



Contents lists available at ScienceDirect

Research in Autism Spectrum Disorders

Journal homepage: <http://ees.elsevier.com/RASD/default.asp>

Patterns of sensory processing in children with an autism spectrum disorder



Scott D. Tomchek^{a,c,*}, Ruth A. Huebner^{b,1}, Winnie Dunn^c

^aWeisskopf Child Evaluation Center, University of Louisville, School of Medicine, Department of Pediatrics, United States

^bEastern Kentucky University, United States

^cKansas University Medical Center, Occupational Therapy Education Program, United States

ARTICLE INFO

Article history:

Received 17 March 2014

Received in revised form 10 June 2014

Accepted 16 June 2014

Available online 10 July 2014

Keywords:

Autism spectrum disorders

Sensory processing

Assessment

ABSTRACT

The literature describing individuals with autism spectrum disorders (ASDs) commonly includes descriptions of differences in sensory processing. The purpose of this study was to describe patterns of sensory processing found in 400 children with an ASD. Exploratory factor analysis identified 6 parsimonious factors: low energy/weak, tactile and movement sensitivity, taste/smell sensitivity, auditory and visual sensitivity, sensory seeking/distractibility, and hypo-responsivity. These factors are consistent with other reports about differences in sensory processing. Findings provide insights about practice and future research.

© 2014 Elsevier Ltd. All rights reserved.

1. Introduction

In addition to the core social-communication features of autism, researchers have reported that children and adolescents with autism spectrum disorders (ASD) respond to sensory experiences differently than peers with or without disabilities. These differences in sensory responding are well documented in the basic science literature (Ornitz, 1989; Ornitz, Lane, Sugiyama, & de Traversay, 1993; Yeung-Courchesne & Courchesne, 1997), clinical literature by direct observation (Adrien et al., 1992, 1993; Adrien, Ornitz, Barthelemy, Sauvage, & Lelord, 1987), parent report (Baranek, David, Poe, Stone, & Watson, 2006; Ben-Sasson et al., 2007; Ermer & Dunn, 1998; Kern et al., 2006; Kientz & Dunn, 1997; Lane, Young, Baker, & Angley, 2010; Leekam, Nieto, Libby, Wing, & Gould, 2007; O'Donnell, Deitz, Kartin, Nalty, & Dawson, 2012; Rogers, Hepburn, & Wehner, 2003; Tomchek & Dunn, 2007; Watling, Deitz, & White, 2001) and first-person accounts of living with autism (Cesaroni & Garber, 1991; Grandin, 1995; Jones, Quigney, & Huws, 2003; Minshew & Hobson, 2008). In fact, the initial appearance of these sensory processing findings often predates diagnosis (Adrien et al., 1993; Baranek, 1999; Dahlgren & Gillberg, 1989; Lord, 1995).

Using parent report measures of sensory responding in individuals with an ASD, several studies have described the prevalence of difficulties in comparison to typically developing peers. Parent report measures are based on the premise that all children exhibit sensory responses, and that parents can report about their children's responses when given specific behavioral explanations. These investigations have consistently found differences in sensory processing across sensory systems when comparing those with an ASD to typically developing peers (Chen, Rodgers, & McConachie, 2009;

* Corresponding author at: Weisskopf Child Evaluation Center, University of Louisville, Department of Pediatrics, 571 South Floyd Street, Suite 100, Louisville, KY 40202, United States. Tel.: +1 502 852 5691; fax: +1 502 852 0955.

E-mail address: scott.tomchek@louisville.edu (S.D. Tomchek).

¹ Retired.

Kientz & Dunn, 1997; Lane et al., 2010; O'Donnell et al., 2012; Tomchek & Dunn, 2007). The existence of these difficulties has been reported to be as high as 92% of samples. Initially, Kientz and Dunn (1997) examined which *Sensory Profile* (SP; Dunn, 1999) scores differentiated between children with autism ($n = 32$) and without autism ($n = 64$). Multivariate analysis showed that children with an ASD were reported to have higher rates of sensory processing differences than the children without autism on all categories of the SP, with 84 of the 99 items (85%) significantly differentiating the sensory processing skills between groups. Children with ASD had more difficulties with both sensory modulation and motor planning, in addition to differences in social and behavior characteristics often utilized in differential diagnosis. Similarly, in Tomchek and Dunn (2007), 95% of the sample ($n = 266$) of children with an ASD demonstrated some degree of sensory processing differences on the *Short Sensory Profile* (SSP; McIntosh, Miller, & Shyu, 1999) total score, with the greatest differences on the underresponsive/seekers sensation, auditory filtering, and tactile sensitivity sections. The ASD group was also rated as significantly different ($p < .001$) on 92% (35 of 38) of the items, total score, and all sections of the SSP compared to age-matched typically developing peers aged 3–7 years. More recently, these findings have been replicated (Chen et al., 2009; Lane et al., 2010; O'Donnell et al., 2012).

Similar methodologies have been used to investigate if these reported differences were unique to autism or related to developmental or intellectual disability. Rogers et al. (2003) compared parent report of sensory reactivity on the SSP for 102 young children (19–36 months) in four groups: autism ($n = 26$), fragile X syndrome ($n = 20$), developmental disabilities of mixed etiology ($n = 32$), and children developing typically ($n = 24$). All groups were comparable in socioeconomic status, ethnic status, and overall mental age. Findings indicated that regardless of mental age, both children with fragile X syndrome and children with autism had significantly more sensory responses overall than the two comparison groups, with the children with ASD being described as having more difficulty with auditory filtering, taste/smell and tactile sensitivity. More recently, Wiggins, Robins, Bakeman, and Adamson (2009) found that children with an ASD ($n = 17$) had more tactile and taste/smell sensitivities and difficulties with auditory filtering than a comparison group of children ($n = 17$) with developmental delay.

Studies have also attempted to define patterns of sensory responding using SP factor summary scoring based on performance of typically developing children. Initially, Ermer and Dunn (1998) sought to determine which of the nine factors on the SP best discriminated between children with autism or pervasive developmental disorder (PDD; $n = 38$), children with attention deficit hyperactivity disorder (ADHD; $n = 61$), and children without disabilities ($n = 1075$) aged 3–15 years. The results yielded two discriminant functions: one that differentiated children with disabilities from those without disabilities and another that differentiated the two groups with disabilities from each other. Nearly 90% of the cases were classified correctly using these two functions. Specific to children with autism/PDD, 4 of the 9 factors best discriminated from those with ADHD: a low incidence of behaviors reported within the sensory seeking factor, and a high incidence of behaviors noted within oral sensitivity, inattention/distractibility, and fine motor/perceptual factors. Watling, Deitz, and White (2001) compared sensory processing behaviors of children aged 3–6 years with ($n = 40$) and without ($n = 40$) autism, gathered via parent report on the *Sensory Profile* (SP; Dunn, 1999) and found that sensory processing of children with autism was significantly different from the sample without autism on 8 of 10 factors (sensory seeking, emotionally reactive, low endurance/tonic, oral sensitivity, inattention/distractibility, poor registration, fine motor/perceptual, and other).

A more recent approach to defining patterns of sensory processing compares performance to quadrant scoring on the *Sensory Profile Supplement* (SPS; Dunn, 2006). Standardization data from the SP was reanalyzed to identify quadrant scores reflecting four general pattern of sensory responsiveness: registration, seeking, sensitivity, and avoiding. In these studies, children with an ASD have been noted to significantly lower scores (i.e., greater difficulty) on all four quadrant scores when compared to typically developing peers (Brown, Leo, & Austin, 2008; Joosten & Bundy, 2010; Kern et al., 2006; Reynolds, Bendixen, & Lane, 2011). In general, children with autism have consistently been reported to have more avoiding, sensitivity, seeking and low registration than typical peers. Additional analysis by Joosten and Bundy (2010) compared children with an ASD and intellectual disability with those with intellectual disability aged 5–18 years and found that differences were noted between the groups on sensitivity and avoiding factors. In a study comparing a younger sample of 101 toddlers with an ASD (Ben-Sasson et al., 2007) to a typically developing age-matched group ($n = 100$) using the *Infant Toddler Sensory Profile*, they found that the ASD group differed on all four sensory patterns/quadrants, with a high frequency of under-responsiveness and avoiding behaviors and a low frequency of sensory seeking as the primary patterns discriminating the ASD group from the typical groups. Additionally, these investigators found that mental age was not a substantial moderator in the presentation of extreme sensory behaviors.

There have been limited attempts to subtype children with an ASD on sensory features. Recent cluster analysis (Lane et al., 2010) using the SSP with 54 children with an ASD aged 2–10 years, found three subtypes: Sensory-based Inattentive Seeking, Sensory Modulation with Movement Sensitivity, and Sensory Modulation with Taste/Smell Sensitivity. Follow-up replication with a separate sample of 29 children with an ASD by the same research group confirmed the triad subtypes, though further parsed the Sensory-based Inattentive Seeking and Sensory Modulation with Movement Sensitivity clusters based on degree of SP dysfunction, taste/smell sensitivity and vestibular/proprioceptive processing (Lane, Dennis, & Geraghty, 2011). Here, Children with a primary pattern of sensory-based inattention could be further described as sensory seekers or nonseekers. Children with a primary pattern of vestibular/proprioceptive dysfunction were also differentiated on movement and tactile sensitivity.

The above review of sensory processing findings in ASDs converges to confirm the presence of sensory processing differences for most individuals who have ASD. It is also evident that this line of investigation has variability among the size

Download English Version:

<https://daneshyari.com/en/article/370111>

Download Persian Version:

<https://daneshyari.com/article/370111>

[Daneshyari.com](https://daneshyari.com)