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## TOPIC : SENSORY PROCESSING DIFFICULTIES OF INDIVIDUALS WITH AUTISM SPECTRUM DISORDERS

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## Sensory Processing Difficulties - General Information

One of the most intrusive symptoms in individuals with Autism Spectrum Disorders (ASD) is sensory processing difficulty. This can manifest as oversensitivity, where a moderately loud noise can sound piercing or a blinking light can cause distraction that cannot be redirected. These difficulties can also make an individual with Autism seem like he or she is ignoring others, as it can sometimes be difficult for him/her to hear spoken language and make sense of the meaning quickly. Much of the research literature is devoted to explaining the difficulties individuals face when struggling with sensory difficulties because these are so prevalent in individuals with Autism Spectrum Disorders.

### A. Correlation Between Sensory Difficulties and Severity of Autism

Kern, et al (2007) studied sensory processing dysfunction in children, adolescents, and adults with Autism and sought for a relationship between sensory dysfunction and severity of Autism. They also looked for a correlation between the different types of sensory difficulties (e.g. if a person had difficulties with auditory processing, did he or she also have difficulties with visual processing, etc.). The researchers hypothesized that the more sensory difficulties an individual had, the more severe the symptoms of Autism.

#### *Methodology:*

In this post-test only non-experiment design, participants were assessed for sensory processing difficulties and symptoms of Autism. Responses of 104 participants were studied. The age range of the participants was 3-56 years old. All participants had been diagnosed with Autism as a child and the researchers confirmed the diagnosis before administering the assessments.

The assessment tools used by the researchers measured the number of sensory challenges the participant had and the severity of his/her Autism symptoms. The participants' scores on the assessment tools were studied by the researchers to see if there is a relationship between their sensory processing difficulties and their severity of Autism.

#### *Results/Outcomes:*

The researchers found that when someone has a sensory processing difficulty in one of the main sensory areas, they often have difficulties in one or more other areas. This study also suggested that only children ages 3-12 showed

a relationship between sensory processing difficulties and severity of symptoms of Autism, with children in that age range showing higher sensory processing difficulties coupled with higher severity of symptoms.

### B. Sensory Processing Difficulties in Adults with Autism

Crane, Goddard & Pring (2009) studied sensory processing in adults with Autism. The researchers hoped to compare a group of adults with Autism to a comparison group of age, gender and IQ matched typically-developing adults to see if adults with Autism continue to experience sensory difficulties as compared to typically-developing adults.

#### *Methodology:*

In this post-test only experimental design with a control group study, thirty-six (36) adults aged 18-64 were grouped into an experimental group and a control group. The experimental group consisted of 18 adults diagnosed with ASD while the control group consisted of 18 typically-developing adults. The participants were all assessed on their IQ, symptoms of Autism, and were given a sensory profile. Their IQ scores, scores on the Autism screening tool and sensory profile scores were compared for the presence of sensory processing difficulties.

#### *Results/Outcomes:*

The study showed that the adults with Autism Spectrum Disorders showed higher levels of sensory processing difficulties compared to the control group consisting of typically-developing adults. This study also suggested that within the group of adults with ASDs, there was a great variability of sensory processing difficulties and that individuals manifest these difficulties in different ways and to different degrees. The researchers speculated that these results can be used to advocate for sensory processing interventions to continue into adulthood for those with ASDs and to evaluate those interventions with regard to enhancing quality of life for adults.

The researchers suggested that future studies use a larger sample size and focus on how sensory processing difficulties in adults with ASDs differ from and compare to sensory processing difficulties in adults with other neurological issues.



### C. Sensory Difficulties and Attention Difficulties in Individuals with Autism

Liss, Saulnier, Fein & Kinsbourne (2006) studied the relationship of sensory processing difficulties to overactivity and attention. The researchers hypothesized that individuals who show hypersensitivity to certain sensory stimuli would also show a pattern of intense focus on certain items

#### **Methodology:**

This study employed a post-test only non-experiment design. There were 144 participants in this study. The participants were required to be previously and currently diagnosed of Autism Spectrum Disorder in order to participate in the study.

The participants' parents were asked to complete a set of assessments that consisted of a sensory assessment tool, a symptom checklist from the DSM-IV, an assessment tool that measures over focusing and an assessment of adaptive behavior (this was for follow-up purposes).

The participants were observed as to the level of sensory intensity and over focused attention they displayed.

#### **Results/Outcomes:**

The researchers found that a significant portion of individuals with sensory difficulties, also showed very high attention focus on certain items. This study also suggested that those individuals who showed over-focused attention also showed the most social deficits and were more sensation-seeking, despite having higher IQs than other groups. The authors stressed that over-focused attention should not be mistaken for symptoms of ADHD.

Further studies could focus on whether over-focusing could explain lower reactivity to sensory stimuli, or whether this phenomenon can be explained by over-arousal of the senses in response to stimuli.

#### **References**

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## Sensory Processing Difficulties - General Information Part 2

Sensory processing difficulties often create havoc and stress in the daily routines of individuals with Autism and their families. Sensory processing difficulties can sometimes lessen with age, but seem to persist from preschool through adulthood and often are very intrusive in a person's life. Research focuses, not only on the possible relationships and causes of this issue, but also on the effectiveness of interventions that are geared toward lessening the impact of these difficulties and improving focus of individuals with Autism. This is so that they can attend to necessary information of daily living and less to the sensory overload that they experience.

### A. The Effect of Sensory Issues on Daily Living Skills- Preschoolers

Jasmin, Couture, McKinley, Reid, Fombonne & Gisell (2009) studied sensorimotor development and how it relates to the performance of daily living skills in preschoolers with Autism. Daily living skills are foundational skills that preschool children need to master to increase their independent functioning and quality of life. Mastery of these self-help skills are the keys to children being able to remain in typical environments such as public schools, day care centers, and the family home. The researchers hypothesized that difficulties with sensory processing can interfere with the performance of daily living skills.

#### **Methodology:**

This study employed a post-test only non-experimental design. Thirty-five (35) children with Autism Spectrum Disorder participated in the study. The children were aged three and four years. They had either a diagnosis of autistic disorder (n= 25) or pervasive developmental disorder (n= 10).

The participants' scores on the assessment tools used to identify sensory difficulties, performance of motor skills, and performance of daily living skills were compared.

#### **Results/Outcomes:**

The researchers found that children with Autism have varying sensory responses and some show more difficulties than others. As far as motor and daily living skills, children with Autism perform poorly on most motor and daily living tasks. The researchers found that there was no correlation between sensory processing difficulties and motor skill performance, but they found a correlation between sensory

processing difficulties and performance of daily living skills activities.

The researchers suggest that future studies compare this group to a control group, and explore the neurological processes behind sensory responses, motor skills and daily living skills be done. Also, future studies that explore interventions that assist people with Autism in controlling their sensory difficulties as they perform activities of daily living are recommended.

### B. Patterns of Sensory Processing Difficulties

Kern, et al (2006) studied the patterns of sensory processing difficulties in people with Autism. Some of the atypical sensory responses that were studied were sensory defensiveness (seeking to reduce or avoid certain sensations, whether tactile, oral, visual, or auditory), hyperacusis (the ability to hear very soft sounds to the point where they are sometimes disturbing), and lack of ability to filter out unnecessary sounds in the environment so that an individual can attend to the important auditory stimuli in the environment.

#### **Methodology:**

This post-test only experimental design with a control group involved two groups. One group consisted of people diagnosed with Autism and the second group was a control group of typically-developing individuals. The participants were aged three to fifty-six (3-56) and the control group was matched for age and gender. The researchers excluded anyone who was blind or deaf.

The participants' scores on the assessment tools used to assess them for symptoms of Autism and sensory processing difficulties and their scores on the sensory profile.

#### **Results/Outcomes:**

The researchers found differences in sensory processing between people with Autism and the control group in auditory, visual, touch, and oral domains. They found significant differences between people with Autism and the control group on both sensory defensiveness and sensory-seeking in all domains. The researchers also noted that, as people with Autism age, the sensory differences seem to lessen and older people with Autism score closer to the people in the control group on sensory profiles than younger people with Autism.



The researchers recommend that future studies examine behavioral factors and how they are influenced by sensory difficulties.

### C. Impact of Sensory Processing Difficulties on Family Life

A study by Schaaf, et al (2011) examined the impact of a child with Autism, who experiences sensory processing difficulties, on family routines and daily life. The researchers hope that the results from this study can be used to help professionals, who are working with families, better understand the unique needs of families impacted by Autism and its symptoms and can better assist with roles and routines.

#### Methodology:

This was a qualitative study based on interviews with family members of people with Autism. The participants were recruited from parents' groups, clinics and by word of mouth. The parents who participated were all white, college-educated and between the ages of forty (40) and forty-three (43). The children with Autism in the families were between the ages of seven (7) and twelve (12). Seventy five percent (75%) of the families had at least one additional child without Autism.

The participants were interviewed on their experiences of having a child with Autism and sensory processing difficulties and its impact on family routines and roles. The parents were also given an assessment tool to measure the amount of sensory processing difficulties their children displayed. These interviews were designed to give a phenomenological view of the participants' experiences in living with a child with Autism.

#### Results/Outcomes:

This study showed that all of the children with Autism whose family members were interviewed had at least some problems with sensory processing. The researchers noted that several different challenges were common in the families of children with Autism who have sensory processing difficulties. These are as follows:

1. The families felt they had to be flexible with their plans at all times to accommodate the child with Autism;
2. The families had difficulties when going to unfamiliar places;

3. The families had difficulty completing activities as a family (particularly family routines such as meal-times, bedtime, and going on family vacations);
4. The siblings were impacted in that they often received less attention than their sibling with Autism and;
5. The families reported a need to constantly monitor the environment for items that may trigger problems in the child with Autism.

The study also showed that families were creative in developing strategies to cope with these issues as a family.

The researchers suggest that clinicians who work with families of children with Autism should try to address sensory issues when helping families plan strategies for easing family transitions and activities.

#### Resources:

Jasmin, E., Couture, M., McKinley, P., Reid, G., Fombonne, E. & Gisel, E. (2009). Sensori-motor and daily living skills of preschool children with Autism Spectrum disorders. *Journal of Autism & Developmental Disorders*, 39, 231-241.

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Schaaf, R.C., Toth-Cohen, S., Johnson, S.L., Outten, G. & Benevides, T.W. (2011) The everyday routines of families of children with Autism: Examining the impact of sensory processing difficulties on the family. *Autism*, 15(3), 373- 389.



## Sensory Assessments for Individuals with Autism

Assessments are essential with individuals with Autism, as it gives more information on the current conditions of the disorder and its effect on other domains of the individual's growth and development. This is especially true for sensory processing difficulties, so interventions can be aptly planned to help those suffering from such challenges.

### A. Individualizing Functional Assessments for Children with Autism: The Contribution of Perseverative Behavior and Sensory Disturbances to Disruptive Behavior

Individuals with Autism may process sensory input differently than those without an Autism diagnosis. Assessing for sensory processing deficits would be essential in developing a comprehensive treatment package for individuals with Autism. Louann Rinner (2002) explores 10 different assessments (formal and informal) currently utilized to assess the sensory issues for individuals.

#### Methodology:

This study reviewed four formal assessments, namely: the Sensory Profile; the Short Sensory Profile; Adolescent/Adult Sensory Profile; and Sensory Integration and Praxis Test (SIPT). It also reviewed six informal assessments, namely: Sensory Profile; Sensory Integration Profile – Revised; Checklist of Occupational Therapy; Sensory Screening; Indicators of Sensory Processing Difficulties; Questions to Guide Classroom Observations; and Motivation Assessment Scale.

#### Outcomes/Results:

Of the ten assessments analyzed by the author, eight of them require a certified occupational therapist or professionals with a proficient background in sensory processing/integration. The two that do not require this level of expertise are the Motivational Assessment Scales (MAS) and the Sensory Integration and Praxis Test (SIPT). The MAS is actually a behavioral function assessment which provides information if a possible function of the behavior could be sensory related. This is the extent of the sensory information provided from this assessment. Therefore, the MAS would only provide preliminary information that an individual may have sensory issues that may need to be explored via another assessment. The SIPT is actually computer-based and therefore the interpreter is a pre-programmed computer software. Professionals in sensory integration

are best equipped to administer this assessment. Rinner (2002) found that each assessment has its own unique features and professionals must administer the appropriate assessment for particular individuals. Professionals must also be cautious of not going beyond the scope of any given assessment instrument.

### B. Sensory Assessment for Children and Youth with Autism Spectrum Disorders

Functional analysis or functional assessments typically conclude with a function of behavior in one of five conditions, including escape, attention, alone, tangible, and play (control). Reese, Richman, Zarcone, and Zarcone (2003) studied the identification of reported occurrences of problem behavior related to perseverative/stereotypic behaviors, by caregivers, as well as, identifying functional assessment conditions. Their research expands upon traditional functional assessments in that the assessment results are more individualized. The individualized functional assessment categories include 1) Escape demands when engaged in perseverative activities 2) Obtain access to perseverative activities 3) Escape sensory disturbances.

Limitations of the current study are the lack of experimental design and the restricted age range of the participants in the study.

#### Methodology:

One hundred young children participated in the non-experimental study. They were between the ages of 19 and 70 months, with the average age of 42.8 months. All participants had a diagnosis of Autism. Eight (8) participants had a co-morbid diagnosis of either Down Syndrome, Prader-Willi Syndrome, or seizures. Ninety-two percent (92%) of the participants were male. All participants were observed to exhibit disruptive behavior. The disruptive behavior included yelling, hitting, kicking, biting, scratching, falling to the floor, and self-injury (self-hitting, self-biting, and head banging).

Caregivers of these children underwent Individualized Functional Assessment Interviews (based on the Functional Assessment Interview in the book, "Functional Assessment and Program Development for Problem Behavior: A Practical Handbook" written by O'Neill, Horner, Albin, Sprague, and Newton, 1997) regarding information on the functions of the children's disruptive behavior. Such disruptive behavior



iors are recorded on the functional assessment data form. The interview process also includes gathering information on diagnostic conditions associated with Autism. The caregivers reported that functional disruptive behaviors are related to perseverative interests and sensory disturbances in the children.

### Results/Outcomes:

The results of this research conclude that interviewing caregivers and gathering additional diagnostic information may be helpful in developing an individual functional assessment. The study found that sixty-seven percent (67%) of the participants engaged in disruptive behavior in order to escape demands. However, escape with these participants was only powerful when the participant could gain access or maintain access to perseverative items or activities. The authors suggest that sensory stimulating behaviors may need to be addressed specifically as part of the treatment protocol for students with Autism who demonstrate that disruptive behavior could be maintained by sensory related functions. Understanding diagnostic conditions other than Autism may be a critical factor in developing a plan to address the idiosyncratic nature of the function of behavior. One example the authors provided is an individual with Fragile X Syndrome. Persons with this syndrome are often inclined towards anxiety and hypersensitivity to environmental stimuli. This information may guide the treatment provider to consider anxiety as a function along with escape from demands. “Treatment planning can then proceed in a more effective and ethical fashion” (Reese, et al., 2003, p. 93).

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## Sensory-Based Interventions for Individuals with Autism

In an effort to support individuals with Autism with sensory processing difficulties, practitioners have designed certain interventions to help them manage it so they can still be productive as individuals.

### A. Effects of Weighted Vests on the Engagement of Children with Developmental Delays and Autism

Reichow, Barton, Sewell, Good, and Wolery (2010) conducted research on the effectiveness of incorporating a weighted vest on engagement, non-engagement, stereotypical behaviors, and other problem behaviors. The authors provide a methodological, research-based design to study this common intervention to address sensory abnormality concerns in children with Autism. The authors utilize three conditions: baseline (no vest), treatment (weighted vest), and placebo (weightless vest). Using an Alternating Treatments design, the authors explore the effects of vest wearing on the dependent variables.

#### Methods:

This study which employs the Alternating Treatments Design. All participants were required to meet certain criteria to participate in the study. These include: a) diagnosis of Autism or developmental delay, b) current usage of a weighted vest, c) between the ages of 2 years old and 6 years old, d) enrollment in a specific learning center, and e) teacher's belief that the weighted vest is currently improving engagement. The study had only three participants: a 5-year old male with Autism, a 4-year old male with developmental delays, and a 5-year old male diagnosed with Autism and neuro-developmental abnormalities.

The children alternated on three conditions/treatments namely:

- 1) weighted vest;
- 2) vest with no weight;
- 3) no vest.

In response to these treatments, five behaviors were analyzed:

- 1) engagement;
- 2) non-engagement;
- 3) stereotypic behavior;

4) problem behavior; and

5) unable to see child.

#### Outcomes/Results:

The authors found that wearing a weighted vest did not increase participants' ability to engage with their surroundings or with the activities they were asked to perform.

The researchers acknowledged that there were limitations to the study, including the fact that not all participants had baseline data. The researchers suggest that future studies use a larger sample to more easily generalize the findings. They also suggest that future studies focus on the best practices of using a weighted vest (if this is an effective intervention) so that the practice may be standardized.

#### Recommendations:

*Further research may examine programs that address social problem solving and programs that promote positive social experiences for children with Asperger's syndrome to see how effective these interventions are.*

### B. Asperger's Syndrome and Sensory Processing: A Conceptual Model and Guidance for Intervention Planning

Dunn, Saiter & Rinner (2002) explored interventions for individuals with Asperger's Syndrome who have challenges with sensory processing. The researchers speculate that children who have low sensory processing abilities may seem self-absorbed and may often miss social cues due to not noticing them in their environment.

#### Methods:

The article studied the literature on Asperger's Syndrome with Sensory Processing. It discussed the case studies of 2 males and 1 female. One of the males was an elementary school student and one was a middle school student. The female was a junior in high school. Interventions provided to the case study participants, including increasing sensory input for morning routines (loud music, etc.), snacks with strong sensory input, videotaped social stories, and decreasing sensory input for those who struggle with sensory overload were studied with regards to its effectiveness.

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### Outcomes/Results:

The authors used the case examples in this study to illustrate the fact that interventions for people with sensory difficulties need to be individualized depending on the type of sensory difficulty. It also found that sensory processing challenges affected certain activities of the child. The authors also stressed that interventions for individuals with Asperger Syndrome must address sensory challenges to better individualize and increase the success of the interventions.

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