RCOT
Evidence Spotlight

Royal College of Occupational Therapists

Sensory integration and sensory-based interventions – children & young people

This Evidence Spotlight provides some key reading, selected from the evidence base, about sensory integration and sensory-based interventions for children and young people. Each paper is listed under a broad subject heading, alongside related CPD activities applicable to the pillars of the RCOT Career Development Framework (RCOT 2017). The selected papers do not represent a systematic evaluation or endorsement of the evidence base, they are intended as a starting point to encourage active engagement with and critical consideration of a broad range of research evidence.

Introduction and Overview

Sensory integration (SI) theory originates from the work of A. Jean Ayres, who published two key texts in the 1970s, and has subsequently been built upon by other theorists. SI is based on a conceptualisation of how the brain organises and interprets sensory information, with dysfunction occurring when the brain (in the absence of clear neurological damage) does not become properly organised for processing and integrating this information (Kielhofner 2009).

Occupational therapists offer a range of approaches when working with children and young people with sensory processing issues. These include: Ayres Sensory Integration® (ASI) a play-based method, usually carried out in a clinic using specific equipment, which aims to change neurophysiological processing of sensation; and sensory-based interventions (SBIs) such as use of weighted vests or bouncing on a ball, which typically occur in the child/young person's natural environment and aim to have an effect on self-regulation, attention, or behavioural organisation (Watling and Hauer 2015). However, there is ongoing debate within the occupational therapy profession about sensory integration/sensory-based interventions and their effectiveness.

It should also be noted that 'Sensory Processing Disorder' is not recognised as an independent diagnosis in the Diagnostic and Statistical Manual of Mental Disorders 5 (American Psychiatric Association 2013). A 2012 American Academy of Pediatrics (AAP) Policy Statement cautioned 'it is unclear whether children who present with sensory-based problems have an actual "disorder" of the sensory pathways of the brain or whether these deficits are characteristics associated with other developmental and behavioral disorders' (AAP 2012, p1186.).

Occupational therapists working with children and young people who present with sensory issues should use their professional skills and expertise to carry out a thorough assessment, in collaboration with colleagues from the multidisciplinary team as appropriate. They should be clear about their rationale for using ASI/sensory-based interventions and set well defined goals alongside parameters for evaluating these, ideally using validated and reliable outcome measures. As with any intervention, it is important to critically consider key research, to ensure practice is evidence-informed. This Evidence Spotlight includes a broad but not exhaustive range of research papers, selected by RCOT to provide a starting point for critically considering the evidence base.

References:

American Academy of Pediatrics (2012) Policy statement: sensory integration therapies for children with developmental and behavioral disorders. *Pediatrics, 129(6),* 1186–1189. Available at: *https://pediatrics.aappublications.org/content/129/6/1186*

American Psychiatric Association (2013) *Diagnostic and Statistical Manual of Mental Disorders*. 5th ed. Washington, DC: American Psychiatric Association Publishing.

Kielhofner G (2009) *Conceptual foundations of occupational therapy practice*. 4th ed. Philadelphia, PA: FA Davis Company.

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)*, 1–12.

Selected Evidence

Sensory processing and participation in daily occupations

Ismael et al (2018) conducted a systematic review of studies that used Dunn's sensory processing framework and focussed on participation in daily occupations in children aged 5-13 with autism spectrum disorder (ASD). Seven studies met the inclusion criteria. Whilst the authors found that studies showed sensory processing has a significant impact on participation for children with ASD, they identify the levels of evidence were medium and low. They conclude there is a need for additional research using robust scientific methods, including development of measures of participation.

Reference:

Ismael N, Mische Lawson L, Hartwell J (2018) Relationship between sensory processing and participation in daily occupations for children with autism spectrum disorder: a systematic review of studies that used Dunn's sensory processing framework. *American Journal of Occupational Therapy, 72(3)*, 1–9.

Sensory processing patterns

Little et al (2018) carried out a cross-sectional study, using a subset of a sample (*n*=239) from a larger study, to examine sensory processing in children with ASD, attention deficit hyperactivity disorder (ADHD) and typical development (TD) using the Sensory Profile (2nd edition). Findings included there were similarities in sensory processing patterns in the ASD and ADHD groups compared to the TD group. However, the authors identify that sensory related behaviours are likely to decrease with age, regardless of diagnosis.

Reference:

Little LM, Dean E, Tomchek S, Dunn W (2018) Sensory processing patterns in autism, attention deficit hyperactivity disorder, and typical development. *Physical and Occupational Therapy in Pediatrics, 38(3)*, 243–254.

Sensory responsiveness, anxiety and ritual behaviour

Bart et al (2017) conducted a study, involving boys with mild developmental disabilities and atypical sensory responsiveness (*n*=28) and a control group (*n*=20) to explore relationships between sensory responsiveness, anxiety and ritual behaviours. Parents completed the Sensory Profile, Screen for Child Anxiety Related Emotional Disorders and Childhood Routines Inventory. Findings included that atypical sensory responsiveness was significantly related to both anxiety and ritual behaviours.

Reference:

Bart O, Bar-Shalita T, Mansour H, Dar R (2017) Relationships among sensory responsiveness, anxiety, and ritual behaviors in children with and without atypical sensory responsiveness. *Physical and Occupational Therapy in Pediatrics, 37(3)*, 322–331.

Career Development Framework Pillars

Suggested CPD activities

Facilitation of Learning

Professional Practice

Reflect on the frames of reference you use within your practice and critically consider how these inform your reasoning and conceptualisation of factors that influence participation in occupations.

Professional Practice

Reflect on the findings of the study and how they might impact on the interventions you use when working with children with ASD and ADHD.

Consider the paper in the context of the AAP Policy Statement referenced on the first page of this Evidence Spotlight.

Facilitation of learning

Professional Practice

Consider the potential complexity of the relationship between anxiety and sensory over responsiveness, including issues of causality. See discussion section of Bart et al (2017) for further reading.

Sensory processing and sleep

Foitzik and Brown (2018) investigated the relationship between sensory processing and sleep in typically developing children aged 8-12. Parents completed measures of sensory processing, sleep hygiene and sleep habits and the children completed the Children's Report of Sleep Patterns. Findings included that sensory processing factors were significantly associated with children's sleep habits and patterns, as reported by parents and children. The authors conclude that the study provides preliminary insights, and that occupational therapy practitioners should consider sensory processing factors when working with children with suspected sleep problems.

Reference:

Foitzik K, Brown T (2018) Relationship between sensory processing and sleep in typically developing children. *American Journal of Occupational Therapy, 72(1)*, 1–9.

Facilitation of Learning

Before reading the article, write a list of factors that might impact upon a child's quality of sleep. It may be helpful to use a conceptual structure (such as the Person-Environment-Occupation Model) to do so. Compare your list with the findings of the study.

Critically consider what factors may influence sleep, and how causality may be conceptualised differently.

Effectiveness of sensory-based techniques/interventions, environmental modifications and Ayres Sensory Integration®

Bodison and Parham (2018) carried out a systematic review to examine the effectiveness of specific sensory techniques and sensory environmental modifications for children and youths with SI difficulties. Eight records met the inclusion criteria and related to children with ASD/ADHD. The findings are reported in terms of sensory techniques (Qigong massage; weighted vests; slow linear swinging; sensory enrichment in preschool; other specific techniques) and sensory environmental modifications (in a dental environment).

Watling and Hauer (2015) carried out a systematic review of literature related to the effectiveness of Ayres Sensory Integration® (ASI) and sensory-based interventions (SBIs) for people with ASD. 23 articles were included in the review, only four of which were classified as studies of ASI. The authors identify there was moderate evidence for ASI and results for SBIs were mixed. However, they suggest that as the amount of level I-III evidence identified was limited (the majority was classified as Level IV) caution must be used when drawing conclusions regarding effectiveness.

Schaaf et al (2018) conducted a systematic review to examine the efficacy of occupational therapy using ASI to support functioning and participation. Five studies were identified for the review, all of which related to children with ASD. The authors suggest that the body of evidence regarding ASI is growing, but the results emphasise the importance of using systematic processes and outcome measures that evaluate performance and participation in everyday activities/routines.

References:

Bodison SC, Parham LD (2018) Specific sensory techniques and sensory environmental modifications for children and youth with sensory integration difficulties: a systematic review. *American Journal of Occupational Therapy, 72(1)*, 1–11.

Schaaf RC, Dumont RL, Arbesman M, May-Benson TA (2018) Efficacy of occupational therapy using Ayres Sensory Integration®: a systematic review. *American Journal of Occupational Therapy, 72(1)*, 1–10.

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)*, 1–12.

Facilitation of Learning

Within a journal club or as a self-directed learning activity, critically appraise the three systematic review papers. Critique the approaches used to select studies and grade levels of evidence (including any potential biases). Also, consider the strengths and limitations of the studies included in the reviews.

Professional Practice

Consider how you can effectively incorporate appropriate outcome measures in your practice.

A checklist produced by the Allied Health Professions (AHP) Outcome Measures UK Working Group, a cross-disciplinary group representing a number of professional bodies including RCOT, can be used to guide your reasoning. It is available at: https://www.rcslt.org/outcome-measures-checklist

Evidence, Research and Development

Summarise the gaps/limitations in the existing evidence identified through the three systematic reviews.

Together with peers, discuss priorities for future research, and how this might be approached.

Access to journal articles

RCOT members can access the full text of these articles via the e-journals collection or, in the case of open access articles, via the link/DOI provided in the reference.

Access the RCOT e-journals collection at: https://www.rcot.co.uk/practice-resources/library-resources/journals-and-e-journals

The journals and e-journals webpage provides links to the *American Journal of Occupational Therapy* (AJOT), *Australian Occupational Therapy Journal* (AOTJ), *British Journal of Occupational Therapy* (BJOT) and *Canadian Journal of Occupational Therapy* (CJOT).

A wide range of other journals, including Physical and Occupational Therapy in Pediatrics, are available via the 'additional RCOT e-journals' link.

Career Development Framework

The Career Development Framework: Guiding Principles for Occupational Therapy (RCOT 2017) is an over-arching set of guiding principles for occupational therapy and offers a structured process to guide careers, learning and development within our profession. It contains four interacting Pillars of Practice (each with nine Career Levels):

- Professional Practice
- Facilitation of Learning
- Leadership
- Evidence, Research and Development

Access the framework at: https://www.rcot.co.uk/cpd-rcot

Further reading

Members can access a wide range of literature through the RCOT Library e-books and e-journals collections, as well as via the CINAHL and Medline databases.

The Library has produced a series of information skills guides to help members get the most of the resources available. They cover a range of subjects, from accessing the e-journal and e-books collections, through to searching databases and carrying out literature searches.

Access the guides at: https://www.rcot.co.uk/practice-resources/library-resources/information-skills

The Library catalogue is available at: https://www.rcot.co.uk/practice-resources/library-resources/search-library-catalogue

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