



AOTA Critically Appraised Papers Series

Evidence Exchange

**A product of the American Occupational Therapy Association's Evidence-Based Literature Review Project*

CRITICALLY APPRAISED PAPER

FOCUSED QUESTION

Does wearing a weighted vest improve in-seat behavior, task completion speed, and attention-to-task in learners diagnosed with attention deficit hyperactivity disorder?

Buckle, F., Franzsen, D., & Bester, J. (2011). The effect of the wearing of weighted vests on the sensory behaviour of learners diagnosed with attention deficit hyperactivity disorder within a school context. *South African Journal of Occupational Therapy*, 41(3), 36–42.

CLINICAL BOTTOM LINE:

This study is a significant contribution to current literature about attention deficit hyperactivity disorder (ADHD). Not only does this study use a strong design of randomized control trial, but it also uses standardized tools that are reliable and valid to analyze areas of in-seat behavior, task completion speed, and attention to task in children with ADHD while wearing a weighted vest.

Results of this study suggest those diagnosed with ADHD can improve their in-seat behavior attention-to-task, and task completion while wearing weighted vests in a school context. Significant improvement of in-seat behavior (Group B), task completion speed (Group A), and attention to task (Group A and B) was observed while participants wore weighted vests. Sensory sensitivity or underresponsiveness was improved by the proprioceptive and deep-pressure input provided by the weighted vest. A weighted vest is a convenient tool in the classroom. To achieve optimal results, the vest should be used as part of the sensory diet.

Limitations that may have had an impact on results are the “novelty” effect, the limited duration of intervention and Washout Period Phases, time of day the intervention was provided, and the study taking place over school holiday. Although these factors should be considered, results still point toward positive effects of using the weighted vest within a classroom setting. This research is a positive contribution to the existing literature further supporting the use of weighted vests to improve attention to task, in-seat behavior, and task completion speed.

RESEARCH OBJECTIVE(S)

List study objectives.

- Does wearing a weighted vest affect in-seat behavior in children with ADHD?

- Does wearing a weighted vest affect task completion in children with ADHD?
- Does wearing a weighted vest affect attention to task in children with ADHD?

DESIGN TYPE AND LEVEL OF EVIDENCE:

Level I
 Randomized control trial; longitudinal quantitative research design; cross-over treatment

Limitations (appropriateness of study design):

Was the study design type appropriate for the knowledge level about this topic? *Circle yes or no, and if no, explain.*

YES NO

Yes, the longitudinal cross-over study includes multiple participants and phases to observe weighted-vest effects in children with ADHD.

SAMPLE SELECTION

How were subjects selected to participate? Please describe.

The population included all students in the Foundation Phase, Grades 1–3, from a remedial school in Gauteng, who had been diagnosed with ADHD by a neurologist. 40 students met the criteria. Therefore, purposive sampling was utilized. A convenience sample was taken from this group of students who met the inclusion criteria. Simple random sampling was used to for group assignment in Group A or Group B. The technique was done separately for each grade and gender to obtain well-rounded, representative groups for comparison.

Inclusion Criteria

- Students at the Foundation Phase in Grades 1–3
- Had “definite” difference scores on a scale of typical, probable, and definite scores in School Factors 1 and 2 on the Sensory Profile, Definite difference scores indicate much less or much more sensory impairment than typical children for the particular school factor; 2 standard deviations above or below the mean
- Diagnosed with ADHD by a neurologist
- Stable with or without medication during the study.

Exclusion Criteria

- Students who did not attend the Foundation Phase
- Were not in Grades 1–3
- Did not have “definite” difference scores in School Factors 1 and 2 on the Sensory Profile; were not 2 standard deviations above or below the mean
- Not diagnosed with ADHD
- Children who were unstable on medication or who had switched medications.

SAMPLE CHARACTERISTICS

N = 30

% Dropouts 5/35 = 14.29%

#/ (%) Male n = 21, 70%

#/ (%) Female n = 9, 30%

Ethnicity NR

Disease/disability diagnosis ADHD

Check appropriate group:

<20/study group - Two groups of 15	✓	20–50/study group	51–100/study group	101–149/study group	150–200/study group
---	---	-------------------	--------------------	---------------------	---------------------

INTERVENTION(S) AND CONTROL GROUPS

Add groups if necessary.

Group 1 (Group A)

Brief Description	<p>1. PHASE I. Pretest: Data on in-seat behavior were collected 10 times by primary investigator. Data on task completion speed were collected 10 times by classroom teacher, and data on attention to task were collected 3 times by school counselors.</p> <p>2. PHASE 2. Intervention: Participants wore vests 10% of his or her body weight 10 minutes prior to observation time and also during the intervention phase of the study; the participants were then observed. The data collected previously were collected again.</p> <p>3. PHASE 3. Washout.</p> <p>4. PHASE 4. Becomes control group for comparison to Group B. Data collected previously were collected again, only without the participants wearing vest.</p> <p>5. PHASE 5. Remain control group during Group B washout. Data collected previously were taken again, only without the participants wearing vest.</p> <p>6. PHASE 6: Posttest. Data collected previously for both groups was collected again, with neither group wearing a vest.</p>
Setting	School
Who Delivered?	Teacher-administered vests and observations were collected via personal contact by teacher and via camera by counselors and researcher.
Frequency?	One class period (45 minutes)/day of which the child wore weighted vest 10 minutes prior to observation times.
Duration?	15 consecutive school days.

Group 2 (Group B)

Brief Description	<p>1. PHASE 1. Pretest. Data on in-seat behavior were collected 10 times by primary investigator, data on task completion speed were collected 10 times by classroom teacher, and data on attention to task were collected 3 times by school counselors.</p> <p>2. PHASE 2. Remains control group for comparison to Group A. Data collected previously was collected again.</p> <p>3. PHASE 3. Remains control group for comparison to Group A.</p> <p>4. PHASE 4. Intervention. Participants wore vests 10% of his or her body weight 10 minutes prior to observation time and also during the intervention phase of the study; the participants were then observed. The data collected previously was collected again.</p> <p>5. PHASE 5. Washout.</p> <p>6. PHASE 6. Posttest. Data collected previously for both groups were collected again, with neither group wearing a vest.</p>
Setting	School
Who Delivered?	Teacher administered the vests, and observations were collected via personal contact by teacher and via camera by counselors and researcher.
Frequency?	One class period (45 minutes)/day of which the child wore weighted vest 10 minutes prior to observation times.
Duration?	15 consecutive school days.

Intervention Biases: *Circle yes or no and explain if needed.*

Contamination

YES NO

Co-intervention

YES NO

Timing

YES NO

Yes, a 15-day timeframe and washout period may be too short, which could have an effect on results.

Site

YES NO

NO

Use of different therapists to provide intervention

YES/NO

Because the intervention took place in more than one classroom across different grade levels, various teachers administered the vests and activities to the children. Teachers, researchers, and counselors collected data.

MEASURES AND OUTCOMES

Complete for each relevant measure when answering the evidence-based question:

Name of measure, what outcome was measured, whether the measure is reliable and valid (as reported in article—yes/no/NR [not reported]), and how frequently the measure was used.

In-seat behavior: This was measured 10 times during each phase of the study via video cameras, which were installed in each classroom. The researchers reviewed the video tapes at the end of each to day and measured in-seat behavior according to length of time learners were able to stay seated in a 20-minute period. The researchers recorded time in minutes using a standard stopwatch. This method is standard, valid, and reliable due to tool used and instructions given.

Name of measure, what outcome was measured, whether the measure is reliable and valid (as reported in article—yes/no/NR [not reported]), and how frequently the measure was used.

Task completion speed: This was measured 10 times in each phase of the study. A teacher who was previously trained recorded task completion speed. The teacher used a standard stopwatch and recorded time in minutes. This method was standard, valid, and reliable due to tools and training.

Name of measure, what outcome was measured, whether the measure is reliable and valid (as reported in article—yes/no/NR [not reported]), and how frequently the measure was used.

Attention to task: Two school counselors assess the participants' attention-to-task 3 times during each phase using Conners' Continuous Performance Test II (CPT II). The CPT II is a computer assessment that gives accurate information using percentages; it is standardized in the United States and has satisfactory test-retest reliability and validity.

Measurement Biases

Were the evaluators blind to treatment status? *Circle yes or no, and if no, explain.*

YES/NO

Evaluators could not be blinded due to the participants wearing visible weighted vests.

Recall or memory bias. *Circle yes or no, and if yes, explain.*

YES/NO

RESULTS

List results of outcomes relevant to answering the focused question.

Include statistical significance where appropriate ($p < 0.05$).

Include effect size if reported.

In-seat behavior improved in Groups A and B, although it was only statistically significant ($p \leq 0.00$) in Phase 4 (Group B). Group A improved from 17.95 minutes to 18.52 minutes and Group B improved from 17.95 minutes to 18.76 minutes. No significant improvement occurred for Group A.

Task completion speed showed a significant improvement ($p \leq 0.00$) in Group A. The difference between the class average and Group A intervention was 2.26 minutes. No significant improvement for Group B occurred.

Attention to task was significant ($p \leq 0.00$) during both intervention phases (Groups A and B).

Was this study adequately powered (large enough to show a difference)? *Circle yes or no, and if no, explain.*

YES/NO A power analyses was not completed. However, because each group contained only 15 participants (total of 30) from the same school, the study was not adequately powered, and results may not be generalizable to the entire ADHD population.

Were appropriate analytic methods used? *Circle yes or no, and if no, explain.*

YES NO The data was analyzed using a two-way, repeated-measure of ANOVA. Using the mean data of each, Group A and B were compared. Significant levels of in-seat behavior, task completion speed, and attention to task were determined during each Phase. Finally, regression analysis was used to determine the difference between Group A and B.

Were statistics appropriately reported (in written or table format)? *Circle yes or no, and if no, explain.*

YES NO Statistics were included in a table.

CONCLUSIONS

State the authors' conclusions that are applicable to answering the evidence-based question.

Results of this study suggest children diagnosed with ADHD can improve their in-seat behavior, attention to task, and task completion while wearing weighted vests in a school context. Sensory sensitivity or underresponsiveness was improved by the proprioceptive and deep-pressure input provided by the weighted vest. A weighted vest is a convenient tool in the classroom. To achieve optimal results, the vest should be used as part of the sensory diet.

Although wearing the weighted vests did not provide significant results for Group A, the in-seat behavior mean increased, indicating a slight improvement after wearing the vest. This may be due to the novelty of the vest, which excited the children and may have affected performance. However, Group B was able to observe Group A intervention; therefore the “novelty effect” did not have an affect on Group B’s results.

Group B’s results indicated significance in areas of in-seat behavior and attention to task. The pretest indicated the Group B’s in-seat behavior was better than that of Group A. Group A started at a lower level than Group B and, therefore, presented more room for improvement than Group B, but their results did not improve significantly. Therefore, it is possible Group B had more potential in this specific factor than Group A.

Limitations that may have had an impact on results are the “novelty” effect, the limited duration of intervention and washout period phases, and the study taking place over school holiday. Although these factors should be considered, significant improvement of in-seat behavior (Group B), task completion speed (Group A), and attention to task (Group A and B) was observed while participants wore weighted vests. Therefore, this article is significant to the existing literature, further supporting the use of weighted vests to improve attention to task, in-seat behavior, and task completion speed.

This work is based on the evidence-based literature review completed by Morgan Moll, OTS, and Rebecca von der Heyde, PhD, OTR/L, CHT, Faculty Advisor, Maryville University, St. Louis, MO.

CAP Worksheet adapted from “Critical Review Form--Quantitative Studies.” Copyright © 1998, by M. Law, D. Stewart, N. Pollack, L. Letts, J. Bosch, & M. Westmorland, McMaster University. Used with permission.

For personal or educational use only. All other uses require permission from AOTA. Contact: www.copyright.com



Copyright © 2013 American Occupational Therapy Association, Inc. All rights reserved.
For personal or educational use only. All other uses require permission from AOTA.
Contact: copyright@aota.org