* by Joy Fleming. During this period, they also began the creation of a parent handout and sought feedback from coordinators.

By weeks seven and eight, they received and reviewed feedback on the handouts and began making necessary revisions. Additionally, they discussed further planning and scheduling for the remainder of the semester. As part of their collaborative efforts, they successfully coordinated a co-treatment session between their site coordinators. Another key component of their collaboration involved connecting VIPS with IU's Occupational Therapy department by introducing a practitioner interested in guest lecturing to the Pediatric course. Furthermore, they facilitated a connection between the same provider and the Adaptive Toy Lab department to expand outreach on adaptive switch methods. These efforts aimed to foster relationships and collaboration between organizations, ultimately enhancing accessibility and knowledge-sharing within the field.

During weeks nine and ten, the student continued shadowing therapy sessions, observing additional modifications such as a new version of the busy board and adapted play equipment. They also explored strategies for visually attending while scribbling with the use of elevated

surfaces or light-up surface. The student gained a deeper understanding of the importance of breaks during vision sessions, recognizing how the cognitive demands of visual processing can lead to fatigue. A significant milestone during this period was the student's first co-treatment session with both site mentors from VIPS and CTC. This unique overlap in caseload provided an invaluable opportunity to experience interdisciplinary collaboration firsthand. The student developed a stronger appreciation for the role of occupational therapy in positioning and play-based skill development, while also noting TBLV's emphasis on visual engagement is always occurring. By integrating insights from both disciplines, they were able to note new methods to provide additional cues for tracking, time for latency and processing, and observe the verbal education offered to the occupational therapist on strategies to promote carryover of visual perception skills within sessions.

During weeks eleven and twelve, the student continued refining their understanding of interdisciplinary collaboration while deepening their engagement with patient care. They further explored the intersection of vision and motor development by observing the role of positioning and movement in enhancing visual engagement. Additionally, they contributed to ongoing discussions about best practices for integrating visual accommodations into daily routines. This period also involved continued revisions of educational materials based on feedback from mentors and peers. The student strengthened their ability to communicate key findings effectively, ensuring that resources were both practical and accessible for practitioners and families. Through these experiences, they gained valuable insight into the importance of teamwork in providing holistic care and fostering meaningful progress for children with CVI.

In weeks thirteen and fourteen, the student finalized and implemented the educational resources developed throughout the capstone experience. After incorporating final revisions

based on mentor feedback, the handouts were approved and uploaded to the shared Google Drive, ensuring accessibility for all CTC providers. A notification was sent via Teamworks, informing practitioners of the newly available materials and their potential applications in occupational therapy sessions. Additionally, subjective feedback was gathered from both capstone sites, providing insight into the effectiveness and usability of the resources. During this time, the student also continued to advance their clinical skills within their caseload, integrating knowledge gained from VIPS observations and interdisciplinary collaboration into their occupational therapy sessions. These final weeks solidified the project's impact, reinforcing the critical role of occupational therapists in early detection of visual processing challenges and the importance of adjusting intervention strategies to support children with CVI in a collaborative, evidence-based manner.

### **Capstone Project Implementation**

The doctoral capstone student began implementing the materials by uploading the finalized resources to the shared Google Drive. To ensure accessibility, they sent a message via Teamwork's to inform all First Steps providers about the newly available information.

### **Resource Review**

Before creating educational materials, the doctoral capstone student reviewed various resources to deepen their understanding of visual processing. This review focused on the skills associated with visual processing, the characteristics of CVI, the structure and function of the visual system, and the crucial role of the eye-to-brain connection in visual processing.

As part of this resource review, the student examined the 10 characteristics of CVI, as described by Dr. Christine Roman-Lantzy, which serve as key factors influencing visual processing in individuals with CVI. These characteristics include color preference, where

individuals tend to favor specific colors such as red or yellow, and attraction to movement, as moving or reflective objects help capture visual attention. Visual latency, or a delay in recognizing and responding to objects, is also common. Additionally, individuals may have a visual field preference, meaning they see objects more easily in certain areas while struggling in others, with lower field deficits being particularly common. Many individuals with CVI experience difficulty with visual complexity, making it challenging to interpret faces, locate objects in cluttered environments, or distinguish details in busy settings. They may also be drawn to light sources and require specific lighting conditions for optimal engagement. Despite normal or near-normal eye exams, distance viewing can be difficult, and atypical visual reflexes may result in an absence or inconsistency of natural blinking responses. Difficulty with visual novelty often leads individuals to prefer familiar objects and environments, while visually guided reach follows a distinct pattern where they look at an object, look away, and then reach for it without visually tracking their hand. These characteristics were integral in developing the educational handouts, ensuring they addressed the specific needs of individuals with CVI (Roman-Lantzy, 2018).

This foundational knowledge helped align the materials with best practices and evidence-based interventions for children with visual processing deficits. In addition to CVI research, the student reviewed resources on sensory processing and developmental milestones to better understand how vision integrates with overall development. The capstone project also incorporated key literature from the VIPS resource center, including *Little Bear Sees* by Aubri Tallent, Fredy Bushnell, and Christopher Russell; *Cortical Visual Impairment: An Approach to Assessment and Intervention* by Christine Roman-Lantzy; *Vision and the Brain: Understanding Cerebral Visual Impairment in Children* by Amanda Hall Lueck and Gordon N. Dutton; *Babies*

*with CVI: Nurturing Visual Abilities and Development in Early Childhood* by Anne McComiskey; and *My Brain Can't See: Cortical Visual Impairment in Children* by Joy Fletcher.

These resources provided essential insights into how visual processing challenges manifest in children, the neurological basis of CVI, and the role of occupational therapy in addressing functional deficits. The knowledge gained from these materials directly informed the development of the doctoral capstone educational materials, ensuring they effectively supported both providers and families in understanding and addressing visual processing concerns in early intervention settings.

### **Clinical Observations**

Throughout the capstone experience, the doctoral capstone student spent Monday through Wednesday from 8:30 AM to 5:30 PM with a First Steps provider serving as their clinical instructor. Initially, the student focused on shadowing sessions to understand the structure of early intervention services before gradually adopting a growing caseload. Responsibilities included developing and implementing specialized treatment plans tailored to each child's developmental needs while utilizing a child-led, play-based approach to intervention. The student engaged in writing treatment notes, progress notes, and initial evaluation reports as part of documentation requirements.

During this time, the student refined their skills in early intervention, sensory processing, and functional activity-based treatments. As the semester progressed, the focus shifted toward children on the caseload presenting with visual processing challenges. Drawing from on-site observations with VIPS and extensive research, the student implemented targeted interventions to address these challenges within therapy sessions. By integrating knowledge of visual

processing with occupation-based strategies, the student worked to enhance participation and engagement for children with these specific needs.

### **Handout Creation**

The student created several handouts (Appendix A) to be uploaded to the CTC Google Drive, ensuring all practitioners had access. These handouts included caregiver education, provider education (expanded), and provider education (condensed). The decision to create separate provider education materials evolved throughout the project, informed by site mentor feedback. The condensed version was designed for providers seeking brief, easily accessible information on CVI and how visual processing challenges may present in their caseload. The extended version provided more in-depth information on CVI and visual processing challenges, including background information, resources, and practical strategies for identification and intervention. These handouts were uploaded to the shared Google Drive, followed by a Teamworks announcement detailing the project's completion and objectives. They will remain accessible for providers to reference as needed.

## **Capstone Project Evaluation**

### **Methods**

The original evaluation plan for the capstone project included a pre- and post-survey (Appendix B). However, because this was a community-based site where most communication was virtual, collecting meaningful pre- and post-survey data proved difficult. Instead, the survey was used more as a conceptual tool to show how the information could be applied in practice. Ultimately, qualitative feedback was the primary method used to assess the capstone project's effectiveness and impact.

Qualitative feedback was collected from five key stakeholders through a final evaluation form. This included the doctoral capstone student's site mentor at CTC, the office manager at CTC, a site mentor at VIPS, the Director of Community Outreach at VIPS, and an additional Teacher of the Blind and Low Vision (TBLV) at VIPS. Gathering subjective feedback from these stakeholders was an appropriate and valuable evaluation method, as it allowed for detailed, practice-based insights from professionals working directly with the target population.

Specific feedback from the First Steps site mentor included a recommendation to add information about how vestibular input can support visual processing deficits. After making this addition, the mentor reviewed and approved the updated materials, expressing appreciation for the final design. Similarly, feedback from my VIPS site mentor emphasized the need to include a disclaimer in the signs and symptoms section, making it clear that not all children will show every sign listed. They also suggested adjusting language to focus on "challenges" or "differences" rather than using terms like "deficits" or "disorders," to promote a more positive and strengths-based approach. After making these revisions, the site mentor approved the changes and shared positive feedback on the overall project.

All individuals who reviewed the materials commented on the effectiveness of the project overall. They highlighted that the milestones section clearly outlined vision-specific developmental skills and would serve as a useful reference for providers to refresh their knowledge and recognize important visual skills during practice. Reviewers also appreciated the project's focus on encouraging collaboration between occupational therapy practitioners and teachers of the visually impaired, which they agreed was essential for providing the best support for children.

In addition, the referral process information was well-received for its potential to strengthen community partnerships and streamline services. The at-home strategies for caregivers and intervention ideas for providers were praised for being evidence-based, practical, and easy to implement. Reviewers noted that these resources were thoughtfully designed and based on strong background research. Overall, the feedback suggested that this project will positively impact both organizations involved and help support children with visual processing challenges across the Indianapolis area.

### **Capstone Discussion and Impact**

#### **Limitations**

While this capstone project successfully promoted awareness of CVI and strengthened interdisciplinary collaboration, several limitations were encountered throughout its development. One significant challenge was the scheduling and availability of providers, which shifted the original focus of the project from education to advanced clinical skills. The dynamic nature of community-based sites also posed obstacles, particularly in conducting a pre/post survey effectively, ultimately shifting to subjective feedback as the main method to measure effectiveness. Working with a community-based site required a flexible approach, ultimately leading to the creation of educational handouts that providers could access as needed, ensuring sustainability and usability over time as the provision of material. Additionally, organizational changes within the site over the year-long process influenced the project's direction. VIPS experienced significant growth, expanding its provider base and eliminating its waitlist. As a result, the project's focus evolved from advocating for a broader occupational therapy role in vision care to emphasizing collaboration and strengthening interdisciplinary relationships. Furthermore, while integrating clinical skills into the project proved to be a valuable addition, it

also reduced the time available for continued research. The hands-on, practice-based component enhanced the project's impact but limited the depth of exploration into additional literature and emerging evidence in the field. Despite these challenges, the project remained adequate and responsive to the needs of the site, ultimately achieving meaningful outcomes in increasing awareness, fostering collaboration, and providing practical resources for professionals and caregivers.

### **Capstone Impact**

This capstone project played a crucial role in increasing education and awareness of CVI and visual processing challenges, particularly within the field of occupational therapy. Research indicates that children with multiple disabilities are at a higher risk of having a visual perceptual disorder as discussed in the literature review, yet these challenges may go unrecognized. Because these children frequently receive occupational therapy services, OTs are in a unique position to observe the signs and symptoms of CVI early on and play a key role in its detection and intervention. Through this project, the capstone student developed educational materials to help occupational therapists recognize visual processing deficits and adjust their interventions accordingly. By equipping OTs with knowledge of CVI-related characteristics they can modify their sessions to better accommodate these children's needs. These adaptations ensure that therapy is not only more accessible but also more effective in fostering engagement and participation in daily activities. Furthermore, this project reinforced the importance of interdisciplinary collaboration between occupational therapists and teachers of blind and low vision. By utilizing the educational resources provided, OTs can better tailor their treatment sessions to align with VIPS strategies, creating a more cohesive and effective treatment plan. This collaboration ensures that children with CVI receive consistent, well-rounded support that

integrates both vision-focused and occupation-based interventions. Ultimately, this project helped bridge the gap between vision care and occupational therapy between two early intervention organizations in Indianapolis. By increasing awareness and providing practical education, this initiative has the potential to improve the quality of care and long-term outcomes for children with CVI.

### **Sustainability Plan**

To ensure the long-term impact of this capstone project, several sustainability measures were implemented. The doctoral capstone student uploaded all educational materials to a shared Google Drive, providing practitioners with ongoing access to resources whenever they encounter visual perceptual challenges in their caseloads. This ensures that the information remains readily available, supporting continued education and intervention strategies. Beyond material sustainability, efforts were also made to foster relationship sustainability. The student facilitated a connection between a provider at VIPS and the professor of the IU OT pediatric course. This collaboration aims to strengthen interdisciplinary relationships and create opportunities for guest lectures that further educate OT students on visual processing deficits, related conditions, treatment strategies, and the critical role of interprofessional collaboration in addressing vision-related challenges. By establishing both accessible resources and ongoing professional connections, this project ensures that awareness, education, and collaboration surrounding visual processing challenges will continue to grow beyond the completion of the capstone experience.

### **Conclusion**

Cortical visual impairment (CVI) is an emerging condition that significantly impacts individuals' ability to engage in daily occupations. This capstone project aimed to promote awareness of CVI by providing valuable educational resources to enhance understanding and

support for individuals with visual processing challenges. Through extensive collaboration with the site, the capstone student developed and distributed educational handouts detailing the signs and symptoms of CVI, associated conditions, available resources, referral processes, and evidence-based intervention strategies. These materials were designed to support both providers and caregivers, offering practical strategies for intervention and at-home application. This project positively influenced the site by strengthening partnerships between VIPS, CTC, and IU OT, fostering interdisciplinary collaboration, and expanding the knowledge base on visual processing within occupational therapy. Additionally, these resources highlighted the critical role of occupational therapists in facilitating continuity of care across services offered by TBLV, with a focus on sensory integration, positioning, and enhancing visual attention through occupation-based interventions. As a result, the capstone site is now better equipped with the necessary tools and materials to continue educating professionals and caregivers on CVI and related visual processing challenges, ensuring sustained awareness and support for individuals with visual impairments.

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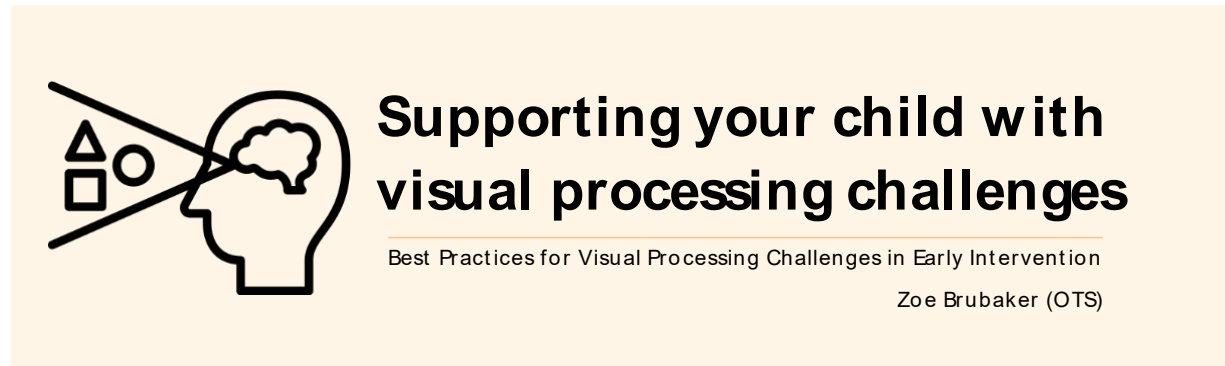
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## Appendices

### Appendix A

#### Handouts

Figure 1. Caregiver Handout



**What is Visual Processing?** Visual processing is the brain's ability to interpret and analyze the visual information received through the eyes. It helps us recognize objects, track movement, and understand what we see.

- **Cortical Visual Impairment (CVI)** - CVI is a diagnosis where a child's eyes may see clearly, but the brain has difficulty processing visual information. Early intervention and sensory-based strategies can help strengthen visual processing skills.

## Signs & Symptoms

### Visual processing difficulties in 0-3 year olds

Some of these challenges may appear in some children, but visual processing difficulties vary for each child, and signs or symptoms can present differently.

- **Trouble recognizing familiar faces or objects**, even when they see them often.
- **Takes extra time to focus** on objects or respond to what they see.
- **Prefers looking at moving objects** rather than still ones.
- **Becomes overwhelmed** by too many things to look at in busy environments.
- **Struggles to find toys or objects** in a cluttered space.
- **Has difficulty judging distance**, such as reaching for a toy but missing it.
- **Prefers certain colors**, often red or yellow, and may focus more on high-contrast items.
- **Avoids eye contact** or looks away quickly when someone is talking to them.
- **Turns head or body to look at objects** rather than moving just their eyes.
- **Uses touch more than vision** to explore objects, relying on hands instead of sight.
- **Struggles with following a moving object** with their eyes.
- **Frequently bumps into furniture or objects** while moving around.
- **Difficulty transitioning between light & dark spaces**, such as moving from indoors to outdoors.
- **Shows inconsistent visual attention**, sometimes focusing well & other times not responding at all.

## Referrals & Resources in Indiana

If you notice any of these signs or symptoms in your child and have concerns about **Cortical Visual Impairment (CVI)**, you can request a referral. Here's what to do:

Referral Process for CVI Concerns	
<b>Discuss Your Concerns</b>	Talk to your child's Occupational Therapist or another provider on their care team about the signs you've noticed.
<b>Request a Referral</b>	Your OT can submit a Change Request Form to refer you to a Vision Interventions and Parental Support (VIPS) provider for further evaluation and support.
<b>Ophthalmologist Consultation</b>	While an OT can refer you to VIPS, they may also recommend that you see an ophthalmologist for a formal CVI diagnosis and further medical assessment.
<b>Next Steps</b>	Based on the evaluations, your child may receive specialized vision services and strategies to support their development.

### Why see an Ophthalmologist vs. an Optometrist?

- Ophthalmologists (MDs) diagnose and treat neurological vision conditions like CVI—they offer medical expertise beyond basic vision tests. Optometrists (ODs) focus on routine vision exams and prescribing glasses but may not specialize in CVI or visual processing difficulties.

### Specialized Services

- Vision Interventions and Parental Support (VIPS) – Early intervention for children with blindness or visual impairments.
- (317) 961-5001
- 📍 1212 Southeastern Ave, Indianapolis, IN.

*VIPS can provide family education, vision services, and strategies to support children with visual processing challenges in their daily activities.*

- Indiana School for the Blind and Visually Impaired (ISBVI) – Education & outreach programs for children with low vision or blindness.
- (317) 253 - 1481
- 📍 2701 N Devon Ave, Indianapolis, IN

## At-Home Strategies

### For General Visual Processing Development

- Use high-contrast toys (red/yellow on a plain background).
- Model movement of objects (light-up toys, shiny objects).
- Keep environments simple & clutter-free to reduce distractions.
- Allow extra time to process what they see.
- Choose simple shapes (balls, stacking cups, shape sorters).
- Play hide-and-seek with toys to build visual memory.
- Encourage visual tracking (slowly move toys side to side or up and down).
- Pair touch with vision (let them feel objects before naming them)
- Keep toys in consistent locations for easier recognition.
- Use mirrors to help with facial recognition.
- Read/offer high-contrast books (bold images, minimal details).
- Encourage crawling, reaching, and exploring their environment.

### Media Recommendations

<p><b>To utilize during play:</b></p>	<ul style="list-style-type: none"> <li>● <a href="https://www.youtube.com/@AlissaDeSousa">www.youtube.com/@AlissaDeSousa</a> - CVI friendly youtube videos with various nursery rhymes, spelling/counting content, etc.</li> <li>● <a href="#">Tap-n-See Now</a> – A simple, high-contrast app designed to encourage visual attention in children with CVI.</li> </ul>
<p><b>To learn more:</b></p>	<ul style="list-style-type: none"> <li>● <a href="https://www.youtube.com/@PerkinsVision">www.youtube.com/@PerkinsVision</a> - Educational Information regarding visual processing conditions.</li> <li>● <a href="https://www.perkins.org/cvi-now/">https://www.perkins.org/cvi-now/</a> - Website exploring components of CVI via learning guides and additional resources.</li> <li>● "Little Bear Sees: How Children with Cortical Visual Impairment Can Learn to See" by Aubri Tallent, Fredy Bush, and Nancy Tallent</li> </ul>

Resources are available to help support your child's development. If you have any concerns, discuss them with your OT or early intervention provider. **Early detection is key** in providing the right strategies and support to help your child thrive.

**Figure 2. Provider Handout (Expanded)**



“Children with undetected and untreated vision problems may have difficulty participating in occupations such as reading, copying from the board, writing, playing, and sports, which creates a need for occupational therapists to have a comprehensive understanding of vision.” (Clifford O'Brien & Kuhaneck, 2020, p. 2979)

- Visual Processing skills are important for participation in functional occupations.
- Children with multiple disabilities have a higher prevalence of visual diagnoses during development.

## Condition

<b>Visual Processing</b>	A term used to refer to the brain's ability to perceive, interpret and process information that is seen throughout eyes. Visual processing skills are what our brain uses to understand the world around us. It is also known as visual perception.
<p>Visual perception is both a cognitive and sensory process</p> <p style="padding-left: 40px;">Sensory component: receiving visual stimuli</p> <p style="padding-left: 40px;">Cognitive component: interpreting visual stimuli</p>	
<b>Cortical Visual Impairment</b>	A neurological form of visual impairment that affects the structures of the brain responsible for receiving, understanding, and responding to the visual images collected by the eye. It is an impairment of the brain's ability to process, or make sense of, what the eyes see.
<p style="text-align: right;">(Roman-Lantzy, 2018)</p> <p><b>CVI may be considered when three criteria exist as described</b></p> <ol style="list-style-type: none"> <li>1. A normal ocular-based eye exam that cannot explain or account for a child's visual impairment</li> <li>2. There is a presence or history of neurological complications</li> <li>3. The child displays any of the <b>10 visual behaviors or characteristics</b> as described by Dr. Roman-Lantzy that are unique to CVI.</li> </ol>	

**Children with visual processing difficulties** may struggle to recognize faces or objects, take longer to focus, prefer moving objects, or become overwhelmed in busy environments. They may have trouble finding toys, judging distances, tracking movement, or transitioning between light and dark. Some rely more on touch than sight, avoid eye contact, or show inconsistent visual attention. Recognizing these signs can help therapists provide early support for visual development.

### 10 Characteristics of CVI

Any or all of the 10 characteristics may be present in a child who has CVI.

The characteristics may range from very mild to severe, depending upon the child's level of functional visual processing ability.

1. **Color Preference:** May only respond to certain color(s); often red and yellow
2. **Movement:** May not be able to see an object unless it has movement; the child themselves may need to be moving to "see" a stationary object
3. **Latency:** Needs extra time to see/notice a toy presented
4. **Visual Field Preference:** May prefer to use peripheral fields to view objects instead of central vision
5. **Complexity:** May struggle telling the difference between an object and the background; May have difficulty using vision with other senses at the same time; May struggle to make sense of human faces and complex visual patterns
6. **Light-Gazing:** May spend a lot of time looking at overhead lights, windows, and ceiling fans
7. **Distance Viewing:** Objects may need to be very close for the child to attend to them
8. **Visual Reflexes:** Inconsistent blink to visual threat or touch of nose bridge
9. **Novelty:** May prefer to look only at familiar toys/objects
10. **Lack of Visually Guided Reach:** Looks at an object, turns head away, then reaches

**If a child has CVI it is not because the eyes can't "see". It is because the brain can't make sense of or effectively process the images seen by the eye.**

## Intervention

For General Visual Processing Development	
<p><b>Helping the Brain Organize Visual Information for Daily Activities</b></p>	<ul style="list-style-type: none"> <li>● <b>Keep a Consistent Setup</b> – Store toys and objects in the same place so children learn where to look.</li> <li>● <b>Combine Touch with Vision</b>– If they struggle to recognize an object visually, let them feel it first. <ul style="list-style-type: none"> <li>○ <i>Example:</i> Before using a spoon, allow them to explore it with their hands.</li> </ul> </li> <li>● <b>Use Mirrors for Visual Engagement</b> – Looking in a mirror supports facial recognition and visual attention.</li> <li>● <b>Choose Simple, High-Contrast Books</b>– Select books with bold, black-and-white images or one bright object per page.</li> <li>● <b>Encourage Movement for Visual Development</b>– Crawling, reaching, and grabbing help strengthen vision. <ul style="list-style-type: none"> <li>○ <i>Example:</i> Place a toy slightly out of reach to encourage looking and movement.</li> </ul> </li> </ul>
<p><b>Strengthening Visual Perception &amp; Coordination</b></p>	<ul style="list-style-type: none"> <li>● <b>Use High-Contrast Labels</b> – Help kids identify objects by adding white labels on dark surfaces or bright stickers on key items.</li> <li>● <b>Practice Hand-Eye Coordination</b> – Games like catch, balloon volleyball, and rolling a ball improve visual-motor connections.</li> <li>● <b>Engage Multiple Senses</b> - Choose toys that make sounds or have different textures (rattles, crinkly fabric, musical toys) to improve visual attention and exploration.</li> <li>● <b>Use Finger Tracking for Reading</b> – Have children point to each word to help with line tracking.</li> <li>● <b>Encourage Outdoor Play</b>– Natural environments challenge depth perception. <ul style="list-style-type: none"> <li>○ <i>Example:</i> Ask, “Can you see the red mailbox?” to encourage distance awareness.</li> </ul> </li> </ul>
<p><b>Developing Visual Awareness</b></p>	<ul style="list-style-type: none"> <li>● <b>Use High-Contrast, Simple Objects</b>– Present one brightly colored toy against a plain background to reduce visual overload. <ul style="list-style-type: none"> <li>○ <i>Example:</i> A red rattle on a black cloth.</li> </ul> </li> <li>● <b>Engage with Movement &amp; Light</b>– Many children with CVI respond better to moving or illuminated objects. <ul style="list-style-type: none"> <li>○ <i>Example:</i> A spinning toy, Mylar balloon, pom-pom or light-up toy.</li> </ul> </li> <li>● <b>Limit Distractions</b> – Keep the room dimly lit with minimal background noise to improve focus.</li> <li>● <b>Allow Extra Processing Time</b> – Hold an object in their preferred visual field and wait 5–10 seconds for a response.</li> <li>● <b>Encourage Reaching</b> – Hold a toy slightly away from their hand to encourage looking before reaching.</li> </ul>

## Intervention continued

For General Visual Processing Development	
<b>Teaching the Brain to Use Vision More Effectively</b>	<ul style="list-style-type: none"> <li>● <b>Use Preferred Colors</b>– Bright red, yellow, or shiny objects often grab attention.               <ul style="list-style-type: none"> <li>○ <i>Example:</i> A red Mylar balloon against a black background.</li> </ul> </li> <li>● <b>Reduce Visual Clutter</b> – Present one object at a time on a solid-colored surface.</li> <li>● <b>Incorporate Movement &amp; Light</b> – Use a light-up or spinning toy to draw attention before presenting another object.</li> <li>● <b>Try Backlighting</b>– Shining a light behind objects can make them easier to see.               <ul style="list-style-type: none"> <li>○ <i>Example:</i> A flashlight behind a red cup.</li> </ul> </li> <li>● <b>Provide Extra Processing Time</b> – Wait 5–10 seconds for the child to respond to a visual cue.</li> </ul>
<b>Vestibular Input to Support Visual Perception</b>	<p>The <b>vestibular system</b> is closely linked to <b>visual processing</b>. Activating the vestibular system helps improve:</p> <ul style="list-style-type: none"> <li>● <b>Gaze Stability (Vestibulo-Ocular Reflex - VOR)</b> – Keeps vision clear during movement, essential for reading &amp; tracking.</li> <li>● <b>Visual Tracking &amp; Scanning</b> – Supports smooth eye movements for reading &amp; writing.</li> <li>● <b>Visual-Spatial Awareness</b> – Helps with depth perception, hand-eye coordination, and letter formation.</li> <li>● <b>Attention &amp; Focus</b> – Regulates the nervous system, making visual tasks easier.</li> <li>● <b>Eye Teaming (Convergence/Divergence)</b> – Strengthens coordination between both eyes.</li> </ul> <p><b>OT Activities to Strengthen Vestibular-Visual Integration</b></p> <ul style="list-style-type: none"> <li>● <b>Swinging (linear, rotary, orbital motions)</b> – Improves gaze stability.</li> <li>● <b>Spinning on a chair or scooter board</b> – Strengthens eye movement control.</li> <li>● <b>Obstacle courses</b> – Encourages visual scanning with movement.</li> <li>● <b>Bouncing on a therapy ball</b> – Develops focus &amp; eye tracking.</li> <li>● <b>Inverted play (hanging upside down)</b> – Stimulates vestibular &amp; visual connections.</li> </ul>

## Referral & Resources

### Referral

#### Importance of Consulting an Ophthalmologist Over an Optometrist

When addressing conditions like Cortical Visual Impairment (CVI) or Visual Processing Disorders (VPD), it's crucial to consult the appropriate eye care professional:

<b>Ophthalmologist:</b>	<ul style="list-style-type: none"> <li>○ <b>Qualifications:</b> Medical doctors (MDs) specializing in eye and vision care, including performing surgeries.</li> <li>○ <b>Expertise:</b> Trained to diagnose and manage complex eye conditions, including those related to neurological issues like CVI.</li> <li>○ <b>Recommendation:</b> For children with suspected CVI or other neurological visual impairments, an ophthalmologist can provide comprehensive evaluations and medical interventions.</li> </ul>
<b>Optometrist:</b>	<ul style="list-style-type: none"> <li>○ <b>Qualifications:</b> Healthcare professionals (ODs) focusing on vision testing, prescribing glasses or contact lenses, and managing common eye conditions.</li> <li>○ <b>Expertise:</b> Primarily trained to assess refractive errors and general eye health.</li> <li>○ <b>Recommendation:</b> While optometrists are essential for routine vision care, they may not have the specialized training required for complex neurological visual impairments.</li> </ul>

*In summary, for visual processing challenges, consulting an ophthalmologist ensures access to specialized medical expertise necessary for accurate diagnosis and management.*

#### Vision Interventions and Parental Support (VIPS)

VIPS can provide **family education, vision services, and strategies** to support children with visual processing difficulties in their daily activities.

- **Services:**
  - **Home-Based Early Intervention:** Certified teachers and specialists conduct home visits to provide personalized instruction and support.
  - **Family Resource Center:** A unique facility offering resources, playgroups, and support for families.
  - **Parent Support:** Educational workshops and support groups to empower parents in their child's development.
- **Contact Information:**
  - **Address:** 1212 Southeastern Ave, Indianapolis, IN 46202
  - **Phone:** (317) 961-5001
  - **Website:** <https://vips.org/vips-indiana/>

<b>When to refer a child to VIPS?</b>	
<b>Signs a Referral is Needed:</b>	<ul style="list-style-type: none"> <li>● <b>Confirmed or Suspected CVI Diagnosis</b> – A medical provider has diagnosed CVI, or the child shows strong signs but hasn't been evaluated yet.</li> <li>● <b>Vision Impairment Affecting Development</b> <ul style="list-style-type: none"> <li>○ Difficulty <b>reaching, grasping, or using vision to guide hands</b></li> <li>○ Hesitation with <b>crawling, cruising, or walking</b> due to poor visual guidance</li> <li>○ Trouble <b>recognizing faces, toys, or pictures</b></li> <li>○ <b>Inconsistent visual attention</b> or easily overwhelmed by busy environments</li> </ul> </li> <li>● <b>Limited Progress with Visual Strategies</b> – If high-contrast materials, lighted objects, or environmental adaptations <b>are not improving engagement</b>, the child may need specialized intervention.</li> <li>● <b>Parent Concerns Align with CVI</b> – If caregivers report their child: <ul style="list-style-type: none"> <li>○ Looks past objects or has <b>inconsistent visual responses</b></li> <li>○ Responds only to <b>moving objects, certain colors, or lights</b></li> <li>○ Has difficulty recognizing <b>familiar people or items</b></li> </ul> </li> <li>● <b>Previous medical history includes any of the following:</b> <ul style="list-style-type: none"> <li>○ Seizures</li> <li>○ Oxygen Deprivation</li> <li>○ Stroke</li> <li>○ Near Sudden Infant Death Syndrome (SIDS)</li> <li>○ Hypoxic-Ischemic Encephalopathy (HIE) Events</li> <li>○ Brain Trauma</li> <li>○ Infections</li> <li>○ Genetic Conditions</li> <li>○ Metabolic Disorders</li> <li>○ Abnormal Brain Development</li> </ul> </li> </ul>
<b>Next Steps for Referral:</b>	<ol style="list-style-type: none"> <li>1. <b>Confirm CVI signs</b> through observation and caregiver input.</li> <li>2. <b>Discuss concerns</b> with the First Steps team.</li> <li>3. <b>Encourage a medical evaluation</b> if CVI is not yet diagnosed.</li> <li>4. <b>Complete a referral to VIPS</b> for specialized vision assessment and intervention.</li> </ol>

## Referral & Resources

### Resources

Media Resources:	
<b>To utilize as interventions:</b>	<ul style="list-style-type: none"> <li>• <a href="http://www.youtube.com/@AlissaDeSousa">www.youtube.com/@AlissaDeSousa</a> - CVI friendly youtube videos with various nursery rhymes, spelling/counting content, etc.</li> <li>• Tap-n-See Now – A simple, high-contrast app designed to encourage visual attention in children with CVI.</li> </ul>
<b>For More Education on CVI:</b>	<ul style="list-style-type: none"> <li>• <a href="http://www.youtube.com/@PerkinsVision">www.youtube.com/@PerkinsVision</a> - Educational Information regarding visual processing conditions.</li> <li>• <i>"Little Bear Sees: How Children with Cortical Visual Impairment Can Learn to See"</i> by Aubri Tallent, Fredy Bush, and Nancy Tallent</li> <li>• <i>Cortical Visual Impairment: An Approach to Assessment and Intervention</i> by Christine Roman-Lantzy.</li> <li>• <i>Vision and the Brain: Understanding Cerebral Visual Impairment in Children</i> by Amanda Hall Lueck and Gordon N. Dutton</li> <li>• <i>Babies with CVI: Nurturing Visual Abilities and Development in Early Childhood</i> by Anne McComiskey.</li> </ul>
In-person Training:	
<b>Vision Impaired In-Service of America (VIISA):</b>	<ul style="list-style-type: none"> <li>• VIPS provides a training program known as the VIISA at the family resource center in Indianapolis.</li> <li>• If you would like to learn more about how vision impacts learning and development in order to enhance your current practice they offer a half day training.</li> <li>• The <b>purpose</b> of VIISA training is for participants to gain and develop skills in understanding the unique needs of infants and toddlers who experience blindness or low vision in a home-based setting.</li> <li>• The <b>focus</b> will be on working with these children, supporting the families, and collaborating with other members of the service delivery team.</li> </ul>

Early identification of visual processing challenges is essential for promoting development in young children. Occupational therapists play a critical role in recognizing signs and working with Vision Interventions and Parental Support to provide targeted support. Through collaboration, children can receive the best interventions to enhance visual engagement and overall growth.

**Figure 3. Provider Handout (Condensed)**



**Visual Processing**

Best Practices for Visual Processing Challenges in Early Intervention

Zoe Brubaker (OTS)

“Children with undetected and untreated vision problems may have difficulty participating in occupations such as reading, copying from the board, writing, playing, and sports, which creates a need for occupational therapists to have a comprehensive understanding of vision.” (Clifford O'Brien & Kuhaneck, 2020, p. 2979)

- Visual Processing skills are important for participation in functional occupations.
- Children with multiple disabilities have a higher prevalence of visual deficits during development.

## The Hawaii Early Learning Profile

The Hawaii Early Learning Profile (HELP) 0-3 is a play-based, developmental assessment used in early intervention to observe and track a child's growth from birth to 3 years old. It helps identify strengths, potential delays, and areas where support may be needed.

Vision-related developmental milestones	
<b>0-3 Months:</b>	<ul style="list-style-type: none"> <li>• <b>Visual Response to Light:</b> Babies at this stage will respond to light changes by blinking or turning their head away.</li> <li>• <b>Eye Contact &amp; Focus:</b> Begins to make eye contact with caregivers and focuses on faces or objects placed close (within 8-10 inches).</li> <li>• <b>Tracking Objects:</b> Can begin to track a slowly moving object with their eyes, often limited to side-to-side motion.</li> </ul>
<b>3-6 Months:</b>	<ul style="list-style-type: none"> <li>• <b>Visual Tracking:</b> Can track moving objects horizontally and vertically with their eyes, focusing on both near and farther objects.</li> <li>• <b>Focus on Faces &amp; Objects:</b> Starts to focus more clearly on faces and objects and may start to reach toward visually interesting items.</li> <li>• <b>Color Differentiation:</b> Starts differentiating primary colors (red, blue, yellow) but will still have more difficulty with more subtle shades.</li> </ul>

<b>6-9 Months:</b>	<ul style="list-style-type: none"> <li>● Improved Eye-Hand Coordination: Baby can now coordinate their eye movement with hand movements (e.g., reaching for an object they see).</li> <li>● Visual-Motor Integration: Begins to exhibit more integrated visual-motor skills, such as grabbing objects or picking things up from a distance.</li> </ul>
<b>9-12 Months:</b>	<ul style="list-style-type: none"> <li>● Improved Visual Discrimination: By 9-12 months, infants develop better ability to discriminate between different shapes and sizes.</li> <li>● Depth Perception: At this stage, babies begin to show early signs of depth perception (e.g., trying to grab objects from varying distances).</li> </ul>
<b>12-18 Months:</b>	<ul style="list-style-type: none"> <li>● Increased Visual Discrimination: Starts to visually distinguish between various objects, shapes, and patterns. For instance, can identify common household items.</li> <li>● Visual Exploration: Becomes more visually curious, beginning to scan the environment and show preference for visually stimulating objects (e.g., colorful toys).</li> </ul>
<b>18-24 Months:</b>	<ul style="list-style-type: none"> <li>● Hand-Eye Coordination: Improved ability to engage with objects using visual information, such as stacking blocks or fitting objects into a container.</li> <li>● Visual Memory: Begins to recognize familiar objects, people, and places. May point to or name familiar items in books or around the house.</li> <li>● Symbol Recognition: Recognizes pictures of familiar objects (e.g., a picture of a dog or a ball) and begins to understand these as symbols for real-life items.</li> </ul>
<b>24-36 Months:</b>	<ul style="list-style-type: none"> <li>● Refined Visual-Motor Skills: By this age, toddlers refine their ability to use vision in hand-eye coordination tasks like drawing or building more complex block structures.</li> <li>● Spatial Awareness: Exhibits an understanding of spatial relationships in the environment (e.g., understanding that objects are near or far).</li> <li>● Visual Memory: Continues to improve visual memory skills, recalling images, objects, or even patterns previously seen.</li> </ul>

### Summary:

- **Sensory Development:** Tracking, visual focus, response to light, and the ability to distinguish between colors.
- **Fine Motor Development:** Visual-motor coordination, hand-eye coordination, and integration of visual cues for grasping and manipulating objects.
- **Cognitive Development:** Recognizing and identifying objects, faces, and symbols.

Parks, S. (2012). *Hawaii Early Learning Profile (HELP) for Preschoolers: 3–6 years*. VORT Corporation.

## Appendix B

### Survey Questions

#### Pre-Survey

##### General Knowledge on CVI

- How familiar are you with Cortical Visual Impairment (CVI)?
  - Not at all familiar
  - Slightly familiar
  - Somewhat familiar
  - Very familiar
  - Extremely familiar
- How well do you understand the primary causes of CVI?
  - Not at all
  - Slightly
  - Somewhat
  - Very well
  - Extremely well

##### Identifying Signs and Symptoms

- How confident are you in identifying signs of CVI in young children?
  - Not confident
  - Slightly confident
  - Somewhat confident
  - Very confident
  - Extremely confident
- To what extent do you recognize common signs of CVI in practice?
  - Never
  - Rarely
  - Sometimes
  - Often
  - Always

##### Intervention Strategies

- How frequently do you incorporate visual accommodations in your therapy sessions?
  - Never
  - Rarely
  - Sometimes
  - Often
  - Always

##### ➔ If "Rarely" – "Always" selected, this question will appear:

- What intervention strategies do you find most effective for improving visual processing deficits?
  - Sensory integration techniques
  - Visual motor integration activities
  - Adaptive equipment and environmental modifications
  - Collaboration with other professionals (e.g., ophthalmologist, teachers of blind and low vision)
  - Parent/caregiver education and training
  - Other (please specify)
- How do you typically incorporate visual processing interventions into your therapy sessions?
  - Structured, stand-alone activities

- Embedded within play-based activities
- Integrated into daily routines (e.g., feeding, dressing)
- Other (please specify)
- Do you use technology (e.g., apps, computer programs) in your visual processing interventions? If yes, please specify which ones.
  - Yes \_\_\_\_\_
  - No \_\_\_\_\_
- How effective do you feel in implementing intervention strategies for children with CVI?
  - Not effective
  - Slightly effective
  - Somewhat effective
  - Very effective
  - Extremely effective

### Environmental Adaptations

- How comfortable are you in recommending environmental adaptations for children with visual processing deficits?
  - Not comfortable
  - Slightly comfortable
  - Somewhat comfortable
  - Very comfortable
  - Extremely comfortable
- How often do you consider environmental factors when working with children with visual processing deficits?
  - Never
  - Rarely
  - Sometimes
  - Often
  - Always

### Referral and Collaboration

- How often do you involve parents or caregivers in the intervention process for visual processing deficits?
  - Always
  - Frequently
  - Sometimes
  - Rarely
  - Never

➔ If "Rarely" – "Always" selected, this question will appear:

- What strategies do you use to educate and involve families in supporting their child's visual processing development at home?
  - Providing handouts and resources
  - Demonstrating activities during sessions
  - Conducting parent training workshops
  - Using telehealth for parent coaching
  - Other (please specify)
- How knowledgeable are you about when to refer a child for further vision assessment?
  - Not knowledgeable
  - Slightly knowledgeable
  - Somewhat knowledgeable
  - Very knowledgeable
  - Extremely knowledgeable
- How familiar are you with professionals specializing in visual processing-related interventions?

- Not familiar
- Slightly familiar
- Somewhat familiar
- Very familiar
- Extremely familiar
- How often do you encounter barriers when referring children for further vision assessments?
  - Never
  - Rarely
  - Sometimes
  - Often
  - Always

### **Challenges and Barriers:**

- What are the main challenges you face when working with children with visual processing deficits?
  - Lack of standardized assessment tools
  - Limited training and resources
  - Difficulty in engaging the child in interventions
  - Inadequate time for intervention during sessions
  - Parent or caregiver compliance
  - Other (please specify)
- How do you address challenges or barriers in providing effective interventions for visual processing deficits?
  - Modifying intervention strategies
  - Seeking additional training or professional development
  - Collaborating with other professionals
  - Engaging parents more actively
  - Other (please specify)

### **Professional Development and Training:**

- What additional training or resources would you find helpful in enhancing your practice for addressing visual processing deficits?
  - Workshops and seminars on visual processing interventions
  - Online courses and webinars
  - Access to assessment tools and resources
  - Peer support groups or mentoring
  - Collaboration opportunities with other professionals
  - Other (please specify)

### **Open-Ended Questions:**

- Please share any specific strategies or techniques you have found particularly successful in addressing visual processing deficits in early intervention.
- What are your thoughts on current best practices in OT for visual processing deficits? How could these practices be improved?
- Are there any additional comments or insights you would like to provide about your experience with visual processing deficits in early intervention?

### **Post-Survey**

#### **General Knowledge on CVI/VPD**

- After this session, how familiar are you with Cortical Visual Impairment (CVI)?
  - Not at all familiar
  - Slightly familiar
  - Somewhat familiar
  - Very familiar

- Extremely familiar
- How well do you now understand the primary causes of CVI?
  - Not at all
  - Slightly
  - Somewhat
  - Very well
  - Extremely well

### Identifying Signs and Symptoms

- How confident are you now in identifying signs of CVI in young children?
  - Not confident
  - Slightly confident
  - Somewhat confident
  - Very confident
  - Extremely confident
- To what extent do you now recognize common signs of CVI in practice?
  - Never
  - Rarely
  - Sometimes
  - Often
  - Always

### Intervention Strategies

- How frequently do you plan to incorporate visual accommodations in your therapy sessions after this session?
  - Never
  - Rarely
  - Sometimes
  - Often
  - Always

### ➔ If "Rarely" – "Always" selected, these questions will appear:

- What intervention strategies do you now feel more confident using to improve visual processing deficits? (Select all that apply)
  - Sensory integration techniques
  - Visual-motor integration activities
  - Adaptive equipment and environmental modifications
  - Collaboration with other professionals (e.g., ophthalmologists, teachers of blind and low vision)
  - Parent/caregiver education and training
  - Other (please specify)
- How do you now plan to incorporate visual processing interventions into your therapy sessions?
  - Structured, stand-alone activities
  - Embedded within play-based activities
  - Integrated into daily routines (e.g., feeding, dressing)
  - Other (please specify)
- Are you now more likely to use technology (e.g., apps, computer programs) in your visual processing interventions? If yes, please specify which ones.
  - Yes \_\_\_\_\_
  - No
- How effective do you now feel in implementing intervention strategies for children with CVI/VPD?
  - Not effective
  - Slightly effective
  - Somewhat effective
  - Very effective
  - Extremely effective

### Environmental Adaptations

- How comfortable are you now in recommending environmental adaptations for children with visual processing deficits?
  - Not comfortable
  - Slightly comfortable
  - Somewhat comfortable
  - Very comfortable
  - Extremely comfortable
- How often do you now consider environmental factors when working with children with visual processing deficits?
  - Never
  - Rarely
  - Sometimes
  - Often
  - Always

### **Referral and Collaboration**

- How often do you plan to involve parents or caregivers in the intervention process for visual processing deficits after this session?
  - Always
  - Frequently
  - Sometimes
  - Rarely
  - Never

➔ If "Sometimes" – "Always" selected, this question will appear:

- What strategies do you now feel more confident using to educate and involve families in supporting their child's visual processing development at home?
  - Providing handouts and resources
  - Demonstrating activities during sessions
  - Conducting parent training workshops
  - Using telehealth for parent coaching
  - Other (please specify)
- How knowledgeable are you now about when to refer a child for further vision assessment?
  - Not knowledgeable
  - Slightly knowledgeable
  - Somewhat knowledgeable
  - Very knowledgeable
  - Extremely knowledgeable
- How familiar are you now with professionals specializing in visual processing-related interventions?
  - Not familiar
  - Slightly familiar
  - Somewhat familiar
  - Very familiar
  - Extremely familiar

### **Challenges and Barriers**

- What challenges do you still foresee when working with children with visual processing deficits? (Select all that apply)
  - Lack of standardized assessment tools
  - Limited training and resources
  - Difficulty engaging the child in interventions
  - Inadequate time for intervention during sessions
  - Parent or caregiver compliance
  - Other (please specify)
- How do you now plan to address challenges or barriers in providing effective interventions for visual processing deficits?
  - Modifying intervention strategies

- Seeking additional training or professional development
- Collaborating with other professionals
- Engaging parents more actively
- Other (please specify)

**Professional Development and Training**

- What additional training or resources would you still find helpful in enhancing your practice for addressing visual processing deficits? (Select all that apply)
  - Workshops and seminars on visual processing interventions
  - Online courses and webinars
  - Access to assessment tools and resources
  - Peer support groups or mentoring
  - Collaboration opportunities with other professionals
  - Other (please specify)

**Open-Ended Questions**

- Please share any specific strategies or techniques you learned from this session that you plan to implement in your practice.
- How has this education session influenced your understanding of best practices in OT for visual processing deficits?
- Are there any additional comments or insights you would like to provide about your experience with visual processing deficits in early intervention?