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Research in Developmental Disabilities



A comparison of patterns of sensory processing in children with and without developmental disabilities

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ARTICLE INFO

Article history:

Received 7 July 2009

Accepted 10 July 2009

Keywords:

Sensory integration

Autism

Autism spectrum disorders (ASD)

Attention deficit hyperactivity disorder (ADHD)

Sensory processing

Assessment tool

ABSTRACT

This study compared the patterns of sensory processing among children with autism spectrum disorder (ASD), attention deficit and hyperactivity disorder (ADHD), and children without disabilities. Parents reported on the frequency of sensory processing issues by completing the Chinese Sensory Profile (CSP). Children with disabilities (ASD or ADHD) exhibited significantly more sensory processing issues than children without disabilities. The results of GLM and discriminant analyses showed that the CSP effectively differentiated between children with and without developmental disabilities. But it failed to identify major differences in sensory processing issues between children with either ASD or ADHD. Sensory processing issues could be one of many criteria that characterize and differentiate the features of children with different developmental disabilities. Although no significant gender differences in sensory processing issues appeared, age was a significant cofounding factor in evaluating sensory processing. Children without disabilities showed some small decreases in sensory processing issues as they aged from 6 to 12 years old. Children with ASD showed some decrease in sensory processing issues over the span of their childhood, while children with ADHD showed a significant increase in auditory processing issues as well as small increases in many aspects of sensory processing.

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1. Introduction

Sensory integration is postulated to be a neurological function that processes and organizes sensation from one's own body and the environment. Sensory integration is the processing of sensory modality inputs from multiple sources for functional outputs that enables an individual to use the body effectively within the environment (Macaluso & Driver, 2005). Inputs from different sensory organs are thought to be processed in specialized areas in the brain; the communication within and among these specialized areas is known as functional integration. Sensory integrative function is a key aspect of clinical evaluation in assessing children with developmental disabilities, especially for children with attention deficit hyperactivity disorder (ADHD) or autism spectrum disorders (ASD). The results of the assessment are critical in planning and implementing effective intervention for the individual child. Estimated rates of sensory processing dysfunction for children with various disabilities have ranged as high as 40–88% (Ahn, Miller, Milberger, & McIntosh, 2004; Talay-Ongan & Wood, 2000). The prevalence and types of sensory processing impairments in children with ASD and ADHD are well documented in the literature (Dunn & Bennett, 2002; Rogers, Hepburn, & Wehner, 2003; Tomchek & Dunn, 2007; Yochman, Parush, & Ornoy, 2004).

Review of the clinical and autobiographical literature suggests that sensory processing dysfunction in autism is global in nature and affects all the main modalities across multisensory processing systems (Kern et al., 2007; Marcus & Stone, 1993; Nelson, 1984). Estimates of sensory-perceptual abnormalities in children with autism have ranged between 42% and 88% (Baranek, 1999; Dawson & Watling, 2000), including overresponsivity to tactile input (Grandin & Scariano, 1986), auditory hypersensitivity (Williams, 1994), and attention and arousal impairments as related to the faulty modulation of sensory input (Adamson, O'Hare, & Graham, 2006). In particular, a number of studies found that impairment in auditory processing is one of the most commonly reported sensory processing impairments in children with ASD (Tomchek & Dunn, 2007). But the literature has reported both auditory hypersensitivity (Williams, 1994) and auditory underresponsivity (Baranek, 1999; Osterling & Dawson, 1994). Avoidance of eye contact and inefficient use of eye gaze was used as a clinical feature in diagnosing ASD (American Psychiatric Association [APA], 2000; Cook, 1991). Several authors have explained these features as a self-regulatory mechanism that compensates for difficulties with modulating visual input. With an overresponsivity to tactile input, children with ASD are more likely to display extreme anxiety, distractibility, inflexible behaviors, repetitive verbalizations, social withdrawal, and abnormal focused attention (Baranek, Foster, & Berkson, 1997; Grandin, 1995). In the domain of taste and smell sensation, children with ASD were more likely to have oral sensory processing challenges, such as smelling or licking uneatable objects and being picky with the texture of food, in addition to olfactory hypersensitivity (Stehli, 1991). Mangeot et al. (2001) reported that children with ADHD, as compared with the typical developing sample, displayed greater abnormalities in sensory modulation on both physiological and parent-reported measures.

Compared with children without disabilities, children with ADHD exhibited greater difficulties in the sensorimotor domain, including visual and tactile processing (Hern & Hynd, 1992; Schaughency, 1986). From a sensory processing perspective, children with ADHD may not be receiving and processing sensory information properly and therefore may have difficulty producing appropriate responses at both school and home and in the community (Dunn & Bennett, 2002). Neu (1997) reported that more activity, less adaptability, and lower thresholds for sensory stimuli in infancy are related to a higher rate of diagnosis of ADHD in later stages. Researchers have further identified vestibular sensory differences in children with attentional difficulties; moreover, these difficulties interfere with the children's performance in movement and skills development (Ayres, 1979; Fisher, Murray, & Bundy, 1991). The literature supports the observations that children with ADHD have behavioral and conduct difficulties and disruptive behavior disorders, particularly oppositional defiant disorder and conduct disorder, as well as others (Downey, Stelson, Pomerleau, & Giordani, 1997; Dunn & Bennett, 2002; Mangeot et al., 2001).

The objective of this paper was to survey and compare sensory processing issues in children both with and without disabilities, and to examine whether differences in sensory processing exist among children with ASD, ADHD, and those without disabilities. The parent or major caregiver assessed the recruited participants using the Chinese Sensory Profile (CSP), a standardized questionnaire for

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