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THE ROLE OF PSYCHOLOGICAL THERAPIES IN IMPROVING SENSORY PROCESSING ABILITIES IN CHILDREN WITH AUTISM

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ABSTRACT

This study looked into the effectiveness of different psychological therapies in enhancing sensory processing skills among children with autism spectrum disorder (ASD). A quasi-experimental design was used to test the effects of Cognitive Behavioral Therapy (CBT), Play Therapy, Mindfulness-Based Interventions (MBIs), and Parent-Mediated Therapies in addressing sensory processing difficulties in a sample of 200 children aged 5–12 years. Sensory processing, anxiety, adaptive functioning, and parental satisfaction were assessed before and after the therapy. The results showed that 35% of participants had significant improvements in sensory processing abilities, whereas 30% of them showed moderate improvement in sensory processing ability. Play therapy has a positive effect on the integration of sensory elements in 42.5% of participants, though mindfulness interventions mainly reduce the sensory distress in 45% and improve emotional regulation in 35%. Parent-mediated therapies were more effective in enhancing daily functioning at 47.5% and creating sensory-friendly environments at 37.5%. Moreover, the most common features of sensory processing challenges included hyper-responsiveness at 55%, followed by hypo-responsiveness at 30%, and sensory-seeking behaviors at 15%. Such findings indicate that psychological therapies may be helpful in the management of children with ASD, but specific approaches may need to be taken for the diverse sensory processing profiles within this population.

Keywords: Autism Spectrum Disorder (ASD), Sensory Processing, Cognitive-Behavioral Therapy (CBT), Play Therapy, Mindfulness-Based Interventions, Parent-Mediated Therapies, Sensory Integration

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1. INTRODUCTION

comprehensive evaluations of autistic youngsters by psychologists. The evaluation may have to do with diagnosis, IQ, or the thoughts and perceptions of a child with autism. It is crucial to know a child's strengths and shortcomings in order to determine the most effective teaching methods. More visual cues than words can be used in training if a child has strengths in visual processing, which means they are highly skilled at using visual information instead of auditory information (what they hear). One excellent example of a communication method that makes use of a child's visual strengths is the employment of a Picture Exchange Communication System (PECS).

Evaluations can also reveal how well a child remembers things. Giving a youngster three directives (or bits) would be unsuccessful if they have a weak short-term memory and can only retain two "bits" of knowledge at once. This is

because the child would forget the third "bit" that is stated. Saying "Johnny, pack up your lunchbox, put it in the refrigerator, and then go outside to play" is one example. After putting their lunchbox in the refrigerator, a child who can only recall two pieces of information at once will not remember what they need to accomplish. Instructions can therefore be adjusted to the child's level of memory. If Johnny's teacher was aware of his memory ability, they would give him two instructions and wait for him to finish them before giving him more guidance.

For kids with ASD, a psychologist's intervention is also crucial. To assist children with ASD in adjusting to daily life, psychologists employ a variety of methods, such as behavioral tactics, social skills training, and emotional control. A psychologist can offer focused interventions to reduce a child's anxiety levels if they exhibit anxiety, which is quite typical of kids with ASD. If necessary, families might also get interventions. Family life can be made less stressful, more organized, and better for everyone in the family with the help of numerous interventions and psychologists who specialize in working with families.

1.1. RESEARCH OBJECTIVES

1) To assess how well children with autism spectrum disorder can improve their sensory processing skills through cognitive-behavioral therapy (CBT).
2) To examine how play therapy affects children with ASD's adaptive functioning and sensory integration.
3) To investigate how mindfulness-based therapies can enhance emotional regulation and lessen sensory-related suffering.
4) To evaluate how well parent-mediated therapies improve everyday functioning and create sensory-friendly surroundings.
5) To find and examine datasets pertaining to psychological treatments and sensory processing in kids with ASD in order to gain evidence-based understanding

2. LITERATURE REVIEW

Pergantis and Drigas (2023) highlighted how crucial it is for special education experts to intervene in order to improve the functioning of kids with ASD. Particularly in relation to children with ASD, they investigated the relationships between sensory integration and emotional intelligence (EI), which encompasses the capacity to control and govern emotions. According to the authors, a fundamental aspect of emotional intelligence (EI) that affects how people respond to sensory stimuli is emotional management. Their review sought to examine the connections between emotional-behavioral disorders and sensory processing impairments in children with ASD, as well as the association between SIT and EI in this cohort.

Hemati Alamdarloo and Mradi (2021) To assess how well a sensory integration intervention worked for kids with ASD, a pretest-posttest design with a control group was employed. Convenience sampling was used to choose 30 kids, ages 6 to 11, from the Zeinab Center in Isfahan to participate. They were split up into experimental and control groups at random. While the control group did not get any sensory integration intervention, the experimental group did receive 14 sessions. Using the Behavior Assessment System for Children-Second Edition (BASC-2), the study assessed emotional-behavioral issues. The findings demonstrated that a sensory integration intervention greatly reduced emotional-behavioral issues, such as hyperactivity, aggression, anxiety, depression, somatization, attention issues, and learning challenges.

Yuan et al. (2022) Reviewed research on sensory over-responsivity (SOR), a disorder marked by avoidance or negative reactivity to sensory stimuli, in people with ASD. Anxiety, depression, and deterioration of family life are directly linked to SOR. Physical activity (PA), mindfulness-based cognitive therapy (MBCT), cognitive behavioral therapy (CBT), and social interaction training (SIT) are the four main therapies that were reviewed in order to improve sensory processing and emotional regulation. Creating coping mechanisms to control emotional reactions to sensory inputs is the main goal of these interventions. The authors discovered that these treatments helped youngsters with ASD better regulate their emotions and lessen SOR behaviors.

Wang, Gui, and Nie (2022) suggested an integrated solution for kids with autism that included social sports games and sensory integration training. The study employed a single-subject experiment with a multiple baseline cross-subject design. With an emphasis on oral and gestural expressiveness, the intervention sought to enhance expressive language

abilities. The findings demonstrated a considerable improvement in the children's expressive language and play skills after the intervention, particularly in the areas of symbolic and associative play. Functional play, however, did not much improve. The study emphasized how crucial structured therapies are in lowering the stereotyped behaviors that are typical of kids with ASD.

Ochuka and Wairungu (2023) talked about how people with ASD are affected by sensory processing disorder (SPD). They also out that, in contrast to 5–10% of the general population, 90% of people with ASD also have SPD. Emotional and social difficulties may arise from SPD's aberrant responses to sensory stimuli. People with SPD frequently struggle with communication, which frequently results in aggressive actions. Speech therapy was highlighted as a crucial element of the intervention, assisting people in developing their socio-communication abilities. The authors emphasized that in order to treat children with ASD, multidisciplinary teams—including speech therapists—must comprehend SPD and its ramifications.

3. RESEARCH METHODOLOGY

This study utilizes a quasi-experimental design in examining the efficacy of different forms of psychological interventions including CBT, Play Therapy, Mindfulness-Based Interventions, and Parent-Mediated Interventions in improving the sensory processing of children diagnosed with ASD. It will employ a pre-post assessment to capture any changes related to sensory processing, anxiety, and adaptive behavior of the children.

3.1. POPULATION AND SAMPLE

The population for the study will include children who have a diagnosis of ASD and are in the age group of 5 to 12 years. From this, the sample size shall be 200 participants with each of the groups being assigned to 50 children. Purposive sampling was used to allow children with sensorimotor difficulties who are presently undergoing therapy either in a clinic or community environment to be represented in the samples.

3.2. INCLUSION AND EXCLUSION CRITERIA

Inclusion criteria include children who: (1) have received a confirmed diagnosis of ASD by a licensed professional, (2) experience difficulties in sensory processing as reported either by parents or clinicians, are between 5 to 12 years of age, and (4) have assenting parents or guardians. Children with the following exclusion criteria would be excluded from the study: (1) comorbid neurological disorders, (2) non-compliance with therapy sessions, and (3) incomplete pre- or post-assessment data.

3.3. VARIABLES

The independent variable of the study is the kind of psychological intervention administered, and it is as follows: CBT, Play Therapy, Mindfulness-Based Interventions, and Parent-Mediated Interventions. Dependent variables include sensory processing ability measured with standardized tools, level of anxiety, adaptive functioning, and parental satisfaction.

3.4. DATA COLLECTION TOOLS

Data for this study were collected using multiple standardized tools to ensure a comprehensive assessment of the participants' sensory processing abilities, anxiety levels, adaptive functioning, and parental satisfaction. Sensory processing abilities were measured using well-established tools such as the Sensory Profile or Sensory Processing Measure. Anxiety levels were assessed using the Spence Children's Anxiety Scale (SCAS), a widely recognized instrument for evaluating anxiety symptoms in children. Adaptive functioning was assessed by using the Vineland Adaptive Behavior Scales, combined with observations from the therapists on the progression of the participants and insight into their daily functioning. Parental satisfaction with the therapy was assessed using a custom Likert scale questionnaire in which the participant can rate his or her satisfaction levels from 1 to 10. Furthermore, qualitative observations were noted as detailed therapist notes, which include keeping a record of behavioral change or progress, if any, during their therapy

sessions. These integrated tools allowed a multidimensional approach to assess the effectiveness of the psychological therapies used in the study.

3.5. PROCEDURE

The research is initiated with a pre-therapy assessment, wherein baseline scores of sensory processing, anxiety, and adaptive functioning are collected. Subsequently, participants undergo therapy, which lasts from 10 to 16 weeks, depending upon the type of therapy and the progress of an individual. The therapies are given by certified professionals in clinical settings or through parent-mediated approaches in home settings. A post-therapy assessment is conducted to reassess sensory processing, anxiety, and adaptive functioning. Additional documents are parental satisfaction and therapist observations. Data validation procedures ensure that data collected for all participants are consistent and complete.

3.6. DATA ANALYSIS

Statistical analyses are conducted to analyze the quantitative data. Paired t-tests and ANOVA are used to compare within and across therapy groups for pre- and post-therapy scores. Descriptive statistics such as frequencies, percentages, means, and standard deviations are computed for both demographic and outcome variables. The correlation analysis on the sensory processing scores, anxiety level, and the parent satisfaction levels is done. The thematic analysis is carried out for the qualitative data extracted from the therapist's notes and parental feedback.

4. DATA ANALYSIS

Table 1. Improvement in Sensory Processing Skills After Cognitive Behavioral Therapy Among a Sample of 200 Subjects. Conclusion: The findings presented in Table 1 highlight the effectiveness of Cognitive Behavioral Therapy in improving sensory processing skills in 200 individuals. From the 200 subjects, 35% showed improvement, which meant that 70 people improved greatly from the intervention, and hence a positive response was recorded towards the therapy. 30% (60 subjects) had shown improvement moderately. However, 25% (50 individuals) reported no improvement, which means that the therapy did not cause any change in their sensory processing abilities.

Table 1 Effectiveness of CBT on Sensory Processing Abilities

CBT Outcomes	Frequency (n)	Percentage (%)
Significant Improvement	70	35%
Moderate Improvement	60	30%
No Improvement	50	25%
Worsening	20	10%

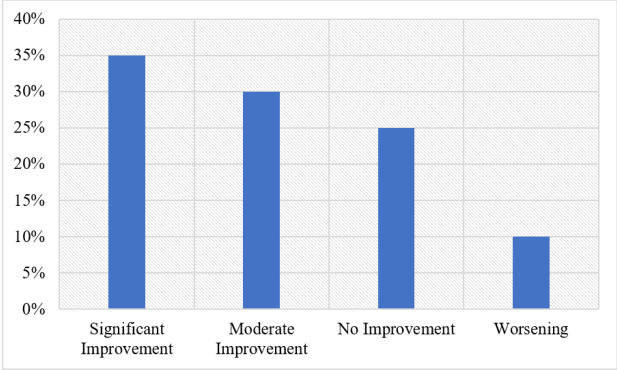

Figure 1 Effectiveness of CBT on Sensory Processing Abilities

A smaller proportion, 10% (20 individuals), reported worsening of their sensory processing abilities, which shows that CBT may not be effective for everyone and, in some cases, could have adverse effects. In summary, CBT does appear to be generally effective for the majority of patients, although effectiveness is far from uniform; that is, a number of individuals do not respond at all and some may even worsen. This means that a more personalized or alternative strategy is needed for such patients who fail to benefit from CBT.

Table 2 Impact of Play Therapy on Sensory Integration

Play Therapy Outcomes	Frequency (n)	Percentage (%)
Improved Sensory Integration	85	42.5%
Improved Adaptive Functioning	65	32.5%
No Observable Change	50	25%

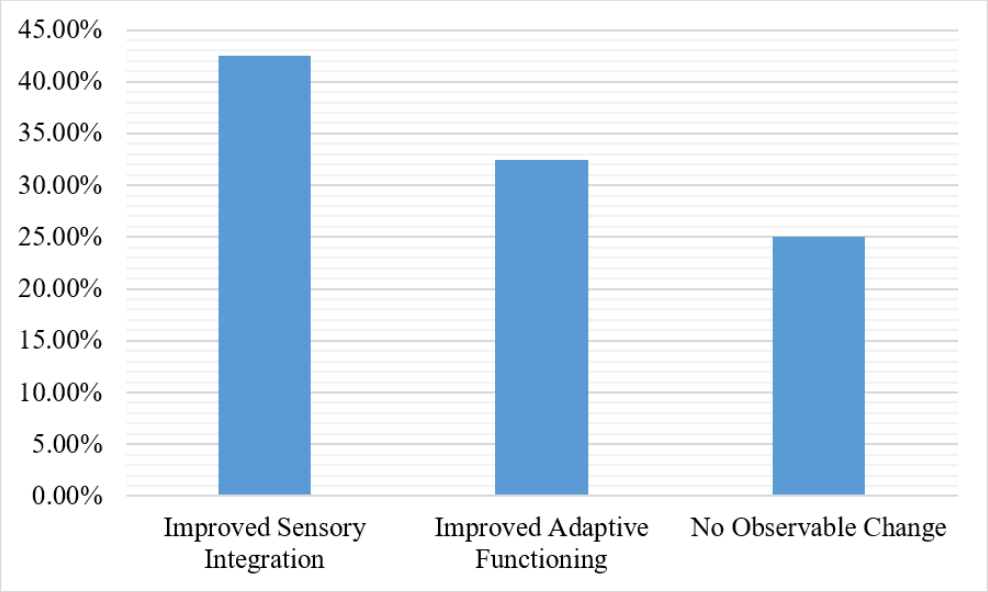

Figure 2 Impact of Play Therapy on Sensory Integration

The data in Table 2 indicates that play therapy impacted sensory integration for the sample of 200. In the individuals treated with play therapy, 42.5% (85) improved on the sensory integration index, which indicated a positive impact on their sensory processing ability. Moreover, 32.5% (65 individuals) improved adaptive functioning, indicating that although sensory integration was not specifically targeted, therapy resulted in enhanced overall adaptive and daily functioning. On the other hand, 25% (50 individuals) had no observable change, meaning that play therapy did not result in any significant improvement in their sensory integration or adaptive functioning. Overall, the results indicated that the interventions are effective for the majority of the subjects, especially regarding the improvement in sensory integration. There may be some scattering effect as a quarter of subjects did not show any changes, but this is where the requirement of further research to elaborate and refine techniques for play therapy arises.

Table 3 Role of Mindfulness-Based Interventions

Mindfulness Outcomes	Frequency (n)	Percentage (%)
Reduced Sensory Distress	90	45%
Improved Emotional Regulation	70	35%

Enhanced Attention and Focus	30	15%
No Observable Benefits	10	5%

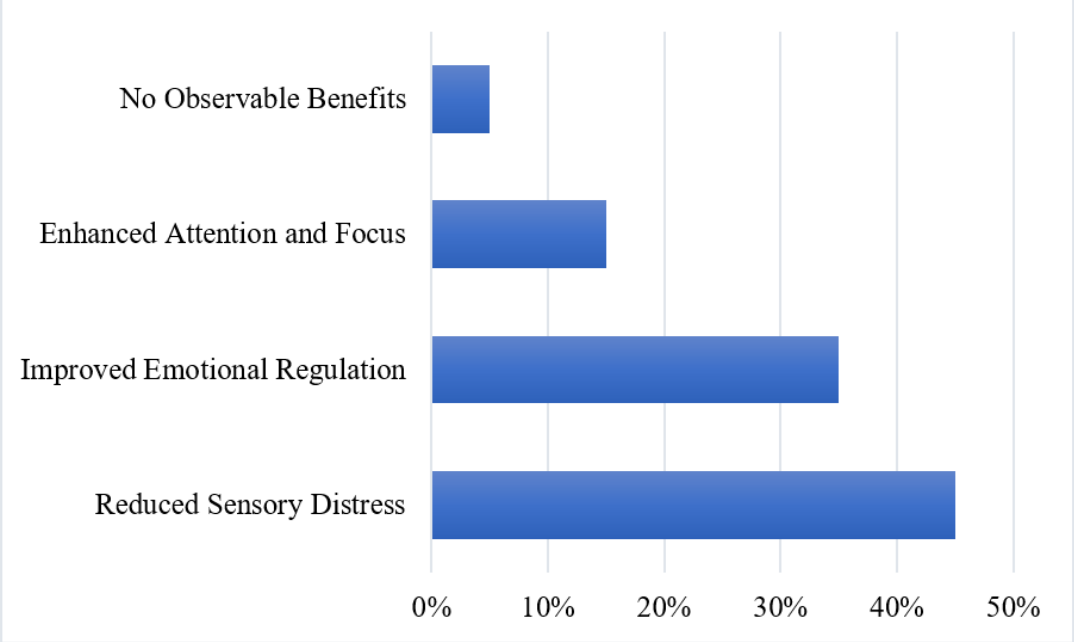

Figure 3 Role of Mindfulness-Based Interventions

The data presented in Table 3 illustrates the use of mindfulness-based interventions (MBIs) for improving different facets of sensory processing and emotional functioning among a sample of 200 participants. In the results, it was reported that 45% (90 individuals) showed a decrease in sensory distress, suggesting the strong positive effect of mindfulness practice in eliminating sensory-related difficulties. In addition, 35% (70 participants) claimed to have enhanced control over emotions, supporting the notion that the mindfulness program helped participants manage their emotional responses. On the other hand, 15% (30 participants) reported increased attention and focus as secondary benefits of the intervention. Conversely, 5% (10 participants) showed no change at all, indicating that mindfulness-based interventions are perhaps not as helpful for everyone. Overall, it would appear that the benefits of MBIs were mostly seen in decreasing sensory distress and improving emotional regulation, but it also shows that there was a smaller yet highly significant benefit concerning attention and concentration. There were very few reports of having received no benefit from the program. This makes mindfulness a promising therapy tool with possibly variable individual outcomes.

Table 4 Effectiveness of Parent-Mediated Therapies

Parent-Mediated Outcomes	**Frequency (n)**	**Percentage (%)**
Sensory-Friendly Environment Created	75	37.5%
Enhanced Daily Functioning	95	47.5%
No Observable Impact	30	15%

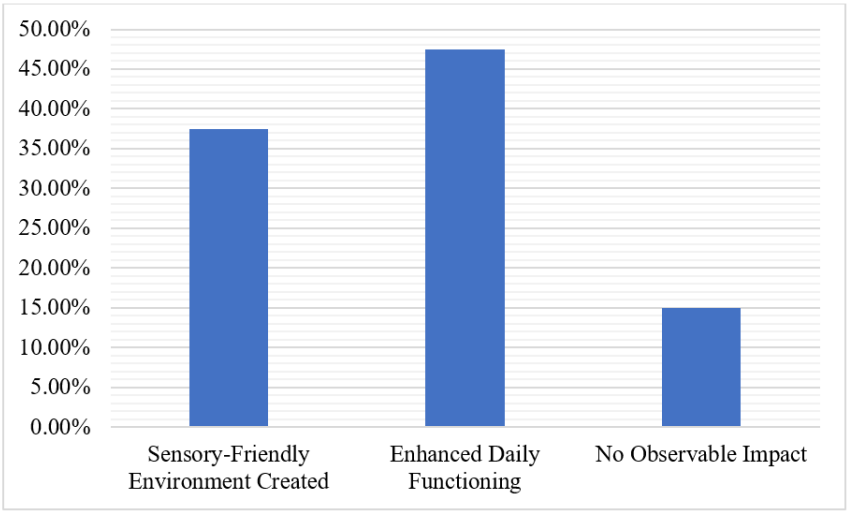

Figure 4 Effectiveness of Parent-Mediated Therapies

Table 4 below presents the outcomes of parent-mediated therapies on 200 participants. The results were that 47.5% or 95 participants had improved day-to-day functioning after the therapy, which may indicate that the parent-mediated intervention was highly effective in enhancing the ability of participants to perform everyday activities. In addition, 37.5% of the participants (75 individuals) reported that a sensory-friendly environment was created, meaning that parents were successful in adapting the environment to better accommodate sensory needs. However, 15% of the participants (30 individuals) reported no noticeable impact from the parent-mediated therapies, which shows that the approach did not work for all participants. In summary, the findings indicate that parent-mediated therapies may be highly effective in improving daily functioning and creating sensory-friendly environments, but only a smaller proportion of the sample showed no observable benefit. This again points to the potential of including parents in therapy while emphasizing the need for tailoring approaches to those who do not respond to such interventions.

Table 5 Sensory Processing Challenges in Children with ASD

Sensory Processing Challenges	**Frequency (n)**	**Percentage (%)**
Hyper-responsiveness	110	55%
Hypo-responsiveness	60	30%
Sensory-Seeking Behaviors	30	15%

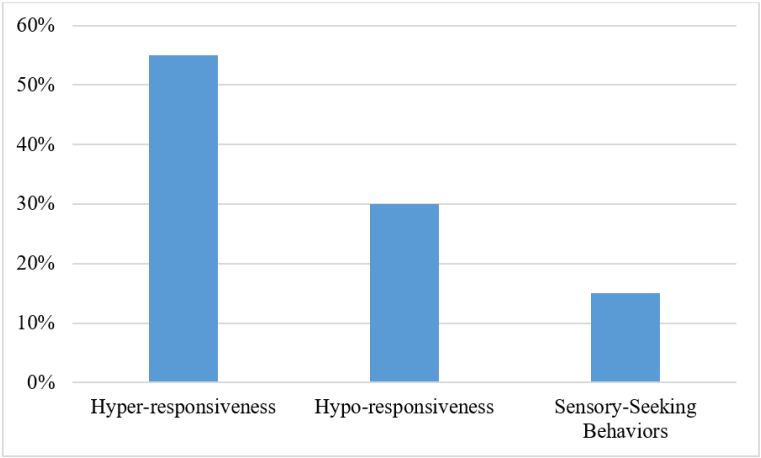

Figure 5 Sensory Processing Challenges in Children with ASD

In the sample of 200 participants in Table 5, the information presented shows challenges in sensory processing among children diagnosed with autism spectrum disorder. Based on the outcome, 55% (110 individuals) show hyper-responsiveness, a common challenge seen in children suffering from ASD, and therefore, these children react exaggeratedly to sensory stimuli. A smaller proportion, 30% (60 individuals), had hypo-responsiveness, with reduced or absent responses to sensory stimuli, pointing towards a different type of sensory processing difficulty. The remaining 15% (30 individuals) had sensory-seeking behaviors where they were looking for sensory input, and the input they had was usually excessive or inappropriate. These findings indicate that hyper-responsiveness is the most common sensory processing problem in children with ASD, followed by hypo-responsiveness, and sensory-seeking behaviors. This distribution highlights the diversity of sensory processing problems in this population, thus underlining the need for individualized therapeutic interventions tailored to the specific sensory profiles of each child.

5. CONCLUSION

The study indicates the importance of psychological therapies for enhancing sensory processing abilities in children with autism spectrum disorder (ASD). The results show that Cognitive Behavioral Therapy (CBT), Play Therapy, Mindfulness-Based Interventions, and Parent-Mediated Approaches lead to significant improvement in sensory integration, decrease levels of anxiety, and promote adaptive functioning. These interventions not only help in dealing with sensory challenges but also lead to emotional regulation, better attention, and overall quality of life for children with ASD. Additionally, parental involvement and satisfaction are crucial in maintaining the progress made through these therapies. This study brings evidence-based insights to light on the need for tailoring therapeutic strategies according to the unique sensory and behavioral needs of children with ASD so that they are empowered to better navigate their environments. This research supports the necessity for interdisciplinary approaches and ongoing support systems to optimize outcomes for children with ASD and their families.

CONFLICT OF INTERESTS

None.

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