

The impact of sensory integration groups on the participation of children and young people with learning disabilities: perceptions of therapists and teaching staff

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Accessible summary

- This study explored occupational therapy groups based on a technique called “sensory integration”. Children and young people with learning disabilities in a school and college took part in these groups.
- Therapists and teachers reported increased skills such as confidence, communication and turn taking.
- They also felt that participation in the groups themselves and later activities increased.
- The study suggests how the effects of these groups could be measured in future research.

Abstract

Background: Sensory integration techniques which follow the theory outlined by Ayres (1972) are widely used by occupational therapists as an intervention for children and young adults with learning disabilities, but their efficacy is unclear. Research studies have suggested increased levels of participation and other positive behavioural changes following group sessions using sensory integration techniques, but literature reviews have highlighted a scarcity of evidence supporting their use.

Materials and Methods: A qualitative study in which therapy and teaching staff of children and young adults with learning disabilities aged between 5 and 22, at a school and a college in England, were interviewed to gain understanding of their perceptions of the impact of these groups.

Findings: Groups involving sensory integration techniques were perceived to have a positive effect on the abilities and participation (in both the group itself and subsequent learning and other activities) of children and young adults with learning disabilities and other complex needs in educational settings.

Conclusions: The findings are of relevance to occupational therapists and others working with young people with learning disabilities in special educational and other settings. In particular, they suggest variables that may have the potential to be measured in future research evaluating such sensory integration groups.

Introduction

This article describes research exploring teachers’ and therapists’ perceptions of the impact from children and young adults’ participation in occupational therapy sensory integration groups. Sensory integration theory seeks to explain how an individual organises sensation for use in everyday activities. It was originally developed by Ayres (1972) who investigated how perception, adaptation and learning may be affected by disruption to sensory input. Her theory proposed that the brain assimilates, organises, processes and interprets information from the senses allowing individuals to adapt and interact appropriately with the environment. This promotes optimal functioning, including participation in activity and regulation of behaviour (Ayres, 2005, Watling and Deitz, 2007, Smith et al., 2009). Sensory integration is both a theory and an intervention approach with individuals and groups.

The scope and prevalence of sensory integrative problems may be concerning for families, therapists and teaching staff of young people with learning disabilities, autism and other complex needs. People with learning disabilities have a significantly reduced ability to understand new or complex information, to learn new skills and to cope independently, which starts before adulthood and therefore has a lasting impact on development (Department of

Health, 2001). People on the autistic spectrum may behave in restrictive or repetitive ways and experience social or communication difficulties. Individuals with either diagnosis who additionally have sensory-integrative problems may find it challenging to take in and interpret sensory input from the environment, discriminate between different sensations, self-regulate behaviour, maintain posture, use both sides of the body together, sequence activities and plan movement (Bundy, Lane and Murray, 2002, Urwin and Ballinger, 2005, Miller, 2007). Physical, psychological and social impacts are highlighted in the literature (May-Benson and Koomar, 2010, Polatajko and Cantlin, 2010). Quality of life can be severely disrupted, with long term impact on health and wellbeing into adulthood, including social isolation, depression, anxiety and dependence on specialist care (College of Occupational Therapists, 2012).

To address this, Ayres (1972) proposes occupational therapy with a sensory integrative approach on an individual basis from appropriately trained therapists. Many occupational therapists adapt aspects of the original neuroscience theory to make it more relevant for their setting (Smith Roley et al., 2009), for example, running groups rather than individual sessions.

A search of the literature revealed 26 studies related to occupational therapy using a sensory integration approach to promote participation by children or adults with sensory-integrative problems. Three were based in the United Kingdom, one in Canada and the remainder in the United States. All considered children except for one which related to 'children and adolescents' and two concerning adults. There were a variety of study designs: systematic or other literature reviews; phenomenological or other qualitative studies seeking the perspectives of parents or teachers; and quantitative research, including single and multiple-subject case studies and longitudinal studies.

The literature suggests that sensory-integrative approaches are widely practiced by occupational therapists with children (and to a lesser extent adults) with sensory processing problems, including those with learning disabilities (Cohn, 2001) and autism (Watling and Deitz, 2007). A number of studies have reported positive impacts, for example:

- Changes in motor skills, balance, co-ordination, social skills, attention and behaviour in school age children (Stonefelt and Stein, 1998), all skills considered central to cognitive, social and academic development.
- Reductions in behaviours of concern, such as assaultive, impulsive or self-injurious behaviours (Urwin and Ballinger, 2005) and aggression (Roberts et al., 2007).
- Gains in self-esteem after six months of intervention that were sustained 3 months later (Polatajko et al., 1991), though not significantly greater than gains by a control group.
- Significant gains in attention and in cognitive and social skills (Miller et al., 2007) compared with children receiving no treatment and an alternative activity-based treatment.
- Possible positive outcomes in motor performance, sensory processing, behaviour, academic and psychoeducational performance and occupational performance, all potentially maintained after the cessation of the intervention (May-Benson and Koomar, 2010).
- Reductions in stereotypical behaviours, improvements in communication and social skills, improvements in quality of life, access to typical environments and academic ability (Lang et al., 2012).

There are, however, limitations with much of this research and reviews have cautioned about the conclusions that can be drawn from it (May-Benson and Koomar, 2010). The majority of the literature focuses on school-age children and few studies are from the UK. Sample sizes are generally small and the heterogeneity of individuals with sensory integrative problems means that studies have often focused on particular diagnoses, though limited description of participant characteristics often makes comparison between studies difficult. For example, in the studies reviewed by Lang et al. (2012), most participants were diagnosed with autistic spectrum disorders, however, insufficient information was provided to determine if they also had learning disabilities. Isolation of the impact of sensory integration is often absent, with many participants also receiving additional therapy, for example behavioural or speech and language interventions. As a result of the limitations with the existing evidence base,

some question whether it is appropriate for sensory integration interventions to be so widely used (Lang et al., 2012).

Changes following sensory integration groups are suggested to support participation in subsequent learning and other activities (Watling and Deitz, 2007), but few studies have measured such changes in participation. As this is key to development and impacts on health and wellbeing, it could be explored further to inform practice (Cribbin and Lynch, 2014). Watling and Deitz's qualitative study (2007) demonstrates the potential of staff and caregiver perspectives to provide some insight into changes in participation following sensory integration interventions, in contrast to questionnaires which may have restricted parents, teachers and occupational therapists in articulating their opinions (Stonefelt and Stein, 1998).

Although there is suggestion of positive impact from sensory integration groups, the exact nature of this could be clearer, which makes it challenging to measure. This research therefore aimed to explore how occupational therapists, teachers and teaching assistants working with children and young-adult learners perceived sensory integration groups to impact on the participation of children and young adults with learning disabilities.

Method

Qualitative research was completed by the first and second authors involving interviews with therapy and teaching staff at a special educational needs school and college for children and young people aged 5-19 and 18-23 years respectively. Both settings supported children and young people with complex needs including autism, speech and language difficulties, developmental delay and moderate-to-severe learning disabilities. The first author had previously undertaken a student placement in the school, but the authors had no other connection with either setting. The research explored teaching and therapy staff perceptions of the efficacy of the sensory integration groups, in which a number of learners took part, providing insight into some of the complexities of participation for young people experiencing altered sensory needs. It aimed to suggest appropriate variables that could be measured in future evaluations of such groups.

Participant information sheets outlining the study purpose were distributed to eligible participants via the therapy management teams at both settings. Staff were sought who were sufficiently familiar with learners' usual behaviour to notice any impacts of participating in sensory integration groups (for example, from working directly with them on the same day as the sensory integration group). Different professions were sought as suggested by Doig et al. (2008) and four occupational therapists, two senior teaching assistants and a speech and language therapist volunteered. There were seven participants in total and the workplace of each is given in brackets following their pseudonyms, which are used to maintain anonymity. Sally (School) is a senior occupational therapist with over ten years' experience working with children with learning disabilities. Jane (School) is an occupational therapist with one years' experience. Fiona (College) and Rachel (College) are both occupational therapists working at the college for over four years. These occupational therapists themselves ran the sensory integration groups in which 5-6 learners (in the college) and 5-10 learners (in the school) took part. They demonstrated deeper understanding of the purpose and techniques used in the groups. The other participants were familiar with those taking part in the groups and had worked with them in other roles providing therapeutic intervention, teaching or teaching support: Felicity (School), a speech and language therapist with over four years' experience; Pauline (School) and Emma (College), teaching assistants with over two years' experience.

Semi-structured individual interviews allowed for flexible data collection as participants were able to discuss learners of their choice. Participants were asked to discuss their perceptions of any effects on engagement or participation that they had observed following sensory integration groups. They were requested not to disclose information which might compromise the anonymity of learners discussed.

Questions explored participants' understandings of the purpose of the groups and the reasons for learners' referrals. They were asked to focus upon participation difficulties visible prior to the groups and then encouraged to describe

any changes in behaviour, participation or engagement in daily activities they may have subsequently observed, whether during, immediately following the sensory integration groups, or longer-term. Participants were also asked to consider current evaluation methods or methods of gaining feedback from stakeholders to offer insight into outcome measurement. Each interview was transcribed verbatim. Ethical approval was granted by the University of Brighton School of Health Sciences Research and Governance Panel.

The theoretical flexibility and clear stages of thematic analysis gave guidance and structure to data analysis (Braun and Clark, 2013). Themes were identified in the data by identifying repeated ideas, terms, phrases or words between the participants. An inductive approach allowed findings to emerge from the raw data rather than prior expectations. All data was given equal attention, allowing for unanticipated insights and adding credibility. Data from the school was coded by the first author by hand whilst data from the college was coded by the second author with assistance of qualitative data analysis software. Braun and Clark (2013) describe how analysis in this method will be influenced by the knowledge, viewpoint and epistemology of these authors, whose positive perceptions of sensory integration from previous observations risked influencing analysis. They were therefore mindful of this and reflexive in order to minimise this risk by placing equal emphasis on data that was not supportive of its efficacy. Keeping reflexive diaries to explore presuppositions and the analytic process contributed to trustworthiness (Banner, 2010).

Findings

The findings relate to perceived changes in behaviour and participation in learning and other activities of young adults and children with learning disabilities, from participating in occupational therapy sensory integration groups at two specialist educational settings.

Rachel (Occupational Therapist, College) described the adult learners as:

“...quite low in their functioning, developmental delay...minimal or non-verbal...not very confident with their own body and their non-execution of certain movements.”

Sally (Occupational Therapist, School) summarised the child learners:

“...social difficulties, difficulties concentrating, difficulties engaging in work, difficulties regulating sensory input...can be sensory seeking.”

The occupational therapists described the groups in detail. In the school, learners were timetabled to attend a daily sensory integration group which had been running since the start of the academic year (around 7 months) and consisted of three ordered stages of activity. Each stage involved the use of different sensory-based equipment to facilitate alerting, organising and calming activities. The activities included the use of therapy balls, swings, skateboards and rope, beanbags and sensory-based soft play equipment. The specific activities and specialist equipment were described as promoting sensory input to stimulate the central nervous system. Following Ayres (2005) this was described as enabling individuals to better-regulate their responses to the environment. Learners also attended individual sessions using a sensory integrative approach which often used one or two of the sensory-based activities from the group.

In the college sensory integration groups were staged for one hour per week and had been running for around 18 months. Similar techniques aimed to improve motor skills, body awareness, planning and execution and to enable identification of behavioural areas of strength or behaviours impacting on learning, for example, problems with waiting or taking turns. These groups involved the same five learners.

Sally (Occupational Therapist, School) described activities as alerting, organising and calming, completed in that order and Fiona (Occupational Therapist, College) explained the set routine of ‘*alerting*’ activities followed by stimulation of a pre-selected sense (such as taste or touch) and finishing with a period of relaxation. Alerting activities included bouncing on balls or wafting a parachute as a group. Rachel (Occupational Therapist, College)

clarified that relaxation might involve weighted blankets, bean bags, listening to music or using 'sensory baskets':

"...I rock [the cushion on which he is laying] slowly or he quite likes to have a duvet cover over him...shutting out all the sensory information.....the result is that when he leaves he's much better in terms of his ability to engage with classroom requests" (Sally, Occupational Therapist, School).

Two overlapping themes were identified: perceived changes in performance capacity and perceived changes in participation following the groups, though participants described their uncertainty as to the extent to which these changes could confidently be attributed to the groups.

Perceived changes in performance capacity

Participants described how the groups supported individuals' ability by impacting upon arousal level, attention, awareness, motor planning and cognitive functioning. It was suggested that sensory integration groups promoted the regulation of very high or very low arousal levels seen in children and adults with learning disabilities, autism and developmental delay, thereby improving levels of participation (see second theme). Emma (Teaching Assistant, College) described the learners as being:

"under responsive and ... [having] a really low arousal level...They need sensory input... for regulation, to get them ready to go..."

Sally, (Occupational Therapist, School) explained how sensory integrative interventions provided sensory input into an '*under responsive system*' and enabled the learners to be sufficiently alert for further therapeutic input.

Participants spoke of how learners could be over or under responsive to their environment, causing an imbalance in arousal levels, interrupting participation:

"He'll jump and jump....you know he's in that high arousal state and he needs bringing down with heavier input really to get him ready to attend." (Jane OT)

The ways they perceived the groups to increase participation in learning activities are further explored within the second theme. In both settings, participants considered the groups to have an immediate impact on, for example, sustained attention and appropriate behaviour:

"...to give some intense vestibular input.....to get that sensory system working.....you can see the difference in five minutes he becomes alert...I can then work on different interventions" (Sally, OT).

Sally (Occupational Therapist, School) described a learner "*engaging for longer during the sessions, being able to participate for the whole session.*" School participants spoke of visible changes of a short duration, with increased focus lasting for fifteen or thirty minutes, though Jane (Occupational Therapist, School) described the sensory integration groups supporting learners to get ready for a subsequent learning or other activity, because they were then more alert and able to concentrate.

The majority of learners discussed were described as experiencing physical and cognitive difficulties interrupting participation in learning activities, including motor planning, balance problems and gravitational insecurity. Participants referred to improved co-ordination amongst learners, with Rachel (Occupational Therapist, College) considering one learner to have '*developed a sense of body awareness*' enabling a better regulation of force and control or movements. As a result, they learned to throw gently or slowly, rather than forcefully or aggressively, with Fiona (Occupational Therapist, College) regarding this as helping social development, as such behaviour '*would frighten people*'.

This theme highlights how sensory integration groups are considered to impact on an individuals' underlying abilities to complete an activity. The second theme explores how these impacts may impact on behaviour and participation in

activities.

Perceived changes in observed participation

Participants described changes they had observed in the behaviour and participation of five adult and six child learners within the sensory integration groups. No reference was made to learners' behaviour remaining unchanged, nor to any aspects of the groups considered by participants or others to be negative.

The groups were described as seeming meaningful for group participants as they were able to complete them in a fun and enjoyable way with others, impacting on self-efficacy, confidence and social interactions. Emma (Teaching Assistant, College) described one learner as initially reluctant to engage, initially needing '*coaxing or persuading*', but he appeared, to learn to view the groups as a positive environment, participating willingly, which she considered to be "*him saying that 'I'm happy to be here'*". Feedback received from a teacher was also reported; "*that he is a lot better after a relaxation session.*" She went on to describe another learner who slowly increased time spent in the group, and whose achievement of a target to remain for ten minutes, suggests that the groups resulted in increased participation. Fiona (Occupational Therapist, College) described a different learner:

"...(initially) he would come in for five minutes...he wouldn't come in at all... and accessed almost the whole session today."

Participants in the school described the behavioural, learning and sensory needs of the children and their difficulty with self-expression. They explored how the sensory integration groups met these needs and were adapted for optimal participation. Participants in the college felt the groups may have impacted positively on behaviours which enabled increased participation in activities, including reduced aggression and prompting. Emma (Teaching Assistant, College) referred to one learner's greatly improved ability to wait for their turn (for example for the trampoline) during the groups.

Changes in confidence and communication were referred to frequently throughout the interviews. Fiona (Occupational Therapist, College) described a learner now entering the room confidently and willingly and alternating between activities more independently. This learner also displayed increased independence by flushing the toilet with confidence which had not happened previously. The sensory integration groups were also thought to support development of peer relationships:

"doesn't have any friendships...needs social communication aside from that kind of input ... the group is good as it gets him used to it." (Jane, Occupational Therapist, School).

College participants reported that any immediate changes following the sensory integration groups were visible for the remainder of the day, although any carryover to the following day was uncertain.

All participants appeared to link increased time spent in the groups with increased participation in subsequent learning activities:

"When they come back [from the groups] they are much more settled.....it can be helping them to calm down and re-engage in the next sort of lesson or next part of the lesson" (Felicity, SLT)

Emma (Teaching Assistant, College) described how one learner's participation levels changed following the groups. Initially they were '*unsettled and difficult to manage*', but they became more '*co-operative, focussed and communicative*'. She felt that the groups '*calmed*' and '*settled*' this learner in preparation for the next academic lesson.

Different staff members worked with learners at different stages of the day and the occupational therapists, for example, had limited contact with learners following a group. As a result they mainly described behavioural changes during the groups. Difficulty evaluating outcomes was referred to by all college participants, who highlighted the

difficulty gaining feedback from learners themselves, mainly due to their cognitive abilities. Nonetheless, indirect feedback could be sought from behaviour during and following the sensory integration groups:

“...he is happier on Wednesday afternoons...smilier... calmer...whereas normally he’s quite manic and very er pacing” (Emma, Teaching Assistant, College).

“...engaging for longer and able to participate for the whole session really” (Rachel, Occupational Therapist, College).

Sally (Occupational Therapist, College) acknowledged the challenge of evaluating the impact of the groups, raising the possibility that it could be participation in activity, rather than sensory integration per se, that resulted in behavioural changes. All participants saw the groups as part of wider therapeutic input:

“I don’t think it is all OT, I think it’s global, I think we play a part in it.” (Fiona. Occupational Therapist, College).

Discussion

Accessing the subjective experiences of college and school staff working directly with learners allowed opportunity to explore subtle behavioural changes following sensory integration input, as encouraged by Watling and Deitz (2007). This has provided insight into the impact on participation within the educational context. The findings suggest that therapists and teachers working with individuals with learning disabilities, autism and other complex needs consider that occupational therapy groups based on sensory integrative principles can have a positive impact on the underlying abilities and participation of those attending. Measuring that impact is, however, perceived to be difficult and the degree to which improvement results from the sensory integration groups or other therapeutic input is uncertain. These findings resonate with similar studies, as will now be discussed.

For children with complex needs such as autism and learning disabilities, the process of interpreting the sensory demands of the environment can be disrupted, resulting in difficulties participating in key activity necessary for development such as learning, play and social interaction (Ayres, 2005, Schaaf and Nightlinger, 2007). The complexities of impaired sensory processing and resulting disruption to participation were described in detail by participants, who referred to sensory integrative problems leading to anxiety and challenging or self-injurious behaviour, reflecting other studies (Urwin and Ballinger, 2005, Schaaf et al., 2013). The most common reasons for referral to the sensory integration groups (motor planning, response regulation, challenging behaviour and ability to remain in and participate in teaching sessions) are all key areas in which these populations may experience difficulties. This supports the highlighted need for regular, intensive, individualised intervention (May-Benson and Koomar, 2010, Polatajko and Cantlin, 2010).

The findings in both studies suggest that participation in sensory integration groups is perceived to be beneficial in addressing several of these issues for children and young adults. Participants described changes in underlying capacities and behaviour leading to increased participation, in particular improved engagement in learning activities and self-help skills. This resonates with many of the studies conducted with children (for example Case-Smith and Bryan, 1999 and Smith Roley et al., 2009) which might suggest that those authors’ findings are equally applicable to young adults. Improved cognitive and motor planning skills have been suggested elsewhere to lead to increased engagement in learning activities and self-help skills (Ayres, 1972, Schaaf and Nightlinger, 2007) promoting academic learning, flexibility, social interaction and development of interests.

All school participants described learners appearing calmer following the sensory integration groups, suggesting that attendance had improved regulation of arousal levels and integration of vestibular, proprioceptive and tactile sensory systems. This supports the use of sensory integration-based interventions using equipment such as weights, swings and scooter boards to help promote the integration of these systems. In both settings, references were made to improved behaviour as a result of attending the groups. Although this has not been widely explored in the literature, perceived reductions in challenging behaviours have been found in other studies (Urwin and Ballinger,

2005, Watling and Deitz, 2007). Improved arousal regulation was perceived to promote engagement in subsequent activities, (as argued by Urwin and Ballinger, 2005 and Waitling and Deitz, 2007). Examples given by participants include leisure activities (listening to music and dance classes) and self-care activities (eating in the dining hall and exercise). Improved arousal regulation and the increased attention and focus observed in some participants following intervention fits with Ayres' theory (2005), and adds to other evidence of the effectiveness of sensory integration in promoting children's participation (Schaaf and Nightlinger, 2007, Watling and Deitz, 2007). Schaaf and Nightlinger (2007) reported improved attention in play and school activities alongside increased independence in self-care activities, following individual sensory integration-based interventions.

Participants highlighted how taking part in the sensory integration groups themselves was an opportunity for socialisation, development of skills such as turn taking and waiting, valuable for young people with complex needs such as autism and learning disabilities (Cosbey et al., 2010). These groups were perceived by participants as having become meaningful to some learners and changes in behaviour, and levels of participation within the sensory integration groups themselves were seen as important in the context of these young people with complex needs.

As well as visible changes within the groups there were suggestions of longer-lasting benefits, such as subtler behavioural changes over longer periods. This included enhanced confidence and learners developing a sense of self identity, reflected also in other studies (Urwin and Ballinger, 2005). This all suggests potential for the benefits of sensory integration groups to be transferred beyond the immediate setting to further enhance the quality of life of young people with learning disabilities. Lasting impact following the groups was, however, difficult for some participants to judge, as not all of them worked with learners immediately following sensory integration groups

Limitations

Similar to other research in this field, this is a small scale study. The findings represent the perceptions of a small number of participants, discussing learners who had participated in sensory integration groups in two educational settings. As such, the potential for generalisation is limited, though detailed description allows transferability by the reader.

Key participants in the studies, the occupational therapists, were involved in setting up and leading the groups. They were in a position to have insight into the immediate impact and effectiveness of the groups, though the possibility of them wishing to portray them in a positive light needs to be considered. They arguably had a vested interest in seeing the outcomes of the sensory integration groups as the cause of perceived changes in behaviour either immediate or longer term following the intervention

Sensory integrative problems do not exist in isolation and the nature of learners' additional cognitive and behavioural issues were only partially described by participants. In both settings the young people received a wide range of therapeutic, behavioural, and educational interventions and participants raised the possibility of these, or the act of participation in a group activity (rather than specifically a sensory integration group) also contributing to changes in behaviour.

Conclusion

Sensory integration techniques are commonly used by occupational therapists with young people and adults with autism and sensory and learning disabilities but there is a paucity of supporting evidence for this. This qualitative research suggests that group sessions involving sensory integration techniques are perceived to have a positive effect on the abilities and participation of children and young adults with learning disabilities and other complex needs in educational settings. It has provided rich descriptions of materials and activities used, specific changes in participation, perceived long- and (in particular) short-term impact of the sensory integration groups, contributing to calls for a stronger evidence base and a better understanding of the relationship between sensory integration

therapy and the everyday lives of children and families (Cohn, 2001, Arbesman and Lieberman, 2010, Polatajko and Cantlin, 2010).

The findings are of relevance to occupational therapists and others working with young people with complex needs in special educational and other settings such as community, inpatient and residential settings. The findings add to evidence from other studies supporting the use of sensory integrative activities to increase independence and participation, particularly in learning activities (Urwin and Ballinger, 2005, Watling and Deitz, 2007). In particular, they suggest variables that may have the potential to be measured in future research, which could triangulate perceptions of the impact on performance capacity and participation, using observation or other methods of evaluating such changes.

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