Classroom based sensory intervention for children with autism spectrum disorders (ASD): A pilot study using single system design

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aspect practice
autism practice that works
Literature Review


• Difficulties in occupational performance resulting from sensory issues (Ashburner, Ziviani & Rodger, 2008)

• Limited studies on classroom based sensory intervention (Case-Smith, Weaver & Fristad, 2014; Lang et al 2012)

• Children with ASD have ID up to 70% of the time, different needs to those with ASD alone (Matson & Goldin, 2013; Matson & Shoemaker, 2009)
Background

• Special school based research
• Children with ASD, ID, autism specific special school in Sydney

**Research Question:**

*What is the impact of a Sensory Activity Schedule (SAS) on task performance and cognitive behaviours in children with ASD in a classroom setting?*
# Meet the Participants

<table>
<thead>
<tr>
<th>Name</th>
<th>Age</th>
<th>Sex</th>
<th>Diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>7 y 10 mo</td>
<td>Male</td>
<td>Autistic Disorder, moderate intellectual disability, severe language delay</td>
</tr>
<tr>
<td>B</td>
<td>5 y 7 mo</td>
<td>Male</td>
<td>Autism spectrum disorder, intellectual disability</td>
</tr>
<tr>
<td>L</td>
<td>6 y 3 mo</td>
<td>Male</td>
<td>Autistic disorder, moderate intellectual disability</td>
</tr>
<tr>
<td>C</td>
<td>6 y 8 mo</td>
<td>Male</td>
<td>Autistic disorder, moderate intellectual disability</td>
</tr>
</tbody>
</table>
Referral and Assessment

- Referred to School OT for reduced participation
- Teacher reported: ‘Off task’ behaviour - sensory seeking or sensory avoiding function, frustrated, fixed in routine
- Short Sensory Profile (McIntosh, Miller & Shyu, 1999) findings summary: All total scores showed definite difference (underresponsive/seeks sensation, auditory filtering, visual/auditory sensitivity, tactile sensitivity)
Method

• Single System AB design: non-concurrent, multiple baseline

<table>
<thead>
<tr>
<th>Phase A (Baseline)</th>
<th>Phase B (Intervention)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Best practice teaching for ASD (Curriculum, structure, routine,</td>
<td>Best practice teaching for ASD +</td>
</tr>
<tr>
<td>visual supports)</td>
<td>Sensory Activity Schedule (SAS)</td>
</tr>
</tbody>
</table>

• Teacher designed desk work tasks were rated including cutting, sticking, put in tasks, puzzles and matching.

• Sampling of class task performance was videotaped by school staff
Method

• Between 11 and 18 videos were rated using Perceive, Recall, Plan and Perform (PRPP) Stage One and Two Analysis for each student (Chapparo & Ranka, 2005)
• Videos were randomly ordered and scored by researchers
• For each student, Phase A (Baseline) and Phase B (Intervention) performances were compared.
• Students were not compared to each other.
### Intervention- Sensory Activity Schedule (SAS)

- Administered by teacher’s aide and teacher.
- Morning session - after morning circle, before desk work.
- Used classroom based equipment
- 10-15 mins

<table>
<thead>
<tr>
<th>Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bouncing on a therapy ball, tight lycra, deep touch pressure</td>
</tr>
<tr>
<td>Jumping on a mini-tramp, deep touch pressure</td>
</tr>
<tr>
<td>Squashing with a bean bag</td>
</tr>
<tr>
<td>Rolled over a therapy ball,</td>
</tr>
<tr>
<td>Jumping on a mini tramp and crashing into cushions, shoulder squeezing, tight lycra</td>
</tr>
</tbody>
</table>
Intervention- Sensory Activity Schedule (SAS)

Queensland DET Guidelines (QLD DET, 2011):

• Based on the ‘sensory diet’ (Wilbarger & Wilbarger, 1991)
• Activities are encouraged at specific times
• Enable occupational performance
• Terminology should be clarified
• Brushing (Deep Pressure Proprioceptive Technique) was not used (Wilbarger & Wilbarger, 1991)
• Participants were not targeted for sensory defensiveness
Perceive, Recall, Plan, Perform (PRPP)

- Two stage standardised criterion referenced assessment
- Stage One uses procedural task analysis to determine level of expected skill
- Stage Two uses cognitive task analysis and measures cognitive strategy application in the context of task performance

(Chapparo & Ranka, 2005)
Data Analysis- PRPP Stage One

- Outcome Measure- PRPP Stage One: Procedural task analysis for teacher designated desk work tasks in the classroom.
- Steps containing errors were recorded
- Percentage of error free performance was calculated

<table>
<thead>
<tr>
<th>PRPP Stage One Put in Task</th>
<th>Errors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sit down</td>
<td></td>
</tr>
<tr>
<td>Take plastic bottle</td>
<td></td>
</tr>
<tr>
<td>Take bottle cap</td>
<td></td>
</tr>
<tr>
<td>Place in bottle</td>
<td>X</td>
</tr>
<tr>
<td>Take bottle cap</td>
<td></td>
</tr>
<tr>
<td>Place in bottle</td>
<td></td>
</tr>
<tr>
<td>Put bottle in finish tray</td>
<td>X</td>
</tr>
</tbody>
</table>

**ERROR FREE- 5/7** 71.4%
Results: M Performance Mastery

Phase A - Baseline

Phase B - SAS Intervention

p = 0.038, p < 0.05

Two-band standard deviation method (Ottenbacher, 1986)
**B Performance Mastery**

![Graph showing task performances over time with phase A baseline and phase B SAS intervention.](graph.png)

\[ p=0.01, \ p<0.05 \]
L Performance Mastery

Phase A Baseline

Phase B SAS Intervention

p=0.502, p>0.05
C Performance Mastery

![Graph showing percentage scores for Phase A and Phase B task performances, with a p-value of p<0.001.](image-url)
## Results Summary PRPP Stage One

<table>
<thead>
<tr>
<th>Child</th>
<th>Stage One Task Mastery Result</th>
<th>Statistics*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Phase A (Baseline)</td>
<td>Phase B (Intervention)</td>
</tr>
<tr>
<td>M</td>
<td>69.5%</td>
<td>82.64%</td>
</tr>
<tr>
<td>B</td>
<td>86.67%</td>
<td>95.88%</td>
</tr>
<tr>
<td>L</td>
<td>81.32%</td>
<td>84.39%</td>
</tr>
<tr>
<td>C</td>
<td>85.2%</td>
<td>98.18%</td>
</tr>
</tbody>
</table>

*Two tailed, Independent Samples T test (confirmed by Mann Whitney U statistic)

** Significance at the 0.05 level, *** Significance at the 0.01 level
3 out of 4 showed improved task mastery following a classroom based SAS as measured by Stage One PRPP

Why was intervention effective for 3 out of 4 children?

A targeted opportunity to meet a child’s sensory needs contributed to better self regulation prior to completion of work tasks in the classroom.

L’s results were not significant - baseline not stable, trend lines showed improvements

L needed a longer baseline
Discussion

• Teachers can be trained to do the intervention
• Intervention designed with teachers
• Qualitative feedback from teachers confirmed statistical results

• PRPP is a suitable tool to use to measure task mastery in context
• Ecologically suitable- teacher set tasks
• Small pilot study, many limitations
• Real life research
Where to from here?

- Results support further research
- Randomised Control Trial (RCT)
- At least 50 children
- Sensory Activity Schedule intervention for least one school term (9 weeks)
- Quantitative and qualitative measures of task mastery and occupational performance in the classroom
- Aspect Elizabeth Hoyles Fellowship
References


References


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Participating students and families
Thank you

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