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## Sensory processing assessment in individuals with intellectual, physical, hearing and visual disabilities

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### Abstract

Disability is the inability of a person with a health condition to perform at the level of their body, person, or society in one or more life domains when combined with external factors and the ability of the central nervous system to take in, process, and arrange appropriate responses to information is known as sensory processing (SP). Sensory processing is very important for the functioning of the body yet very few studies have been conducted to understand the sensory processing ability of children with different disabilities. The aim of the study is to identify the type of sensory processing disorder faced by different children with different type of disability. 187 differentially abled children who were diagnosed with Intellectual Disability, Physical Disability, Hearing Impairment and Visual Impairment with their age ranging from 11 to 14 years old were selected from "Delhi Government school" as the subject for purpose of the study. Researcher has taken at most care for keeping the information confidential and ethical consideration were met by ensuring the informed consent and the identity of the subjects were not disclosed and therefore, codes were given to each subject. The data was collected using "Pearson's Sensory Profile Caregiver Questionnaire" which is a standardized questionnaire made and standardized by Dr. Winnie Dunn. Since, the scholar had used a standardized questionnaire which was developed and standardized by Dr. Winnie Dunn. The researcher sent the Caregiver Questionnaire to the caregivers with a cover letter explaining the purpose of the instrument. The researcher made sure that the caregiver completes the form in the office or clinic while the researcher evaluated the child. He also helped the caregiver fill out the Caregiver Questionnaire. The results revealed that in intellectually disabled children, children with Physical disabilities, Hearing Impairment and Visual Impairment there is a probable difference in performance when it comes to Modulation of Movement Affecting Activity Level whereas when it comes Auditory Processing, Visual Processing, Vestibular Processing, Touch Processing, Multisensory Processing, Oral Sensory Processing, Sensory Processing Related to Endurance/Tone, Modulation Related to Body Position and Movement, Modulation of Sensory Input Affecting Emotional Responses, Modulation of Visual Input Affecting Emotional Responses and Activity Level, Emotional/Social Responses, Behavioral Outcomes of Sensory Processing and Items Indicating Thresholds for Response there is a definite difference in performance regardless of the disability.

**Keywords:** Winnie, difference, performance, regardless

### Introduction

Disability is the inability of a person with a health condition to perform at the level of their body, person, or society in one or more life domains when combined with external factors (Leonardi, Bickenbach, Ustun, Kostanjsek & Chatterji, 2006) [1]. Disability as a health result has not gotten enough attention so far. Given the increasing longevity of the population and the epidemiological shift in the primary cause of health burden from infectious to noncommunicable illnesses, disability: the non-fatal consequences of health conditions, must take priority over causes of death in our attention. Based on a disability model that concentrated on health declines, the World Health Organisation (WHO) introduced the first Global Burden of Disease research, which yielded a measure that allowed comparisons of the effects of diseases. Since then, in the International Classification of Functioning this has been further developed, Disability and Health, where it is now understood to be either an individual characteristic or the result of the interplay between the setting and the person's health (Cieza, Sabariego, Bickenbach & Chatterji 2018) [4].

The central nervous system's ability to take in, process, and arrange appropriate responses to information is known as sensory processing (SP), a word that is frequently used in the

literature to refer to a neurological process (Shimizu, Bueno, & Miranda, 2014) [15]. A disturbance in the way that sensory information is organised is called sensory processing disorder (SPD). This disorder affects how we perceive the world and how we react to it. Either too much information about their environment overwhelms children with SPD, or not enough information is provided to help them make sense of what they encounter. Children with SPD therefore frequently show emotional or behavioural issues. However, mental health professionals might not know much about the disease. This is troubling since, 5% of people worldwide suffer with SPD (Walbam, 2014) [18].

As the related literature suggests there has been a very vital importance of sensory processing when it comes to human body and there aren't many researches that have been done to understand the sensory processing ability of children with different disabilities. The aim of the study is to identify the type of sensory processing disorder faced by different children with different type of disability. The requirement of

such study can be understood through different studies one of which is a study by Kılıç, Cemali, & Akı (2024) [10] who suggested that studies investigating the impact of Visual impairment on social competence and sensory processing skills are needed.

**Methodology**

**Selection of Subjects:** 187 differentially abled children who were diagnosed with Intellectual Disability, Physical Disability, Hearing Impairment and Visual Impairment with their age ranging from 11 to 14 years old were selected from “Delhi Government school” as the subject for purpose of the study.

**Selection of the Variables:** Researcher has taken at most care for keeping the information confidential and ethical consideration were met by ensuring the informed consent and the identity of the subjects were not disclosed and therefore, codes were given to each subject.

**Table 1:** Codes of the Subjects

S. No.	Code no.	Denoting
1.	Intellectual Disability	Autism Spectrum Disorder, Cerebral Palsy, Intellectual disability, Multiple Disability, Mental Retardation, Sensory Integration.
2.	Physical Disability	Locomotor/Learning Disability, Orthopedically Handicap, Dwarfism
3.	Hearing Impairment	Hearing Impairment, Speech & Language Disability, Specific Learning Disability
4.	Visual Impairment	Visual Impairment, Low Vision

**Selection of the Tool:** The data was collected using “Pearson’s Sensory Profile Caregiver Questionnaire” which is a standardized questionnaire made and standardized by Dr. Winnie Dunn. Since, the scholar had used a standardized questionnaire which was developed and standardized by Dr. Winnie Dunn, the detailed reliability is presented below.

**Reliability:** Test reliability is an indication of the degree to which a test provides a precise and stable score. The reliability of the Sensory Profile was estimated using internal consistency. The more reliable a test is, the smaller standard error of measurement (SEM) and the smaller the confidence intervals around a test score. Cronbach’s Alpha was calculated to examine the internal consistency for each section of the Sensory Profile. Internal consistency shows the degree to which the items in each section measure a single construct. The values of alpha for the various sections ranged from .47 to .91.

**Administration of the Questionnaire:** All the steps and intricacies pertaining to the administration of the questionnaire are as follows.

**Caregiver questionnaire layout**

The Caregiver Questionnaire was designed to be user-friendly for caregivers as well as informative to professionals. It contains instructions and a response key for care-givers, and item-specific information such as icons and item thresholds for you.

**Administration of Sensory Profile**

There are three general ways for administering the Sensory Profile.

1. Send the Caregiver Questionnaire to the caregiver with a cover letter explaining the purpose of the instrument.

Be sure to include your phone number in case the caregiver has questions about the form.

2. Have the caregiver complete the form in your office or clinic while you are evaluating the child.
3. Help the caregiver fill out the Caregiver Questionnaire. Use this procedure if the caregiver has difficulty reading because of language differences or reading disabilities.

**Specific Administration Procedure**

Before giving the Caregiver Questionnaire to the caregiver, the researcher filled in the child’s name and birth date on the top of the first page as well as their name (Service Provider’s Name) and discipline. The researcher then explains the purpose regarding Sensory Profile to the caregiver (or provide that information in the cover letter). Have the caregiver write his or her name, relationship to the child, and the date on the first page of the form. Ask the caregiver to read the items and check the box that best describes the frequency with which he or she sees the behaviors in the child. the caregiver can select from five different options which are Always, Frequently, Occasionally, Seldom and Never.

**Administration Time**

As per the user manual, caregivers report that it takes 30 minutes to complete the full Caregiver Questionnaire.

**Statistical Analysis**

Keeping in view the objectives of the study the results were drawn by checking the percentage of typical performance, probable difference and definite difference of different sensory processing ability in children with different disabilities using Microsoft Excel.

**Results**

In order to find the result, the researcher first calculated the percentage of typical performance, probable difference and definite difference of different sensory processing ability in children with different disabilities and shown the results in

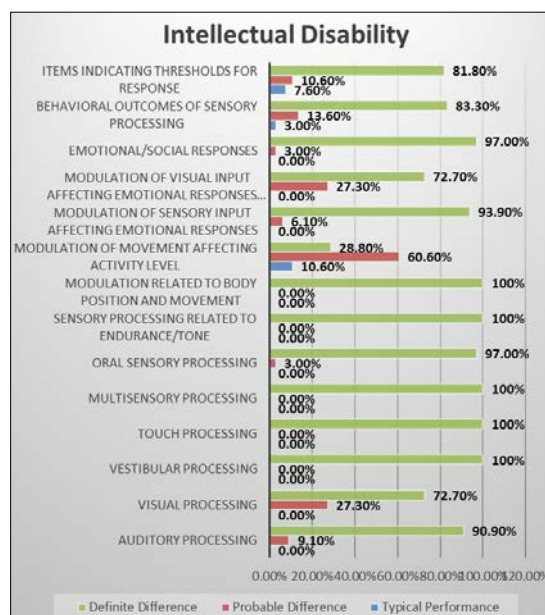
form of tables and graphs which are given below. Figure 1 and Table 2 represents the percentage of typical performance, probable difference and definite difference of different sensory processing ability in children with Intellectual disabilities.

**Table 2:** Percentage of typical performance, probable difference and definite difference of different sensory processing ability in children with Intellectual disabilities

Category	Typical Performance	Probable Difference	Definite Difference
Auditory Processing	0.00%	9.10%	90.90%
Visual Processing	0.00%	27.30%	72.70%
Vestibular Processing	0.00%	0.00%	100%
Touch Processing	0.00%	0.00%	100%
Multisensory Processing	0.00%	0.00%	100%
Oral Sensory Processing	0.00%	3.00%	97.00%
Sensory Processing Related to Endurance/Tone	0.00%	0.00%	100%
Modulation Related to Body Position and Movement	0.00%	0.00%	100%
Modulation of Movement Affecting Activity Level	10.60%	60.60%	28.80%
Modulation of Sensory Input Affecting Emotional Responses	0.00%	6.10%	93.90%
Modulation of Visual Input Affecting Emotional Responses and Activity Level	0.00%	27.30%	72.70%
Emotional/Social Responses	0.00%	3.00%	97.00%
Behavioral Outcomes of Sensory Processing	3.00%	13.60%	83.30%
Items Indicating Thresholds for Response	7.60%	10.60%	81.80%

Table 2 depicts the Percentage of typical performance, probable difference and definite difference of different sensory processing ability in children with Intellectual disabilities, the results revealed that in case of Modulation of Movement Affecting Activity Level, Behavioral Outcomes of Sensory Processing and Items Indicating Thresholds for Response 10.60%, 3.00% and 7.60% of the total population of Intellectually disabled children have typical performance. When it comes to probable difference in performance of Intellectually disabled children Auditory Processing, Visual Processing, Oral Sensory Processing, Modulation of Movement Affecting Activity Level, Modulation of Sensory Input Affecting Emotional Responses, Modulation of Visual Input Affecting Emotional Responses and Activity Level, Emotional/Social Responses, Behavioral Outcomes of Sensory Processing and Items Indicating Thresholds for Response had 9.10%, 27.30%,

3.00%, 60.60%, 6.10%, 27.30%, 3.00%, 13.60% and 10.60% respectively out of the overall population. When it comes to definite difference in performance of Intellectually disabled children Auditory Processing, Visual Processing, Vestibular Processing, Touch Processing, Multisensory Processing, Oral Sensory Processing, Sensory Processing Related to Endurance/Tone, Modulation Related to Body Position and Movement, Modulation of Movement Affecting Activity Level, Modulation of Sensory Input Affecting Emotional Responses, Modulation of Visual Input Affecting Emotional Responses and Activity Level, Emotional/Social Responses, Behavioral Outcomes of Sensory Processing and Items Indicating Thresholds for Response had 90.90%, 72.70%, 100%, 100%, 100%, 97%, 100%, 100%, 28.80%, 93.90%, 72.70%, 97%, 83.30% and 81.80% respectively out of the overall population. The graphical representation of the table is given in Figure 1.



**Fig 1:** Graphical representation of typical performance, probable difference and definite difference of different sensory processing ability in children with Intellectual disabilities

Table 3 and Figure 2 represents the percentage of typical performance, probable difference and definite difference of

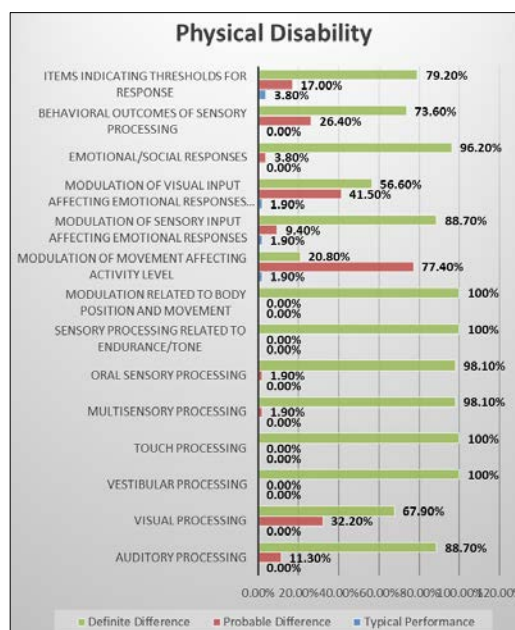
different sensory processing ability in children with physical disabilities.

**Table 3:** Percentage of typical performance, probable difference and definite difference of different sensory processing ability in children with Physical disabilities

Category	Typical Performance	Probable Difference	Definite Difference
Auditory Processing	0.00%	11.30%	88.70%
Visual Processing	0.00%	32.20%	67.90%
Vestibular Processing	0.00%	0.00%	100%
Touch Processing	0.00%	0.00%	100%
Multisensory Processing	0.00%	1.90%	98.10%
Oral Sensory Processing	0.00%	1.90%	98.10%
Sensory Processing Related to Endurance/Tone	0.00%	0.00%	100%
Modulation Related to Body Position and Movement	0.00%	0.00%	100%
Modulation of Movement Affecting Activity Level	1.90%	77.40%	20.80%
Modulation of Sensory Input Affecting Emotional Responses	1.90%	9.40%	88.70%
Modulation of Visual Input Affecting Emotional Responses and Activity Level	1.90%	41.50%	56.60%
Emotional/Social Responses	0.00%	3.80%	96.20%
Behavioral Outcomes of Sensory Processing	0.00%	26.40%	73.60%
Items Indicating Thresholds for Response	3.80%	17.00%	79.20%

Table 3 depicts the Percentage of typical performance, probable difference and definite difference of different sensory processing ability in children with Physical disabilities, the results revealed that in case of Modulation of Movement Affecting Activity Level, Modulation of Sensory Input Affecting Emotional Responses, Modulation of Visual Input Affecting Emotional Responses and Activity Level, and Items Indicating Thresholds for Response 1.90%, 1.90%, 1.90% and 3.80% of the total population of Physically disabled children have typical performance. When it comes to probable difference in performance of Physically disabled children Auditory Processing, Visual Processing, Multisensory Processing, Oral Sensory Processing, Modulation of Movement Affecting Activity Level, Modulation of Sensory Input Affecting Emotional Responses, Modulation of Visual Input Affecting Emotional Responses and Activity Level, Emotional/Social Responses, Behavioral Outcomes of Sensory Processing and Items Indicating Thresholds for Response had 11.30%, 32.20%,

1.90%, 1.90%, 77.40%, 9.40%, 41.50%, 3.80%, 26.40% and 17.00% respectively out of the overall population. When it comes to definite difference in performance of Intellectually disabled children Auditory Processing, Visual Processing, Vestibular Processing, Touch Processing, Multisensory Processing, Oral Sensory Processing, Sensory Processing Related to Endurance/Tone, Modulation Related to Body Position and Movement, Modulation of Movement Affecting Activity Level, Modulation of Sensory Input Affecting Emotional Responses, Modulation of Visual Input Affecting Emotional Responses and Activity Level, Emotional/Social Responses, Behavioral Outcomes of Sensory Processing and Items Indicating Thresholds for Response had 88.70%, 67.90%, 100%, 100%, 98.10%, 98.10%, 100%, 100%, 20.80%, 88.70%, 56.60%, 96.20%, 73.60% and 79.20% respectively out of the overall population. The graphical representation of the same is given in Figure 2.



**Fig 2:** Graphical representation of typical performance, probable difference and definite difference of different sensory processing ability in children with Physical disabilities

Table 4 and Figure 3 represents the percentage of typical performance, probable difference and definite difference of

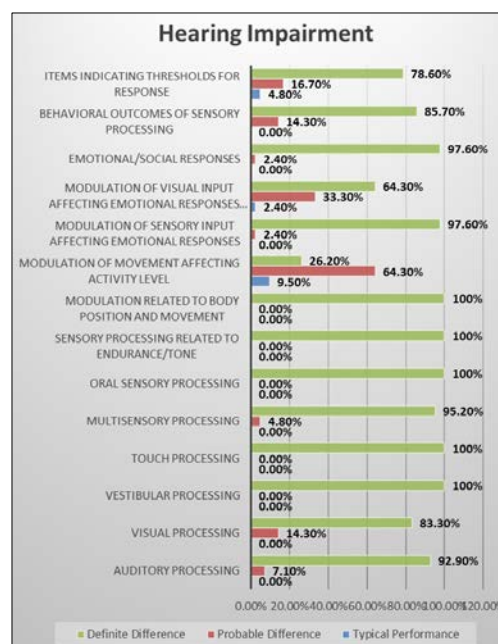
different sensory processing ability in children with Hearing Impairment.

**Table 4:** Percentage of typical performance, probable difference and definite difference of different sensory processing ability in children with Hearing Impairment

Category	Typical Performance	Probable Difference	Definite Difference
Auditory Processing	0.00%	7.10%	92.90%
Visual Processing	0.00%	14.30%	83.30%
Vestibular Processing	0.00%	0.00%	100%
Touch Processing	0.00%	0.00%	100%
Multisensory Processing	0.00%	4.80%	95.20%
Oral Sensory Processing	0.00%	0.00%	100%
Sensory Processing Related to Endurance/Tone	0.00%	0.00%	100%
Modulation Related to Body Position and Movement	0.00%	0.00%	100%
Modulation of Movement Affecting Activity Level	9.50%	64.30%	26.20%
Modulation of Sensory Input Affecting Emotional Responses	0.00%	2.40%	97.60%
Modulation of Visual Input Affecting Emotional Responses and Activity Level	2.40%	33.30%	64.30%
Emotional/Social Responses	0.00%	2.40%	97.60%
Behavioral Outcomes of Sensory Processing	0.00%	14.30%	85.70%
Items Indicating Thresholds for Response	4.80%	16.70%	78.60%

Table 4 depicts the Percentage of typical performance, probable difference and definite difference of different sensory processing ability in children with Hearing Impairment, the results revealed that in case of Modulation of Movement Affecting Activity Level, Modulation of Visual Input Affecting Emotional Responses and Activity Level and Items Indicating Thresholds for Response 9.50%, 2.40% and 4.80% of the total population of children with Hearing Impairment have typical performance. When it comes to probable difference in performance of children with Hearing Impairment Auditory Processing, Visual Processing, Multisensory Processing, Modulation of Movement Affecting Activity Level, Modulation of Sensory Input Affecting Emotional Responses, Modulation of Visual Input Affecting Emotional Responses and Activity Level, Emotional/Social Responses, Behavioral Outcomes of Sensory Processing and Items Indicating Thresholds for Response had 7.10%, 14.30%, 4.80%, 64.30%, 2.40%,

33.30%, 2.40%, 14.30% and 16.70% respectively out of the overall population. When it comes to definite difference in performance of children with Hearing Impairment Auditory Processing, Visual Processing, Vestibular Processing, Touch Processing, Multisensory Processing, Oral Sensory Processing, Sensory Processing Related to Endurance/Tone, Modulation Related to Body Position and Movement, Modulation of Movement Affecting Activity Level, Modulation of Sensory Input Affecting Emotional Responses, Modulation of Visual Input Affecting Emotional Responses and Activity Level, Emotional/Social Responses, Behavioral Outcomes of Sensory Processing and Items Indicating Thresholds for Response had 92.90%, 83.30%, 100%, 100%, 95.20%, 100%, 100%, 100%, 26.20%, 97.60%, 64.30%, 97.60%, 85.70% and 78.60% respectively out of the overall population. The graphical representation of the same is given in Figure 3.



**Fig 3:** Percentage of typical performance, probable difference and definite difference of different sensory processing ability in children with Hearing Impairment

Table 5 and Figure 4 represents the percentage of typical performance, probable difference and definite difference of

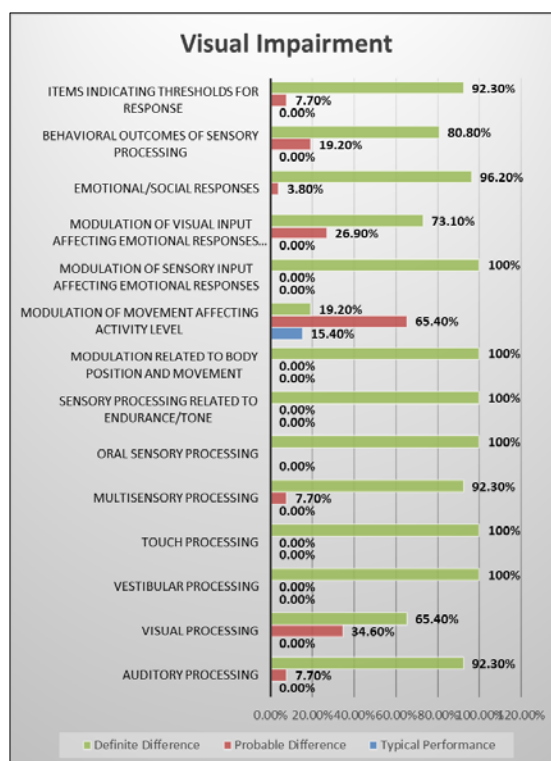
different sensory processing ability in children with Visual Impairment.

**Table 5:** Percentage of typical performance, probable difference and definite difference of different sensory processing ability in children with Visual Impairment

Category	Typical Performance	Probable Difference	Definite Difference
Auditory Processing	0.00%	7.70%	92.30%
Visual Processing	0.00%	34.60%	65.40%
Vestibular Processing	0.00%	0.00%	100%
Touch Processing	0.00%	0.00%	100%
Multisensory Processing	0.00%	7.70%	92.30%
Oral Sensory Processing	0.00%	0.00%	100%
Sensory Processing Related to Endurance/Tone	0.00%	0.00%	100%
Modulation Related to Body Position and Movement	0.00%	0.00%	100%
Modulation of Movement Affecting Activity Level	15.40%	65.40%	19.20%
Modulation of Sensory Input Affecting Emotional Responses	0.00%	0.00%	100%
Modulation of Visual Input Affecting Emotional Responses and Activity Level	0.00%	26.90%	73.10%
Emotional/Social Responses	0.00%	3.80%	96.20%
Behavioral Outcomes of Sensory Processing	0.00%	19.20%	80.80%
Items Indicating Thresholds for Response	0.00%	7.70%	92.30%

Table 5 depicts the Percentage of typical performance, probable difference and definite difference of different sensory processing ability in children with Visual Impairment, the results revealed that in case of Modulation of Movement Affecting Activity Level 15.40% of the total population of children with Visual Impairment have typical performance. When it comes to probable difference in performance of children with Visual Impairment Auditory Processing, Visual Processing, Multisensory Processing, Modulation of Movement Affecting Activity Level, Modulation of Visual Input Affecting Emotional Responses and Activity Level, Emotional/Social Responses, Behavioral Outcomes of Sensory Processing and Items Indicating Thresholds for Response had 7.70%, 34.60%, 7.70%, 65.40%, 26.90%, 3.80%, 19.20% and 7.70% respectively out of the overall population. When it comes to definite

difference in performance of children with Visual Impairment Auditory Processing, Visual Processing, Vestibular Processing, Touch Processing, Multisensory Processing, Oral Sensory Processing, Sensory Processing Related to Endurance/Tone, Modulation Related to Body Position and Movement, Modulation of Movement Affecting Activity Level, Modulation of Sensory Input Affecting Emotional Responses, Modulation of Visual Input Affecting Emotional Responses and Activity Level, Emotional/Social Responses, Behavioral Outcomes of Sensory Processing and Items Indicating Thresholds for Response had 92.30%, 65.40%, 100%, 100%, 92.30%, 100%, 100%, 100%, 19.20%, 100%, 73.10%, 96.20%, 80.80% and 92.30% respectively out of the overall population. The graphical representation of the same is given in Figure 4.



**Fig 4:** Graphical representation of typical performance, probable difference and definite difference of different sensory processing ability in children with Visual Impairment

## Discussion

The results revealed that in case of intellectually disabled children the performance was typical for Modulation of Movement Affecting Activity Level, Behavioral Outcomes of Sensory Processing and Items Indicating Thresholds for Response in minor number of children whereas none of the other children showed typical performance in any other sensory processing ability. In intellectually disabled children, majority of subjects showed probable difference in performance when it comes to Modulation of Movement Affecting Activity Level and minor number of children showed probable difference in performance when it comes to Auditory Processing, Visual Processing, Oral Sensory Processing, Modulation of Sensory Input Affecting Emotional Responses, Modulation of Visual Input Affecting Emotional Responses and Activity Level, Emotional/Social Responses, Behavioral Outcomes of Sensory Processing and Items Indicating Thresholds for Response. Majority of subjects showed definite difference in performance when it comes to Auditory Processing, Visual Processing, Oral Sensory Processing, Modulation of Sensory Input Affecting Emotional Responses, Modulation of Visual Input Affecting Emotional Responses and Activity Level, Emotional/Social Responses, Behavioral Outcomes of Sensory Processing and Items Indicating Thresholds for Response however, all the children showed definite difference in performance when it comes to Vestibular Processing, Touch Processing, Multisensory Processing, Sensory Processing Related to Endurance/Tone and Modulation Related to Body Position and Movement. Showing that in intellectually disabled children there is a probable difference in performance when it comes to Modulation of Movement Affecting Activity Level whereas when it comes to Auditory Processing, Visual Processing, Oral Sensory Processing, Modulation of Sensory Input Affecting Emotional Responses, Modulation of Visual Input Affecting Emotional Responses and Activity Level, Emotional/Social Responses, Behavioral Outcomes of Sensory Processing, Items Indicating Thresholds for Response, Vestibular Processing, Touch Processing, Multisensory Processing, Sensory Processing Related to Endurance/Tone and Modulation Related to Body Position and Movement there is a definite difference in performance. It is observed because the main characteristics of Intellectual disability (like autism and Cerebral Palsy), such as language delay (auditory processing) and trouble understanding emotion from, may actually be caused by sensory processing (Marco, Hinkley, Hill, & Nagarajan 2011; Kang, Palisano, Orlin, Chiarello, King, & Polansky, 2010) <sup>[12, 9]</sup>. Which was also highlighted by Engel-Yeger, Hardal-Nasser, & Gal (2011) <sup>[5]</sup> who mentioned that likelihood of children with a certain intellectual disability (eg. IDD) will be more susceptible to particular SPD symptoms. Williams, & Minshew, (2007) <sup>[19]</sup> also showed that it is difficult for people with autism to understand social cues and pick up language because of their inadequate auditory processing. According McIntosh, Miller, Shyu, & Hagerman (1999) <sup>[13]</sup> children with intellectual disabilities frequently struggle to modulate sensory input, which has significant effects on how well they regulate their emotions. It is also observed that Children with intellectual disabilities, including those on the autistic spectrum, frequently struggle to modulate visual information (Hilton, Graver, & LaVesser, 2007) <sup>[7]</sup>. There are also evidence of sensory processing impairment in 95% of the children with Intellectual disability specifically

Autism spectrum disorder. (Suarez, 2012; Tomchek, & Dunn, 2007) <sup>[16, 17]</sup>.

It was also evident that in case of children with Physical disabilities the performance was typical for of Modulation of Movement Affecting Activity Level, Modulation of Sensory Input Affecting Emotional Responses, Modulation of Visual Input Affecting Emotional Responses and Activity Level, and Items Indicating Thresholds for Response in minor number of children whereas none of the other children showed typical performance in any other sensory processing ability. In children with Physical disabilities majority of subjects showed probable difference in performance when it comes to Modulation of Movement Affecting Activity Level and minor number of children showed probable difference in performance when it comes to Auditory Processing, Visual Processing, Multisensory Processing, Oral Sensory Processing, Modulation of Sensory Input Affecting Emotional Responses, Modulation of Visual Input Affecting Emotional Responses and Activity Level, Emotional/Social Responses, Behavioral Outcomes of Sensory Processing and Items Indicating Thresholds for Response. Majority of subjects showed definite difference in performance when it comes to Auditory Processing, Visual Processing, Multisensory Processing, Oral Sensory Processing, Modulation of Sensory Input Affecting Emotional Responses, Modulation of Visual Input Affecting Emotional Responses and Activity Level, Emotional/Social Responses, Behavioral Outcomes of Sensory Processing and Items Indicating Thresholds for Response however, all the children showed definite difference in performance when it comes to Vestibular Processing, Touch Processing, Sensory Processing Related to Endurance/Tone and Modulation Related to Body Position and Movement. Showing that children with Physical disabilities there is a probable difference in performance when it comes Modulation of Movement Affecting Activity Level whereas when it comes to Auditory Processing, Visual Processing, Multisensory Processing, Oral Sensory Processing, Modulation of Sensory Input Affecting Emotional Responses, Modulation of Visual Input Affecting Emotional Responses and Activity Level, Emotional/Social Responses, Behavioral Outcomes of Sensory Processing, Items Indicating Thresholds for Response, Vestibular Processing, Touch Processing, Sensory Processing Related to Endurance/Tone and Modulation Related to Body Position and Movement there is a definite difference in performance. That is because when compared to typically developing children, children with sensory modulation disorder (SMD), which includes those with physical disabilities, shows significant differences in sensory processing and activity levels (Bar-Shalita, Vatine, & Parush, 2008) <sup>[2]</sup>. Miller, Coll, & Schoen (2007) <sup>[14]</sup> also emphasized that Children with physical disabilities frequently experience difficulties with motor planning and coordination. This can have an impact on their capacity to control their movement and, in turn, their level of activity.

In case of children with Hearing Impairment the performance was typical for Modulation of Movement Affecting Activity Level, Modulation of Visual Input Affecting Emotional Responses and Activity Level and Items Indicating Thresholds for Response in minor number of children whereas none of the other children showed typical performance in any other sensory processing ability. In children with Hearing Impairment, majority of subjects

showed probable difference in performance when it comes to Modulation of Movement Affecting Activity Level and minor number of children showed probable difference in performance when it comes to Auditory Processing, Visual Processing, Multisensory Processing, Modulation of Sensory Input Affecting Emotional Responses, Modulation of Visual Input Affecting Emotional Responses and Activity Level, Emotional/Social Responses, Behavioral Outcomes of Sensory Processing and Items Indicating Thresholds for Response. Majority of subjects showed definite difference in performance when it comes to Auditory Processing, Visual Processing, Multisensory Processing, Modulation of Sensory Input Affecting Emotional Responses, Modulation of Visual Input Affecting Emotional Responses and Activity Level, Emotional/Social Responses, Behavioral Outcomes of Sensory Processing and Items Indicating Thresholds for Response. However, all the children showed definite difference in performance when it comes to Vestibular Processing, Touch Processing, Oral Sensory Processing, Sensory Processing Related to Endurance/Tone and Modulation Related to Body Position and Movement. Showing that in children with Hearing Impairment there is a probable difference in performance when it comes to Modulation of Movement Affecting Activity Level whereas when it comes to Auditory Processing, Visual Processing, Multisensory Processing, Modulation of Sensory Input Affecting Emotional Responses, Modulation of Visual Input Affecting Emotional Responses and Activity Level, Emotional/Social Responses, Behavioral Outcomes of Sensory Processing, Items Indicating Thresholds for Response, Vestibular Processing, Touch Processing, Oral Sensory Processing, Sensory Processing Related to Endurance/Tone and Modulation Related to Body Position and Movement there is a definite difference in performance. That is because Individuals who have hearing loss have a low-registration sensory pattern and a sensation-avoiding pattern that is different from other people's. They also have increased sensitivity to stimuli linked to vision, activity, motion, and touch (Hamed-Daher, & Engel-Yeger, 2019)<sup>[16]</sup>. Another study also strengthens the results which revealed that when it comes to sensory processing, kids with Hearing Impairment show differences from kids with Normal Hearing (Alkhamra, & Abu-Dahab, 2020)<sup>[1]</sup>. In case of Visually Impaired children the performance was typical for Modulation of Movement Affecting Activity Level in minor number of children whereas none of the other children showed typical performance in any other sensory processing ability. In children with Visual Impairment, majority of subjects showed probable difference in performance when it comes to Modulation of Movement Affecting Activity Level and minor number of children showed probable difference in performance when it comes to Auditory Processing, Visual Processing, Multisensory Processing, Modulation of Visual Input Affecting Emotional Responses and Activity Level, Emotional/Social Responses, Behavioral Outcomes of Sensory Processing and Items Indicating Thresholds for Response. Majority of subjects showed definite difference in performance when it comes to Auditory Processing, Visual Processing, Multisensory Processing, Modulation of Visual Input Affecting Emotional Responses and Activity Level, Emotional/Social Responses, Behavioral Outcomes of Sensory Processing and Items Indicating Thresholds for Response however, all the children showed definite

difference in performance when it comes to Vestibular Processing, Touch Processing, Oral Sensory Processing, Sensory Processing Related to Endurance/Tone, Modulation Related to Body Position and Movement and Modulation of Sensory Input Affecting Emotional Responses. Showing that in children with Visual Impairment there is a probable difference in performance when it comes to Modulation of Movement Affecting Activity Level whereas when it comes to Auditory Processing, Visual Processing, Multisensory Processing, Modulation of Visual Input Affecting Emotional Responses and Activity Level, Emotional/Social Responses, Behavioral Outcomes of Sensory Processing, Items Indicating Thresholds for Response, Vestibular Processing, Touch Processing, Oral Sensory Processing, Sensory Processing Related to Endurance/Tone, Modulation Related to Body Position and Movement and Modulation of Sensory Input Affecting Emotional Responses there is a definite difference in performance. This is because when compared to the normal group, children with visual impairments exhibit noticeably higher challenges in sensory processing (Houwen, Cox, Roza, Lansink, van Wolferen, & Rietman, 2022)<sup>[8]</sup>. The difference in performance can be because children with visual impairment are more capable of processing auditory information independently than children without visual impairment (Champoux, Collignon, Bacon, Lepore, Zatorre, & Théoret, 2011)<sup>[3]</sup>.

### Conclusion

From the results and discussion of the study it has been concluded that in intellectually disabled children, children with Physical disabilities, Hearing Impairment and Visual Impairment there is a probable difference in performance when it comes to Modulation of Movement Affecting Activity Level whereas when it comes Auditory Processing, Visual Processing, Vestibular Processing, Touch Processing, Multisensory Processing, Oral Sensory Processing, Sensory Processing Related to Endurance/Tone, Modulation Related to Body Position and Movement, Modulation of Sensory Input Affecting Emotional Responses, Modulation of Visual Input Affecting Emotional Responses and Activity Level, Emotional/Social Responses, Behavioral Outcomes of Sensory Processing and Items Indicating Thresholds for Response there is a definite difference in performance regardless of the disability.

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