UNDERSTANDING THE UNIQUE NEEDS OF CHILDREN WITH VISUAL IMPAIRMENTS AND AUTISM SPECTRUM DISORDER

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By

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ABSTRACT
Understanding the Unique Needs of Children with Visual Impairments and Autism Spectrum Disorder
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Children with visual impairments (VI) display deficiencies in social interactions, have elevated repetitive behaviors, and sensory features similar to children diagnosed with autism spectrum disorder (ASD). ASD is frequently diagnosed comorbidly in children with VI, making it important for researchers to do in-depth research to better analyze the similarities and differences between ASD and other sensory impairments. For this study, the researchers compared 27 children with VI between the ages of 5 and 12 with 177 children with ASD using parent reports of ASD symptomology. Statistical means comparisons were conducted between these two groups on items related to social communication, repetitive behaviors and sensory features. The researchers hypothesized that children with VI would display superior social communication abilities and similar levels of sensory behaviors versus children with ASD. In fact, children with VI did have better social interaction skills and less behavior and sensory problems. This investigation may help parents and educators better understand children's unique needs and develop more targeted supports for children with VI who exhibit sensory differences or social communication impairments.

Keywords: visual impairment, autism spectrum disorder, social interaction, behavioral problems, sensory impairments, social communication abilities

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CHAPTER 1

Introduction

Children with visual impairments (VI) have been reported to exhibit behaviors similar to children with autism spectrum disorders (ASD) in regard to social communication skills and sensory behaviors. As the rate of ASD has nearly tripled in the past two decades (Centers for Disease Control and Prevention, 2020), the comorbid diagnosis of ASD in children with VI has also become more common (Jure, Pogonza, & Rapin, 2016; Mukaddes, Kilincaslan, Kucukyazici, Sevketoglu, & Tuncer, 2007). However, because VI is a low-incidence disability, much of the literature focused on ASD and ASD-like traits in children with VI has been in the form of case descriptions or low quality, small-scale screening studies, so it remains unclear whether patterns of ASD traits are expressed similarly across children with diagnoses of ASD and VI (Absoud, Parr, Salt, & Dale, 2011).

World-wide, there are about 19 million children diagnosed with visual impairments, and 1.4 million of them are considered blind (Ghaderi, Hashemi, Jafarzadehpur, Yekta, Ostadimoghaddam, Mirzajani, & Khabazkhoob, 2018). While in the United states, more than 17,400 children 3 to 5 years of age are diagnosed with visual impairments, and the number is predicted to increase 26% by 2060 (Varma, Tarcy-Hornoch, & Jiang, 2017). Visual impairment can occur at birth, under different circumstances such as hereditary conditions, accidents, and disease. An individual with a visual acuity of 20/70 to 20/200 is considered as low vision, and visual acuity below 20/200 is considered legally blind (Li, 2009). Children with profound visual impairments whose visual acuity is 20/800 or worse tend to experience a delay of social cognitive

development like the ability to understand other people's thoughts and beliefs, which might impede the development of their social interaction skills (Ferrell, Shaw, & Dietz, 1998; Pring, 2004). Different from sighted persons who learn their social communication and leisure skills through visual observation, children with visual impairments may require sequential, careful instruction in order to practice their social and cognitive skills (Wiskochil, Lieberman, Houston-Wilson, & Petersen, 2007).

Although there are few studies that directly compare the behavior of children with VI and ASD, many researchers report an overlap in symptoms between these groups. Children with VI or ASD both may display differences in sensory features and impaired interaction skills (Absoud et al., 2011). Children with ASD may have other sensory impairments and show difficulties in using their vision in certain tasks such as attending to faces, which can lead to later challenges in recognizing and discriminating different faces (Banda, Griffin-Shirley, Okungu, Ogot, & Meeks, 2014; McPartland, Webb, Keehn, & Dawson, 2011). Children with ASD who exhibit these difficulties in using their vision may be diagnosed comorbidly with visual impairments (Jure et al., 2016; Mukaddes, Kilincaslan, Kucukyazici, Sevketoglu, & Tuncer, 2007). Further, about 30% of children with ASD experience challenges in acquiring functional verbal communication skills (Tager-Flusberg & Kasari, 2013) which may be linked in part to decreased eye contact and attention to the faces of others.

Children with VI often display impairment in social interaction (Hobson & Lee, 2010) which is similar to children who are diagnosed with ASD (Mukaddes et al., 2007). Unlike sighted children, children with visual impairments tend to experience an early threat to their attachment with caregivers. They might not be able to distinguish visual

cues from their parents, which causes a disadvantage in practicing their social interaction skills because their parents might feel discouraged from future interactions if their children do not initially respond to their facial expressions and make eye contact (Gourgey, 1998). Children with visual impairments also tend to experience a delay in social cognitive development like the ability to understand other people's thoughts, which might influence their social interaction skills (Pring, 2004). Children learn how to interact through observing and imitating others, however these are persistent challenges for children with VI.

Meanwhile, children with ASD also need extra support to improve their social interaction skills in order to decrease the risk of developmental challenges and enhance their communication abilities to become ready for school (Ramdoss, Sathiyaprakash, Lang, Russell, Mulloy, Austin, Franco, Jessica, O'Reilly, Mark, Didden, Robert, Lancioni, & Giulio, 2011). Therefore, it is important to introduce early social communication support to children with VI and ASD, to improve their motivation to interact with others and improve their access to academic opportunities. Children with ASD experience deficits in social communication and social interaction across multiple contexts such as social-emotional exchange, nonverbal communicative behaviors, and understanding and maintaining relationships (American Psychiatric Association, 2013). They also display repetitive motor movements and may not be flexible about new routines (Hay, Dutton, Biggar, Ibrahim, & Assheton, 2020). Children can also present with restricted interests or perseverative behaviors, which interfere with their ability to interact and learn. Additionally, they can also have hyperactive responses, causing them to avoid sensory input or, conversely, they can have unusual interests in sensory experiences such as sight,

touch, and hearing that lead them to seek out such stimuli (Centers for Disease Control and Prevention, 2020).

Early intervention services play crucial roles in helping children with VI and ASD to enhance their social communication, and behavioral and sensory processing skills (Granpeesheh, Dixon, Tarbox, Kaplan & Wilke, 2009; Wetherick, 2014). However, it is important to understand the unique presentation of social communication and behavioral challenges experienced by children with VI who are showing ASD symptoms in order to provide timely tailored supports and services to reduce the impact of developmental delays.

The purpose of this causal-comparative research study is to determine the relationship between a diagnosis of either visual impairments or Autism Spectrum Disorder and autism traits in school-age children. Research reporting on the similarities and differences in the presentation of communication, behavioral and sensory impairments between children with VI and those with ASD will be highlighted. Interventions frequently utilized in the treatment of these disabilities will also be presented, with a focus on the importance of early intervention. This study will help parents and educators become more sensitive to the unique needs of children with VI or ASD and to choose appropriate supports for children who exhibit sensory and social impairments.

CHAPTER 2

Literature Review

This literature review will begin by defining VI and ASD; will continue to discuss ASD traits in VI with a focus on language development and social communication challenges, restricted interests and repetitive behaviors, developmental delays and sensory differences; and diagnosing ASD in VI. Furthermore, teaching strategies using peer and technology supports, behavioral interventions, music therapy, and newer research regarding PECS, which demonstrates how children with ASD use their vision, will be discussed.

2.1 Students with Disabilities

2.1.1 Definition of Visual Impairments

A deficiency in the function of the eye and the eye's structure is defined as a visual impairment (Demir, Bolat, Yavuz, Karacetin, Dogangun, & Kayaalp, 2014). Visual impairment can occur at birth, which can exist under different situations such as hereditary conditions, accidents, or disease. The degree of visual impairment depends on which part of the eye or brain is injured and how seriously they were damaged (Kelly, & Smith, 2011). Individuals who primarily use Braille, need tactile and audio support, and have little or no functional vision for learning are considered blind. Individuals who can use their vision after correction (e.g. having glasses), need to use low vision devices and modify the environment are considered as being low vision (Heyl, & Hintermair, 2015; Li, 2009). Many visual disorders are also associated with physical or cognitive impairments such as, Charge Syndrome, developmental prosopagnosia, and septo-optic dysplasia (Absoud et al., 2011; Lancioni, O'Reilly, Singh, Sigafoos, Didden, Oliva, &

Campodonico, 2010; Sauer, Lawrence, Mayo-Ortega, Oyama-Ganiko, & Schroeder, 2018). According to Erin (2006), approximately 40% of students who have physical or cognitive disabilities also have some degree of visual impairment. Meanwhile, more than 60% of children with visual impairments are also diagnosed with other disabilities (Ferrell et al., 1998). The function of a person's vision can be influenced by the time of day, the environment, and the task (Heyl, & Hintermair, 2015), which means that children with low vision might see better during the daylight hours and blind children may need explicit tactile materials (manipulatives) to help them better locate materials (Li, 2009).

2.1.2 Definition of Autism Spectrum Disorder

Autism spectrum disorder (ASD) is a neurodevelopmental condition, which is defined as having difficulties with social communication, repetitive behaviors, and sensory challenges (Jones, 2017). According to the DSM-5, individuals with ASD also display repetitive patterns of behaviors or interests and core symptoms need to be apparent during the developmental period before 3 years of age (American Psychiatric Association, 2013). In the United States, one in 54 children according to the CDC are diagnosed with ASD (Center for Disease Control and Prevention, 2020), and 31% of children with ASD are diagnosed with additional disabilities (Banda et al., 2014). In terms of gender, boys are three to four times more likely to be diagnosed with ASD than girls (Baio, Christensen, Maenner, Daniels, Warren, & Dowling, 2018).

2.2 ASD Traits in Individuals with Visual Impairments

2.2.1 Language development and Social Communication Challenges in VI

Vision contributes to general language development, which is associated with joint attention in early childhood (Gordon-Pershey, Zeszut, & Brouwer, 2019). However, a lack of visual information can result in issues regarding overall language and social communication development (Hobson & Lee, 2010; Tadic, Pring, & Dale, 2009). This may include lack of attention to or use of body language and speech that contains repetitive verbal habits that, are, at times, inappropriate (Ayers, 2009). However, if parents can positively be involved in their children's language development, their children are more likely to have better language skills. For example, when parents encourage their children with VI who show ASD symptoms to expand their language, their children will practice more on using their language, compared to children whose parents do not encourage their child (Ramdoss et al. 2011). Because children learn how to interact with others by imitating their parents, it is necessary for parents to use positive reinforcement strategies (Ramey & Ramey, 2004). Children with VI have been reported to have higher rates of developmental delays due to the impact of reduced access to visual information in their interactions with others, such as facial expressions, joint attention, and gestures. Visual information and visual skills play crucial roles in helping children understand other people's intentions when they communicate (Pijnacker, Vervloed, & Steenbergen, 2012). Support and positive encouragement from parents can improve communication levels in children with VI and ASD and assist them in reaching developmental milestones more similarly to their typically developing peers (Wiskochil et al., 2007).

2.2.2 Restricted Interests and Repetitive Behaviors in VI

Restricted interests and repetitive behaviors occur frequently in children with VI. Visual impairments limit the options of different interests or leisure activities children can choose from compared to sighted peers (Pring & Ockelford, 2005). As a result, they might become less active, outgoing, and have fewer life experiences. Vision loss influences their perceptions of the world around them. When children are not familiar with their surroundings and are unsure of routines, they may feel nervous and reject trying new things (Butler, Katayama, Schindling, & Dials, 2018). When challenged by new modes of instruction, they may flap their hands or rock their body. These repetitive behaviors tend to be viewed as stereotypical behaviors, used to decrease stress when children with VI are facing unfamiliar challenges, coping with transition, or interacting with people socially (Tröster, Brambring, & Beelmann, 1991). The most frequent repetitive behaviors noted in students with VI are body rocking, eye pocking, and hand flapping (Fazzi, Lanners, Danova, Ferrarri-Ginevra, Cheza, Luparia, Balottin, & Lanzi, 1999). In order to help children form more appropriate behaviors, it is important to have regular orientation and mobility training to practice daily tasks so that they can navigate environments successfully, thereby reducing stress (Heyl & Hintermair, 2015) and improving access to a greater number of engaging activities.

2.2.3 Sensory Differences in VI

Children with VI display various sensory differences, such as higher developed tactile recognition, smell ability, and auditory memory compared to sighted children. Children with VI have better tactile recognition skills; they are more sensitive when distinguishing line symbols, textured symbols, and point symbols than sighted children

(Perkins, 2002). Children with VI can easily identify different tactile material through touch (Ramsamy-Iranah, Maguire, Gardner, Rosunee, & Kistamah, 2016). In addition to tactile sensory differences, children with VI tend to perform better and faster in identifying and discriminating between odors (Cuevas, Plaza, Rombaux, De Volder, & Renier, 2009; Gagnon, Ismaili, Ptito, & Kupers, 2015). Additionally, individuals with visual impairments tend to have better auditory processing skills as compared to sighted peers (Conway & Christiansen, 2005; Kubovy & Valkenburg, 2001; Miyake & Shah, 1999). Children with VI perform better in auditory memory tasks such as, recognizing a single tone or group of sounds, which shows a relative strength in their working memory (Li, 2009).

2.2.4 Diagnosing ASD in Individuals with VI

According to several studies, ASD is frequently diagnosed comorbidly in children with visual impairments (Jure et al., 2016; Mukaddes, Kilincaslan, Kucukyazici, Sevketoglu, & Tuncer, 2007). Children with ASD experience similar difficulties in communication, sensory impairments, and intellectual disabilities as children with VI (Absoud et al., 2011; Bellomo 2016). However, the degree of autism might differ between children with VI and ASD. As a result, it is difficult to determine whether children with VI have similar autistic features as children with ASD, thus; it is necessary to use different instruments to investigate the similarities and differences between children with VI and ASD (Hobson, Lee, & Brown, 1999).

In order to investigate how autistic features influence early communication difficulties and social behaviors among children with VI, the Visual Impairment and Social Communication Schedule (VISS) was developed (Absoud et al., 2011) and the

Autism Diagnostic Observation Schedule (ADOS) and the Autism Diagnostic Interview, Revised (ADI-R) have been adapted for use in this population (Williams, Fink, Zamora, & Borchert, 2014). The VISS was created as a clinical tool to evaluate ASD features and social communication behaviors among children with VI. To increase participation for children with VI, items in the VISS do not depend on the participants' vision, but are associated with participants' abilities to respond to prompts during the observation. It was based on play behaviors observed during the semi-standardized clinical assessments and social interactions related to Reynell-Zinkin scales. There are 29 items in total, which include social interaction, communication and language, play, routines, behaviors, and interests. Because person and item measures are associated with the same scale, clinicians can compare an item score with a person's ability directly, which helps the clinicians to determine ASD features in an early stage for early intervention and management.

The ADOS and ADIR are frequently used to measure repetitive behaviors, reciprocal social interaction, and communication skills (Williams et al., 2013). During the ADOS observation, different sounds and textures were added as extra support to help children with VI access the materials easily. Modified resources like raised and textured pieces of different pictures were made available for the children. In order to accommodate Braille readers, the standard books were replaced by Braille children's books. As for the ADI-R parent interview assessment, all items related to vision were deleted. Scoring codes were adjusted to increase the reliability of the measure, which enabled the researchers to better discriminate a clinical diagnosis of ASD in children with VI.