On this page:

- Why are sensory-based interventions supposed to support children's development?
- How are these interventions used in clinical practice?
- What are the principles that underpin the use of sensory-based interventions?
- Who delivers these interventions?
- What is the evidence for the effect of sensory-based interventions on child and family outcomes?
- Full reference of report
- Intervention category overviews
- Notes

This is a brief overview of information about sensory-based interventions, taken from the Autism CRC report, Interventions for children on the autism spectrum: A synthesis of research evidence (Autism Interventions Evidence Report).

There are seven other category overviews available designed to help people learn about different interventions and their research evidence.

To understand the information in its full context, we encourage you to access the full report .

Why are sensory-based interventions supposed to support children's development?

Sensory-based interventions are based on the theoretical premise that sensory functions are a fundamental building block of all developmental skills, and that differences in how children on the autism spectrum process sensory information may produce cascading effects on skill acquisition and behavioural development across a range of domains, including core autism characteristics (notes 1 - 3).

Based on this premise, sensory-based interventions are proposed to change how children on the autism spectrum process sensory stimuli on a temporary or permanent basis, with the aim of creating downstream therapeutic effects on skill acquisition and aspects of behaviour, such as attention and self-regulation (note 3).

How are these interventions used in clinical practice?

The clinical application of sensory-based interventions typically involves an assessment of the child's sensory functioning.

In the case of intervention practices such as Ayres Sensory Integration Therapy, the information acquired from the assessment is then used to develop an individually-tailored intervention program of sensory-rich experiences that is hypothesized to promote the better future integration of sensory information and/or to support sensory processing on a permanent basis.

By supporting the development of foundational sensory processing abilities, sensory integration therapies aim to facilitate greater and broader engagement of the individual with day-to-day activities (note 1). Ayres Sensory Integration Therapy is typically conducted in a clinic-based setting with specialised equipment such as suspended equipment and scooter boards (note 4).

Other interventions that are aimed at supporting sensory processing in a particular context are implemented in the child's natural environment, such as home, school or community settings (note 3).

A number of authors (note 3 and 5) distinguish between Ayres Sensory Integration Therapy and a broader group of sensory-based intervention techniques and practices that involve administering specific sensory stimuli, often targeting one modality.

Examples of these latter techniques and practices include auditory integration-based approaches, music therapy, weighted blankets, swinging, brushing, deep pressure, massage, joint compression, vestibular stimulation (note 1 and 2). These techniques and practices may be combined into a sensory diet delivered in specific activities or across the day by clinical practitioners, educators, and/or caregiver under supervision (note 2 and 3).

What are the principles that underpin the use of sensory-based interventions?

There is no universal set of principles relating to sensory-based interventions for children on the autism spectrum. Parham et al. (note 4) identified ten core elements that should be included in sensory integration therapies, such as Ayres Sensory Integration Therapy.

The elements are:

- Providing sensory opportunities, such as tactile and proprioceptive experiences.
- Challenging children's sensory systems, but at a level that is just right for each child.
- Collaborating on activity choice, including incorporating children's interests.
- Helping children learn to self-organise their play and behaviour.
- Supporting optimal arousal, such as by modifying the environment to support attention, engagement, and comfort.
- Using play as the context for learning.
- Maximizing children's success during activities.
- Ensuring children's physical safety.
- Arranging the room so that children are encouraged to interact and learn.
- Fostering therapeutic alliance with the child, such as through conveying positive regard.

Who delivers these interventions?

Children on the autism spectrum often have needs across multiple domains of learning, and physical and mental health.

Accordingly, children and families may benefit from the expertise of a range of clinical practitioners spanning health, education and medical disciplines.

For all intervention categories, it is essential that clinical practitioners have acquired appropriate qualifications, are regulated (eg. by a professional or government body), and deliver interventions that are within their scope of

practice. A detailed explanation is provided in the full report.

What is the evidence for the effect of sensory-based interventions on child and family outcomes?

Below is a summary of the evidence for the effect of sensory-based interventions on child and family outcomes, taken from systematic reviews published since 2010.

This means that a range of relevant individual studies have been considered, and thus reflects the best available evidence at this point in time.

Listed first are findings from systematic reviews that considered a mixture of sensory-based interventions. Following that are findings relating to specific sensory-based intervention practices.

Summary of evidence tables

- Each cell represents evidence for the intervention category or practice (horizontal rows) on various child and family outcomes (vertical columns).
- The effect of these interventions on a range of child and family outcomes is summarised as positive, null, or mixed.
    - **+** means that all available evidence indicated a positive effect of the intervention on a given child or family outcome.
    - **?** means that there was a mixture of positive and null effects reported for the intervention on a given child or family outcome.
    - **0** means that all available evidence indicated a null effect of the intervention on a given child or family outcome.
- H / M / L indicates the methodological quality of the evidence that contributed to the overall intervention effect for a given child or family outcome. The quality of evidence on which these findings are based is summarised as high, moderate, or low. These quality ratings are relative to those that met the minimum standards to be included in the report. Where there is more than one quality rating, it means more than one systematic review is represented.
    - **H** indicates evidence from a high quality review
    - **M** indicates evidence from a moderate quality review
    - **L** indicates evidence from a low quality review
- Where a cell is empty, it means there was no evidence available from the systematic reviews included in the report.

Please refer to the full report for a detailed explanation of the process used to collect, summarise, and synthesise the evidence presented here.

Core autism characteristics

Interventions	No. of systemic reviews	Overall autistic characteristics	Social-communication	Restricted and repetitive interests and behaviours	Sensory behaviours

Systematic reviews of assorted assorted sensory-based interventions*	3			
Auditory integration Therapy	3			
Ayers Sensory Integration (ASI)	4	? L	? LL	? LM
Environmental enrichment	1			
Music therapy	4		+ M	
Sensory diet	1			

Related skills and development

Interventions	No. of systemic reviews	Communication	Expressive language	Receptive language	Cognition	Motor	Social-emotional/ challenging behaviour	Play	Adaptive behaviour	Genera outcome
Systematic reviews of assorted assorted sensory-based interventions*	3	0 M								0 LL
Auditory integration Therapy	3	0 M								0 LL
Ayers Sensory Integration (ASI)	4	? LL			+ L	+ LM	+ L	0 L	? LL	? M
Environmental enrichment	1		0 M		+ M					
Music therapy	4	+ M				+ L	+ L	+ L	? LL	? L
Sensory diet	1									0 L

Education and participation

Interventions	No. of systemic reviews	School/ learning readiness	Academic skills	Quality of life	Community participation

Systematic reviews of assorted assorted sensory-based interventions*	3					
Auditory integration Therapy	3					
Ayers Sensory Integration (ASI)	4			+ L		+ L
Environmental enrichment	1					
Music therapy	4		+ L		+ M	
Sensory diet	1					

Family wellbeing

Interventions	No. of systemic reviews	Caregiver communication and interaction strategies	Caregiver social emotional wellbeing	Caregiver satisfaction	Caregiver financial wellbeing	Child satisfaction
Systematic reviews of assorted assorted sensory-based interventions*	3					
Auditory integration Therapy	3					
Ayers Sensory Integration (ASI)	4					
Environmental enrichment	1					
Music therapy	4		+ M			
Sensory diet	1					

*Practices included in systematic reviews of assorted sensory-based interventions

Alternative seating; Blanket or body sock; Brushing with a bristle or a feather; Chewing on a rubber tube; Developmental Speech and Language Training through Music; Family-Centered Music Therapy; Joint compression or stretching; Jumping or bouncing; Music Therapy; Playing with a water and sand sensory table; Playing with specially textured toys; Qigong (QST) Massage Treatment; Rhythm Intervention Sensorimotor Enrichment; Sensory Enrichment; Swinging or rocking stimulation; Thai Traditional Massage; Tomatis Sound Therapy; Weighted vests.

View the full evidence table for all intervention categories

Full reference of report

Whitehouse, A., Varcin, K., Waddington, H., Sulek, R., Bent, C., Ashburner, J., Eapen, V., Goodall, E., Hudry, K., Roberts, J., Silove, N., Trembath, D. Interventions for children on the autism spectrum: A synthesis of research evidence. Autism CRC, Brisbane, 2020

Intervention category overviews

- Behavioural interventions
- Developmental interventions
- Naturalistic developmental behavioural interventions
- Sensory-based interventions
- Technology-based interventions
- Animal-assisted interventions
- Cognitive behaviour therapy
- Treatment and Education of Autistic and related Communication-handicapped Children (TEACCH) interventions

Notes

1. Baranek, G. T. (2002). Efficacy of sensory and motor interventions for children with autism. *Journal of Autism and Developmental Disorders, 32*(5), 397-422.doi:10.1023/a:1020541906063
2. Sandbank, M., Bottema-Beutel, K., Crowley, S., Cassidy, M., Dunham, K., Feldman, J. I., . . .Woynaroski, T. G. (2020a). Project AIM: Autism intervention meta-analysis for studies of young children. *Psychological Bulletin*, 146(1), 1-29.
3. Watling, R., & Hauer, S. (2015). Effectiveness of Ayres Sensory Integration and sensory-based interventions for people with autism spectrum disorder: a systematic review. *American Journal of Occupational Therapy*, 69(5), 6905180030p6905180031-6905180030p6905180012. doi:10.5014/ajot.2015.018051
4. Parham, L. D., Cohn, E. S., Spitzer, S., Koomar, J. A., Miller, L. J., Burke, J. P., . . . Summers, C. A. (2007). Fidelity in sensory integration intervention research. *American Journal of Occupational Therapy*, 61(2), 216-227. doi:10.5014/ajot.61.2.216
5. Schoen, S. A., Lane, S. J., Mailloux, Z., May-Benson, T., Parham, L. D., Smith Roley, S., & Schaaf, R. C. (2019). A systematic review of Ayres Sensory Integration intervention for children with autism. *Autism Research, 12*(1), 6-19. doi:10.1002/aur.2046