

SENSORY DYSFUNCTION AND ACTIVITY CHOICE FOR TYPICALLY DEVELOPING CHILDREN AND CHILDREN WITH AUTISM: A SYSTEMATIC LITERATURE REVIEW

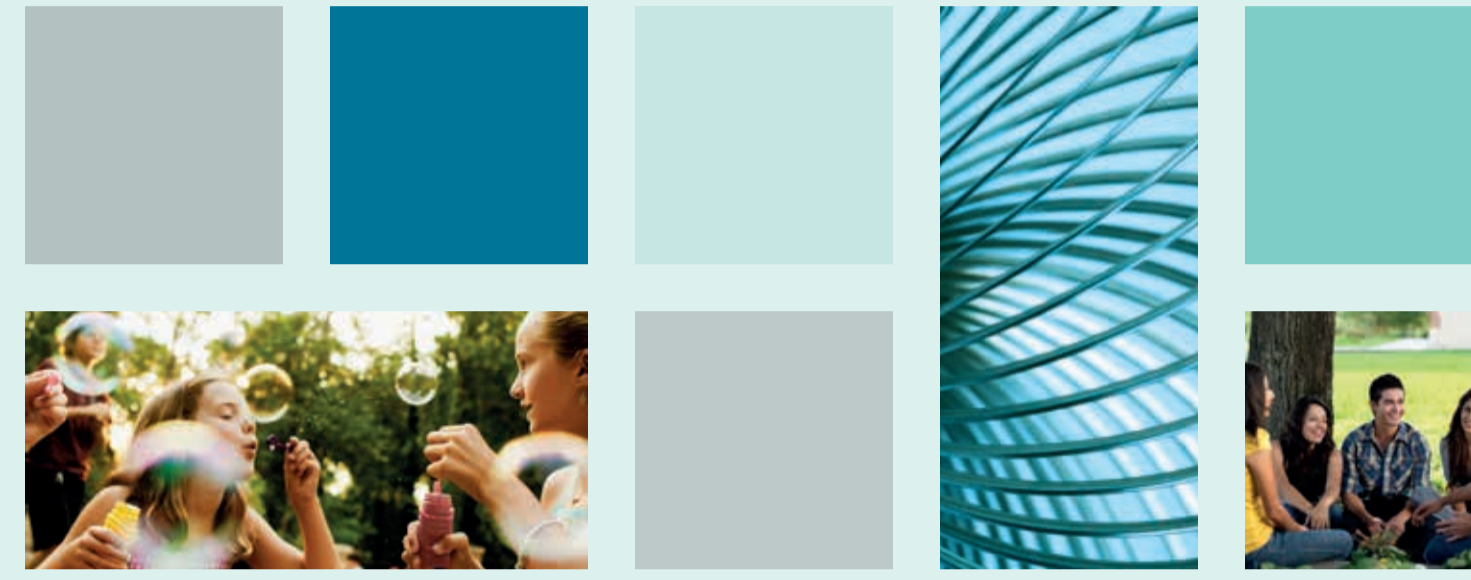
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INTRODUCTION

Participation in daily activities is fundamental to children's social, cognitive and physical development (Law et al., 2004). Engagement in daily activities not only cultivates social, physical, emotional and language skills (Larson and Zemke, 2003; Law, 2002; Morgan and Long, 2012), but also reinforces cultural and societal norms (Harkness et al., 2011), and has the potential to positively influence health and well-being (Yerxa, 1998; Iannelli and Wilding, 2007). However for children with autism, participation in daily activities and therefore essential skill development can be restricted by the core characteristics of the condition (Koenig and Rudney, 2010).

Under the DSM 5 criteria, children with autism are recognised by qualitative differences and difficulties in social interaction and communication, combined with restricted or repetitive patterns of thought and physical behaviour, along with atypical responses to or interest in sensory stimuli (APA, 2013). The predominant atypical behavioural responses to sensory stimuli include hypo-responsiveness and hyper-responsiveness (Baranek et al., 2006). Hypo-responsiveness refers to a lack of or reduced intensity of response to sensory stimuli, such as a diminished response to pain. Hyper-responsiveness is an exaggerated behavioural response to sensory stimuli such as avoidance of touch. The ability to regulate, adapt and organise the intensity and nature of responses to sensory input is known as sensory modulation (Miller and Lane, 2000).

It is thought that having atypical sensory modulation influences activity choice (Baranek, 2002) and activity performance (Koenig and Rudney, 2010). Children with autism displaying atypical sensory modulation have been found to have difficulties sustaining engagement in activities and are often inattentive and easily distractible (Tomchek and Dunn, 2007).



OBJECTIVE

The primary aim of this review was to evaluate the evidence regarding activity choice and sensory preferences of children with autism.

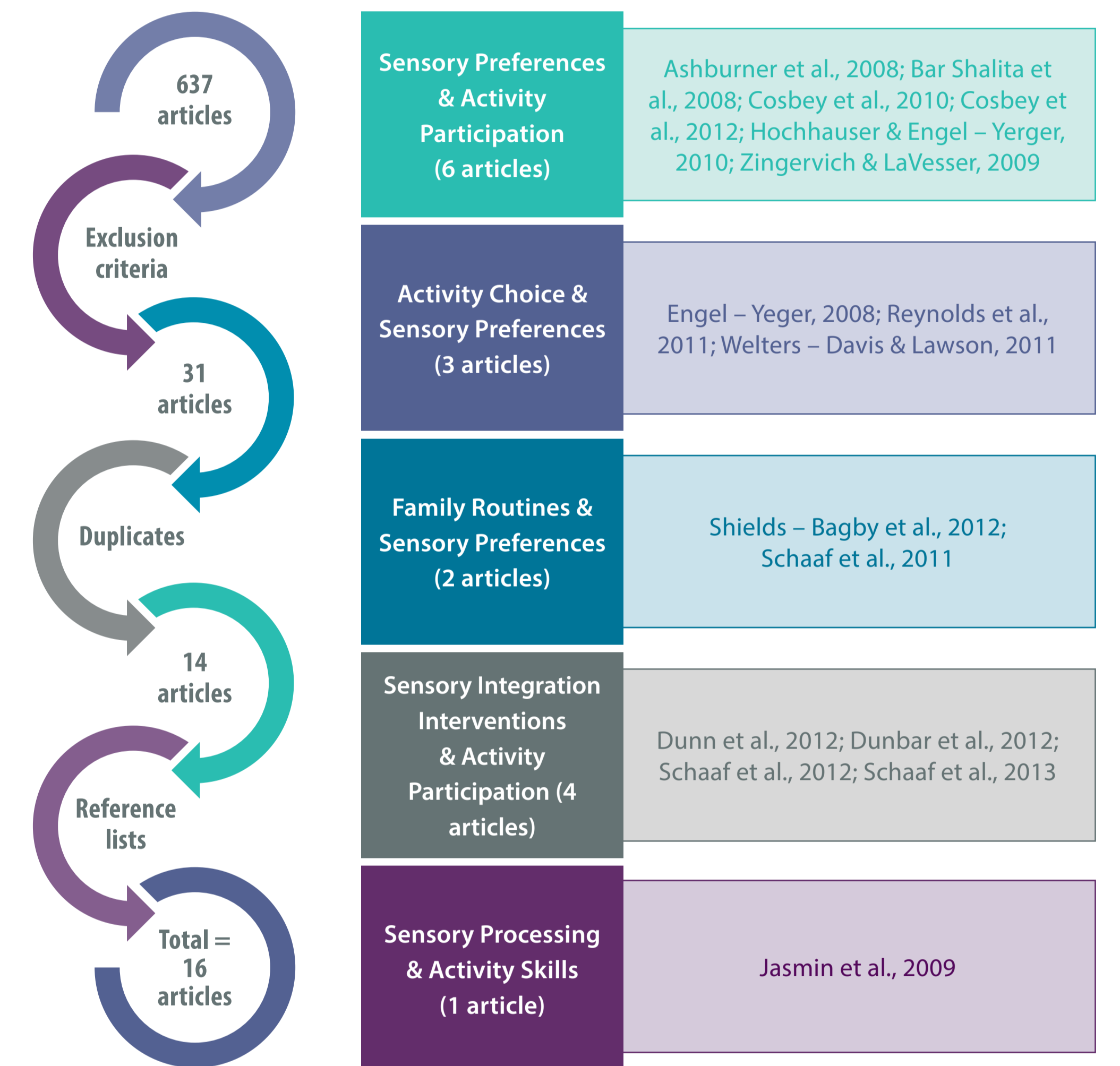
RESULTS

Description of the Studies

All the studies were published in peer reviewed journals from January 2008 to December 2013. Data from or concerning a total of 650 children, (371 male, 263 female, 16 not specified) with a diagnosis of autism (26%), Asperger's Syndrome (.1%), Pervasive Developmental Disorder – not otherwise specified (PDD-NOS) (1.6%) and children characterised as typically developing (56%) or having atypical sensory processing (16%) between the chronological ages of 3 to 11 years were reported. Of the 11 studies including children with a diagnosis of autism, 5 studies included children with high functioning autism (an IQ over 70) who attended mainstream school.

Quality of Studies

Overall the methodological quality of the 16 studies included in this review was adequate. This review included 1 randomised controlled trial categorised as level I evidence, however the majority of the studies included (9/16) were categorised as level II evidence, employing case control, cohort cross sectional and non-experimental comparison designs. Of the remaining 6 studies, 1 was regarded as level III evidence, 3 utilised descriptive study designs classed as level IV evidence and 2 studies employing a qualitative approach were considered level V evidence.



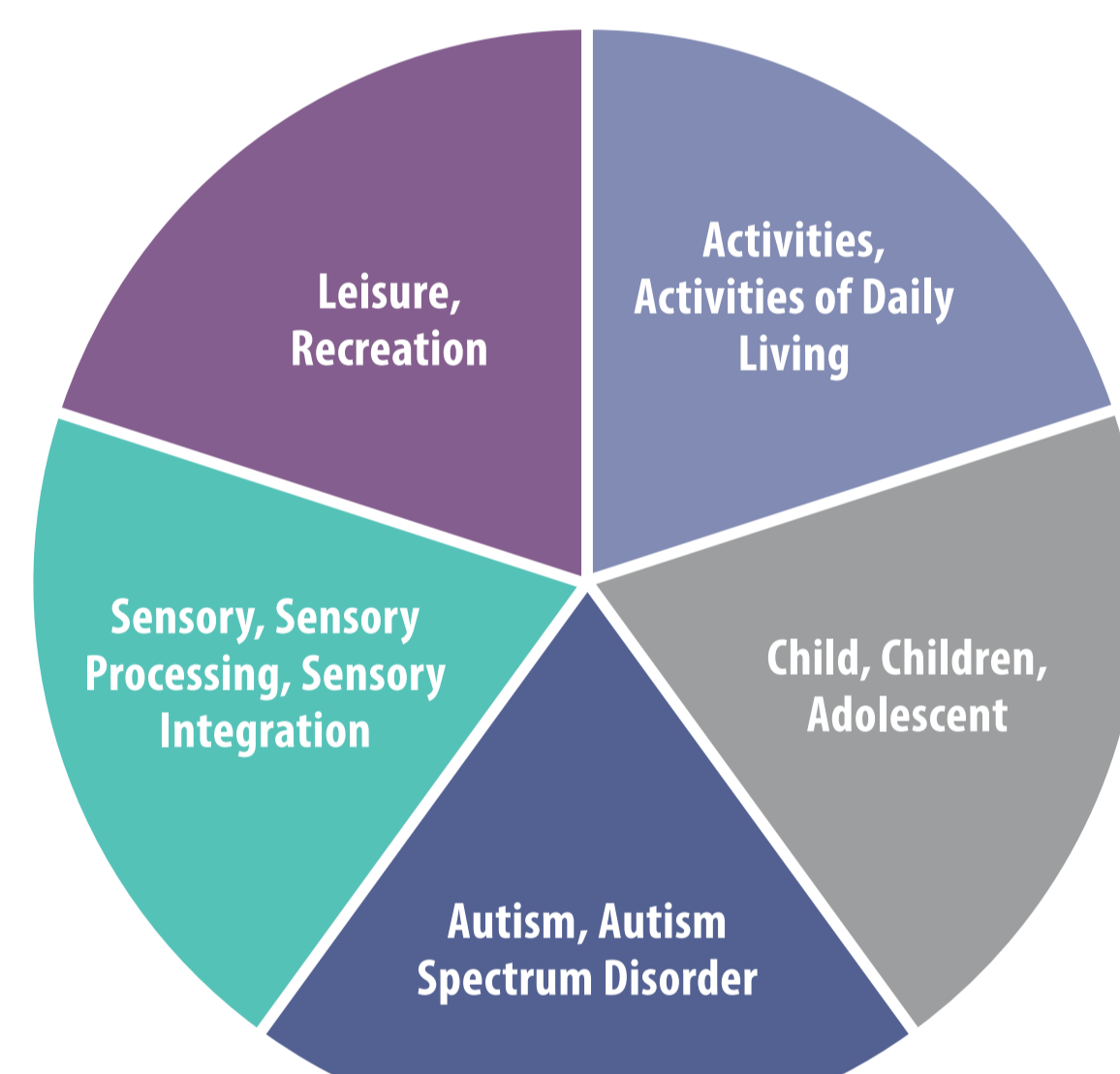
METHOD: SEARCH STRATEGY

A systematic literature search was conducted using a range of electronic databases including, CINAHL, Embase, ERIC, Medline and PsychINFO; and consolidation information sources, such as the Cochrane Database of Systematic Review. A combination of keywords and search terms were employed.

To be included articles had to be:

- Peer reviewed
- Written in English
- Published between January 2008 and December 2013
- Described research regarding sensory processing and activity choice or occupational performance of typically developing children and children with autism

The methodological quality was assessed according to level of evidence (Sackett et al., 2000), and reviewed using two pre-tested checklists the McMaster Qualitative Review Form version 2.0 (Letts et al., 2007) and the McMaster Quantitative Review Form (Law et al., 1998). One author extracted the data using an appropriate pre-tested form and a second reviewer verified the accuracy and completeness of the data, any disagreements were resolved by consensus.



LIMITATIONS

- This review included evidence rated at level I, II, III, IV and V; other systematic reviews only include level I evidence. This limitation suggests that as the level of scientific rigour varied among the studies, the levels of evidence need to be considered in interpreting the results.
- Limitations amongst the included studies:
 - The employment of small convenience samples in which many of the participants volunteered.
 - Little ethnic, demographic or socioeconomic diversity.
 - The use of questionnaire and interview format assessments to measure sensory processing patterns and participation in activities.
 - Some of the assessments were completed in the presence of the researcher; as such it is possible that a Rosenthal effect may have ensued.
 - Biases such as social desirability, recall bias and the accuracy of the participants' ability to understand the question may have jeopardised results.

KEY FINDINGS

- Sensory processing difficulties compromise a child's ability to focus and engage in a wide range of activities in the home, school and community.
- For children aged 3–11 years, the more severe the sensory processing impairment, the more limited the diversity and intensity of participation in daily functional activities.
- Assessing sensory patterns early in life would seem the best method to identify children with atypical sensory patterns and put in place an appropriate intervention to address their specific issues, thus promoting activity participation and skill acquisition.
- For families of children with autism, family activities and the chores families give to their children are constrained by their child's sensory preferences combined with the child's innate desire for sameness and by parent's perception of their child's capabilities.
- Increased parental skills and understanding sensory processing patterns, maximised the opportunities for children's learning in a range of environments with a range of activities, thus affording the child with autism the opportunity to develop a range of skills.
- Implementing sensory integration techniques facilitated a marked improvement in play skills (Dunbar et al., 2012; Schaaf et al., 2012), sleep, self-dressing skills, fine motor skills (Schaaf et al., 2012), communication, daily living skills and social activities (Schaaf et al., 2013). These techniques not only improved the children's participation in everyday activities, but also improved parental competence among families with children with autism (Dunn et al., 2012).

IMPLICATIONS FOR PRACTICE

- In order to maximise the potential development of a child with autism; parents, professionals and care givers should consider the child's sensory needs, the implementation of sensory integration interventions and the child's activity preferences and interests.
- Therapists should consider adapting environments and tasks to meet the sensory needs of the child with autism, thus potentially increasing participation in a broader range of activities and affording more opportunity for skill acquisition.
- This review further evidences the effectiveness of the Short Sensory Profile (McIntosh et al., 1999) as an assessment tool that distinguishes sensory processing difficulties and preferences amongst children with and without autism. Such assessments should be used to identify the sensory needs of children with autism to direct appropriate interventions to facilitate improved activity engagement and performance.

FUTURE RESEARCH

- Future research should explore the relationship between activity choice, activity participation and sensory processing preferences with larger, more diverse populations. Understanding how sensory processing difficulties impact on activity choice and participation for the wider population of children with autism will allow for further investigation into the adaptability and effectiveness of sensory integration interventions on children's ability to engage in play, school and functional activities of daily life.
- Future studies implementing sensory and activity questionnaires should consider triangulating data by direct observations and measuring functional performance.