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A Critical Appraisal and Participatory Action Research Project on Effectiveness of Weighed Vests for
Early Elementary Children with ASD

May 2016

This evidence project, submitted by

Luna Blossom, OTS, Arielle Langworthy, OTS, & Sarah Steckel, OTS

has been approved and accepted
in partial fulfillment of the requirements for the degree of
Master of Science in Occupational Therapy from the University of Puget Sound.

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Key words: Weighted vest, Autism Spectrum Disorder, On-task behavior

Abstract

A Tacoma Public School clinician approached the University of Puget Sound with a research question regarding the effectiveness of weighted vests to increase on-task behaviors and decrease problem behaviors (such as self-injurious behaviors) of students ages 3-12 with ASD. A structured literature review produced eleven studies (six single subject experimental studies and five systematic reviews) published on or after 2005 and presented evidence ranging from no evidence of effectiveness, to inconclusive results, to some rare positive effect results with weighted vest usage related to increasing on-task and decreasing self-injurious behaviors within the target population. Of the six single subject experimental studies, four showed no evidence for weighted vest effectiveness for the target outcomes, and two showed mixed or inconclusive results. Of the five systematic reviews, two showed no effect, one reported inconclusive results, one showed positive (quantitative evidence) and no effect (three experimental studies) results and one showed no effect (four of seven studies), mixed results (one out of seven studies) and positive results (two out of seven studies) for increasing on-task and decreasing self-injurious behaviors in students. There were inconsistent responses to weighted vests across the participants in the studies. These results were confounded by nonstandard outcome measures, or a lack of common outcome measures across studies.

An in-service illuminating research results was provided for school-based OT practitioners. Fourteen attendees filled out surveys about their perceptions of the research and how it would affect their practice. Six out of fourteen respondents to the clinician survey indicated they believed that weighted vests are effective (at least in some cases), while ten suggested that they would consider continued use of weighted vests for children with ASD in the future. Six respondents said that they would share the evidence with teachers and/or families, while one respondent said that he/she/they would not. Six out of fourteen practitioners suggested that they would be more cautious about implementing weighted vest interventions, while four suggested that they might be more cautious. In instances when weighted vests are used, data collection is recommended to inform future prescription of this intervention.

Executive Summary

The first purpose of this project was to locate and synthesize evidence regarding the effectiveness of weighted vests to increase on-task behaviors of students 3-12 years old with ASD. The second purpose of this project was to translate this evidence to a public school OT department where weighted vests are often a common intervention used to increase on-task behavior for students with ASD (Davis et al., 2013). Mixed methods were undertaken in this project, including participatory action research, systematic review, and the collection and analysis of descriptive data from a qualitative study (a survey of school OT practitioners). Articles included in the literature review included students between the ages of three and twelve years old with ASD who were given weighted vests to increase on-task or decrease self-injurious behaviors. Participatory action research and descriptive study research participants included an experienced school-based clinician who approached the University of Puget Sound with the clinical question and a group of occupational therapy practitioners from her district who attended an in-service reviewing the research findings. After dissemination of the findings, those in attendance completed a survey. Methods to obtain data included a structured search of online databases, review of articles for adherence to inclusion/exclusion criteria, and a survey for practicing OT clinicians distributed at an in-service.

Analytical methods included synthesizing published research findings in order to create a CAT table on the topic. Experimental studies and systematic reviews published since 2005 showed minimal positive evidence to support weighted vest usage to increase the on-task behavior and decrease self-injurious behavior of school children with ASD. An in-service illuminating the research results was provided for school-based OT practitioners, who also were given the option of receiving informational pamphlets to distribute to teachers and parents. Analytical methods of this project also included descriptive analysis of qualitative survey results. Fourteen school-based OT practitioners filled out surveys about their perceptions of the research and how it would affect their practice after attending an in-service. The majority of respondents said that the research aligned with their experience, that they would change how they implemented weighted vests, and that they would share the evidence with teachers and/or

families. However, all respondents implied that they would continue implementing weighted vests in some capacity.

While research does not seem to support the use of weighted vests for increasing on-task or decreasing self-stimulatory behaviors of students with ASD, practicing clinician survey results revealed a theme that many practitioners have found vests to be effective in some cases and almost all practitioners suggested that they would continue to use vests in practice at times. Some practitioners suggested they may be more cautious about implementing weighted vest interventions, that they would continue to use vests for children with alternate diagnoses, or that they would use other weighted items such as lap pads. Limitations to published research findings included small sample sizes and failure to control for confounding factors. Weighted vest protocols differed across studies, and many articles did not adequately describe their protocol. Limitations to descriptive results include the fact that our survey was not piloted before use, and after receiving responses, authors reconsidered wording of some items and thought of other items that would have been helpful to include.

In conclusion, weighted vests show minimal evidence in increasing on-task and decreasing self-injurious behavior in students with ASD, supporting decreased reliance on their use. Presentation of the research findings persuaded a majority of school OT practitioners to be more cautious with their implementation, which is recommended. Collecting outcome data when using weighted vests with children with ASD to increase on-task or decrease self-injurious behavior is recommended to inform future practice.

CRITICALLY APPRAISED TOPIC PAPER: Weighted Vests – Is the Vest Best?

Focused Question:

How effective are weighted vests in increasing the on-task classroom behavior and decreasing self-injurious behavior of children between 3- and 12-years old with ASD/PDD/Asperger's?

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Date Review Completed:

3/7/16

Clinical Scenario:

A school-based occupational therapist is interested in the effects of weighted vests on classroom behavior of children with autism and related disorders. Areas of interest include on-task behavior and problem behavior (later specified to include self-injurious behavior, but not stereotypy).

Review Process**Procedures for the selection and appraisal of articles:**

Inclusion Criteria: Inclusion criteria include publication date 2005 or post-2005; participants are school-aged children with a diagnosis of ASD, PDD-NOS, or Asperger's; treatment researched involves weighted vests; published in a peer reviewed journal; and clear inclusion criteria for participants.

Exclusion Criteria:

No exclusion criteria related to low validity and reliability due to desire for completeness.

Search Strategy:

Categories	Key Search Terms
Patient/Client Population	ASD, Autism, Autism Spectrum Disorder, Asperger's, PDD, Pervasive Developmental Disorder

Intervention (Evaluation)	weighted vest(s)
Comparison	Comparison is no intervention (no search terms)
Outcomes	On-task behavior(s): on-task, on task, engagement, attention, participation, in-seat, learning, academic achievement/success/attainment, school, classroom

Quality Control/Peer Review Process:

Search Strategy:

We were most interested in evaluating the current evidence and, thus, included studies published on or after 2005. Our search strategy was refined through collaboration with the project leader and the project chair. Specifically, we followed the advice of our project chair to use the 3-12 yo age range instead of “school-aged” in order to include a significantly greater number of school related studies. Likewise, we followed the advice of our project leader (via email exchange with the project chair) to include systematic reviews that, although published on or after 2005, included studies published prior to the inclusion date of 2005 in order to make our project more robust.

We searched the databases listed in the table below using the following search terms: (weighted vest*) AND (autism OR autism spectrum disorder OR ASD OR pervasive developmental disorder OR PPD-NOS OR Asperger*) AND (on task OR on-task OR atten* OR learn* OR particip* OR engag* OR academic achiev* OR academic success* OR academic attainment* OR academic accomplish* OR disciplin*) AND (school* OR classroom*); results before 2005 were filtered out.

Selection criteria and rationale:

From our database search results, three coders independently examined the abstracts to determine inclusion or exclusion. Inclusion and exclusion criteria (described above in Review Process) were chosen to ensure that results appropriately answered our research question, and met our standards

of rigor.

Additional methods:

Collaboration with a colleague: [0 of 3 articles included]

After a meeting between the authors of this report and a University of Puget Sound Doctor of Occupational Therapy student, said colleague emailed links to three articles she deemed relevant.

One article was excluded because it was a systematic review of articles published prior to 2005 (Lang et al., 2012). Two others were already included from the Google Scholar search: the systematic review by Barton, Reichow, Shnitz, Smith, and Sherlock (2012), and the systematic review by Watling and Hauer (2015).

Manual reference searching: [1 of 2 articles included] Two articles were found by manual reference searching. The study by Quigley, Peterson, Frieder, and Peterson (2010) was included, while the study by Leew, Young, Baker, and Angley was excluded because the study participants were too young.

Total articles retrieved (n = 375)

Duplicates of selected articles (n = 59)

Off topic articles (including their duplicates) (n = 283)

Excluded articles (n = 22)

Incorrect diagnosis = 6 (ADHD, sensory integration dysfunction, or not specified).

Not peer reviewed = 6 book chapters discussing ASD or Sensory Integration Therapy (SIT)

Not published (dissertations) = 4

Study participants were too young = 2

Systematic reviews of articles prior to 2005 = 3

Outcome not relevant to research question (stereotypy) = 1

Included articles (n = 11)

Databases searched and date performed (using search terms on page four unless otherwise specified)	Hits	Met criteria	Duplicates of selected articles
EBSCOhost (searching CINAHL, ERIC, Academic Search Premier, PsychInfo, and MEDLINE), 10/21/15	61	6 of 30	31
JSTOR (search terms: “weighted vest*”), 10/22/2015	2	0 of 2	0
OT Search (search terms: “weighted vest*), 10/22/2015	7	0 of 6	1
Cochrane Library (search terms: “weighted vest*), 10/22/2015	1	N/A	1
PEDro, 10/22/2015	11	0 of 11	N/A
PubMed, 10/22/2015	2	N/A	2
Google Scholar, 10/23/2015	286	5 of 262	24

Databases and Sites Searched
CINAHL
ERIC
Academic Search Premier
PsychInfo
MEDLINE
PubMed
OTSearch
JSTOR
Cochrane
Allied Health Evidence
PEDro
GoogleScholar

Results of Search

Summary of Study Designs of Articles Selected for the CAT Table

Pyramid Side	Study Design/Methodology of Selected Articles	Number of Articles Selected
Experimental	<u>2</u> Systematic Reviews of Experimental Trials ___ Individual Blinded Randomized Controlled Trials ___ Controlled Clinical Trials <u>6</u> Single Subject Studies	8
Outcome	_ Systematic Reviews of Related Outcome Studies ___ Individual Quasi-Experimental Studies ___ Case-Control Studies ___ One Group Pre-Post Studies	0
Qualitative	___ Systematic Reviews of Related Qualitative Studies ___ Small Group Qualitative Studies ___ brief vs prolonged engagement with participants ___ triangulation of data (multiple sources) ___ interpretation (peer & member-checking) ___ a posteriori (exploratory) vs a priori (confirmatory) interpretive scheme ___ Qualitative Study on a Single Person	0

Pyramid Side	Study Design/Methodology of Selected Articles	Number of Articles Selected
Descriptive	___ Systematic Reviews of Related Descriptive Studies ___ Association, Correlational Studies ___ Multiple Case Studies (Series), Normative Studies ___ Individual Case Studies	0
Systematic Reviews with Multiple Study Designs	<u>1</u> Systematic Reviews with Experimental and Outcome Studies <u>1</u> Systematic Reviews with Experimental, Outcome and Descriptive Studies <u>1</u> Systematic Reviews with Experimental and Descriptive Studies	3
Comments:		<i>Total:11</i>

Table Summarizing the Quantitative Evidence:

<u>Author, Year</u>	Study Objectives	Study Design/ Level of Evidence	Participants: Sample Size, Description, Inclusion/Exclusion Criteria	Interventions & Outcome Measures	Summary of Results	Study Limitations
Carter, 2005	To examine the function of self-injurious behavior (SIB) demonstrated by the subject both in presence and in absence of sinus infection and to evaluate effect of weighted vest use on SIB.	Single subject functional analysis methodology Pyramid level: mainly D2 with some elements of E4 with the addition of weighted vest Pyramid Level: E4 AOTA level: IV	n=1: 4-year old, non-verbal, Asian boy with ASD (functioning at profound level of adaptive behaviors, based on Vineland Adaptive Behavior Scale) who attended a public preschool, demonstrated self-injurious behaviors, and experienced repeated sinus infections.	I = Participant wore a 3-lb Velvasoft™ vest (~7.5% of body weight) O = Direct observation of SIB	Weighted vest was not observed to affect occurrences of SIB in participant (sinus infection, increased SIB.)	Lack of definitive diagnosis of sinus infections, when present; wearing schedule of vest not discussed (no mention of frequency or duration of intervention)
Cox, Gast, Luscre, & Ayres, 2009	Evaluate effect of weighted vest use on in-seat behavior of 3 elementary school students with autism, intellectual	Single-subject alternating treatment design to compare 3 conditions' (no vest, weighted vest, and un-weighted vest)	n=3: a 5-year old ♀, a 6-year old ♂, and a 9-year old ♂ all with autism diagnoses and sensory processing abnormalities, and attending suburban public school in SW	I=weighted vest procedures: participant wore vest weighing 5% of body weight. Unweighted vest procedures: participant wore	No significant difference in percentage of in-seat behavior found between baseline/weighted vest usage/ unweighted vest	Participants assessed with different tools and diagnosed by different institutions; small sample size; difficulty quantifying target behavior, possible observer

<u>Author, Year</u>	Study Objectives	Study Design/ Level of Evidence	Participants: Sample Size, Description, Inclusion/Exclusion Criteria	Interventions & Outcome Measures	Summary of Results	Study Limitations
	disabilities, and sensory processing difficulties.	effects on percentage of time in-seat/on-task. Pyramid level E4 AOTA level: IV	USA. Inclusion/exclusion criteria not specifically listed.	vest with no weights O=10-min observation of in-seat behaviors in each condition using 10-sec interval recording	usage, suggesting the intervention may not have the calming effect on classroom students as has been previously speculated.	drift/bias; data only collected for first 10 min of vest usage; no functional analysis of behavior; duration/intensity not described.
Davis, Dacus, Strickland, Copeland, Chan, Blenden, & Christian, 2013	Examine long term effect of a weighted vest use and SIB for a young ♂ with ASD.	Single subject study; multi-element design w/ 5 conditions (attention, demand, tangible, play, and alone) embedded in ABAB design (A: vest, B: no vest). Pyramid level: E4 AOTA level: IV	n= 1, 9 yo ♂ w/ ASD; reportedly capable of one-step directions; communicates nonverbally w/ problem behavior. Inclusion criteria: weighted vest protocol in IEP, supported by OT.	I = 5 minute condition-based sessions reinforced by implementer. About five sessions per day, 2-3 days per week for 6 weeks. Baseline: vest not worn (all day). Intervention: vest w/ 5 lbs. of weights evenly distributed worn all day. O = Percentage of 10s intervals of biting (tip of tooth contacting w/ skin	SIB similar across phases: 1st A phase (M = 12.2%); 1st B phase (M = 20.4%); 2nd A phase (M = 29.8%); and, 2nd B phase (M = 19.0%). Undifferentiated biting across conditions except “alone” condition.	Small sample; recorders not blinded to condition; lack of setting in group instruction weakens external validity; potential ceiling effect from long term pre-exposure to weighted vests; details of implementers and data recorders missing; proportion of vest to body weight missing; exact placement of weights missing; and, measures

<u>Author, Year</u>	Study Objectives	Study Design/ Level of Evidence	Participants: Sample Size, Description, Inclusion/Exclusion Criteria	Interventions & Outcome Measures	Summary of Results	Study Limitations
				of self or other) recorded by unreported # of Ed. Psych. grad students		during “alone” condition skewed due to fewer biting targets.
Hodgetts, Evans, & Misiaszek, 2011 (<i>Research in Autism...</i>)	To investigate the effects of WV on on-task behavior for children with autism in a classroom setting.	Single-subject, randomized, blinded ABC design (phases: baseline, non-weighted vests, weighted vests). Pyramid level: E4 AOTA level: IV	n = 10; 8♂, 2 ♀, 3-10 yo, 7 had severe language delay, 7 were non-verbal, 3 had echolalia with limited or no functional language. 4 had severe cognitive delays, 3 with possible severe cognitive delays, the other 3 likely had significant cognitive delays. Inclusion criteria: ASD diagnosis, difficulty with attention to task and score of at least 2 standard deviations below the mean on the Short Sensory Profile.	I = 20 min/day with weights of 5-10% of body weight. WV had two weight pockets in front and back. Styrofoam balls were used during control to blind observers to condition. Each child had their own fitted vest. O = Video, blinded observers rated target behaviors, blinded teachers rated behavior with the Conners’ Global Index (CGI), unblinded aides provided subjective feedback.	Changes to off-task behavior were variable between phases and participants. WV use did not improve sitting behavior. CGI results did not correspond with video data. WV improved classroom behaviors some of the time. Teachers and aides liked WV.	Results are limited to targeted behaviors reported by clinicians and researchers, problematic behaviors limited to those identified by teachers and aides, homogeneous sample, phase lengths were based on available time at school.

<u>Author, Year</u>	Study Objectives	Study Design/ Level of Evidence	Participants: Sample Size, Description, Inclusion/Exclusion Criteria	Interventions & Outcome Measures	Summary of Results	Study Limitations
Quigley, Peterson, Frieder, & Peterson, 2011	Evaluate the effects of WV on problem behavior of children with PDD.	Single subject, multi-element, reversal design (no vest, unweighted vest, 5% WV, 10% WV, functional communication training (FCT), functional analysis (FA). Pyramid level: E4 AOTA level: IV	n = 3; 6yo with Asperger's and ADHD, 12yo with ASD and 4yo with ASD. All participants had previously received SIT. Inclusion criteria: between ages 3-18, PDD diagnosis and frequent problem behaviors.	I = At least 3, 4 min sessions of contingent tangible, contingent attention contingent escape conditions and free play. 2 participants wore cotton WV, 1 participant wore commercial vest. O = Video recording of activities were coded by blinded observers. Problem behaviors were recorded in 10 sec intervals. Functional Behavior Assessment (FBA) completed prior to study.	WV did not have an effect on problem behaviors, but operant-based FCT decreased problem behaviors.	Length of the FA, no assessment were performed after each phase, participants did not have SI related diagnoses, WV were not administered by a SI specialist, length of study, WV design and placement of weight.

<u>Author, Year</u>	Study Objectives	Study Design/ Level of Evidence	Participants: Sample Size, Description, Inclusion/Exclusion Criteria	Interventions & Outcome Measures	Summary of Results	Study Limitations
Reichow, Barton, Sewell, Good, & Wolery, 2010	Determine effectiveness of weighted vest in ↓ problem behavior, ↓ stereotyped behavior, and ↑ engagement for children with ASD or developmental delay.	Multiple (3) single subject study; start w/baseline (no vest) phase (only 2 of 3 participants), then randomly alternating (intervention and placebo); observer blinded. Pyramid level: E4 AOTA level: IV	n = 3, ♂ aged 4-5 yo. One w/ ASD, one w/ developmental delay, and one w/ ASD and neurodevelopmental abnormalities. Inclusion criteria: current use of vest determined by teacher's judgment to ↑ attention span or decrease challenging behaviors; dx of ASD or developmental delay; aged 2-6 yo; and participant in university affiliated early childhood center.	I = Typical preschool activities in classroom; 10-minute session each day for 13 days. Intervention w/ vest provided by OT (4 pockets front and back) w/ weights (5% body weight); placebo phase w/ foam imposter weights. O = stereotypic behavior (based on teacher report), problem behavior, and engagement coded by three authors.	Visual analysis: no difference for 5 yo w/ ASD in engagement, vest related to ↑ in problem behavior, and ↓ in stereotypic behavior w/vest; no systematic differences for other 2 participants. Social validity questionnaire: 23 graduate students (special education) reported w/ mixed results.	Small sample; no baseline for 5 yo w/ ASD; brief tx session (10 minutes) inconsistent w/ typical usage weakens external validity; exact placement of weights unclear; potential ceiling effect from long term pre-exposure to weighted vests; brief data collection; and, unrepresentative sample (inclusion criteria to have previous weighted vest intervention).

Table Summarizing the Meta-Analyses/Meta-Syntheses/Systematic Review Evidence:

<u>Author, Year</u>	Study Objectives	Study Design/ Level of Evidence	Number of Papers Included, Inclusion and Exclusion Criteria	Interventions & Outcome Measures	Summary of Results	Study Limitations
Barton, Reichow, Schnitz, Smith, & Sherlock, 2015	To evaluate the efficacy of sensory based treatment for children with disabilities.	13 RCTs (AOTA level I), 2 experimental and 15 single case research design (AOTA levels II or III). Pyramid Level E1,4 Overall: AOTA Level I	30 studies, n (all studies) = 856 Resources: 4 databases, 5 reference reviews, 2 control trial registries Inclusion criteria: experimental design, participants less than 9yo with behavioral or developmental disability, published in English by a peer reviewed journal. Exclusion criteria: not specified	Interventions: 18 SIT, 6 perceptual motor, 12 SIBS (WV, sensory diet, special seating, massage, and Snoezelen) Outcomes: 11 problem behaviors/attention, 10 sensory, 8 motor, 4 stereotypic behavior, 4 adaptive behavior, 4 academic skills, 4 generalization and maintenance of target behavior. Outcome measures: 14 standard assessments, 20 direct observation, questionnaires, and rating scales. Integration approach: not specified	Overall, the evidence for effectiveness of sensory treatments, including weighted vests, is inconclusive. Sensory interventions were found to be more likely to be ineffective than effective, but this tx should still be considered on a case-by-case basis.	For the purposes of our study most participants were 36-96 mo, 40% of dx in studies were not ASD or related dx, only 6 studies reported using weighted vests as intervention. Exclusion criteria did not include date of publication. Authors reported high probability of participant and personnel blinding bias and procedural fidelity bias and lack of fidelity, maintenance data, and standard outcome battery.

Case-Smith, Weaver, & Fristad, 2015	This critical literature review aimed to research the effect of SIT and SBIs on self-regulation and behavior in children with ASD and sensory processing problems.	Included RCTs (AOTA level I) and single-subject designs (AOTA level IV.) Pyramid Level: E1,4 Overall: AOTA level I	Included 19 studies published 2000-2012 (5 SIT, 14 SBIs). Searched 5 databases for key terms and hand-searched article reference sections. Inclusion criteria: peer reviewed, participants 3-21 years old with ASD diagnoses, SITs or SBIs were studied, interventions targeted self-regulation and/or arousal state.	Interventions: SIT and SBIS (therapy ball chairs, WV, swinging, pressure, brushing...) Outcomes: 11 published assessment tools, video-coding of stereotypic/self-stimulatory/self-injurious behaviors, direct observation of in-seat/on-task behaviors, cortisol levels, heart rate.	7 of 14 SBI studies included WV, which had no effect. Most SBI studies did not adhere to protocols or target sensory issues. If SBIs are used, clinicians should carefully match intervention to sensory needs.	Strict inclusion criteria led to a small number of studies included in review, mostly single-subject designs; small sample sizes; short-term interventions; no long-term follow-up to check retention of gains; most studies included non-blinded evaluation
Morrison, 2007	This literature review examined research available on weighted vest use to improve attention and sensory processing with children with ASD	3 experimental single-subject (AOTA level IV); 1 qualitative/descriptive (AOTA level IV); 1 CAT (AOTA level I) Pyramid Level: E4/D/Q Overall: AOTA level I	Included 5 research articles published 2001-2005. Searched 5 OT journals and 7 databases. Inclusion criteria: studies covered weighted vest interventions for children with ASD. Exclusion criteria: differential diagnoses, outcomes other	Weighted vest interventions. Outcomes included attention, stereotypical/deep-pressure seeking behaviors, and on-task/in-seat behaviors. Descriptive study was interview/survey of therapists' experience with and impressions of vest use. CAT examined use and effectiveness of vests.	Qualitative data from survey of occupational therapists reported WVs somewhat increase positive behavior such as attention to task. However, the 3 experimental studies showed limited evidence to support their efficacy when used with children with	Experimental studies: small, homogeneous samples, lack of control of confounding factors, lack of standardized protocol for vests, complex nature of ASD Descriptive study: small, non-representative sample CAT: unclear on types of research included. Overall: relatively

			than on-task behaviors or attention, studies not covering weighted vests.		ASD.	small number of articles reviewed.
Stephenson & Carter, 2006	This critical literature review aimed to explore the research evidence available on weighted vest use to increase on-task attention and decrease self-stimulatory behaviors of students with disabilities	Studies included were single-subject AB, ABA, ABAB, ABC, and alternating treatment designs (AOTA level IV) Pyramid Level: E1/D1 (see Carter, 2005) Overall: AOTA level I	Included 5 peer reviewed papers, 1 non-peer reviewed paper, and 1 poster presentation from 2001-2007. Searched 4 databases for key terms and manually searched reference lists. Inclusion criteria: presentation of empirical data on weighted vests to improve behavior of children with disabilities. Non-peer referenced included due small number of initial findings.	Weighted vest interventions (ranged from 5-10% of participant body weight, worn continuously for 5 min-2 hrs; worn during and prior to activities. Outcomes were extent of self-stimulatory or stereotypic behaviors, on-task/off-task behaviors, and problem behavior.	Authors of 4 studies concluded that weighted vests were ineffective, one author found mixed results, and remaining 2 authors found positive results. Weighted vests should not be recommended until further research justifies their use.	Weak research designs, problematic presentation of data, conditions not adequately controlled in some studies, questionable definitions of stereotyped behavior, inadequate inter-observer reliability, non-blinded observers, short observation periods, questionable match between participants and intervention, no consideration of effect of long-term vest usage.

Watling & Hauer, 2015	This critical literature review examined research on effectiveness of Ayres SI (ASI) and SBIs in OT in improving the ADL and occupational participation in individuals with ASD	AOTA levels I-IV (IV only included when no I-III evidence found.) Pyramid Level: E1/O1 Overall: AOTA level I	23 articles (4 ASI, 19 SBIs) published Jan. 2006-Apr. 2013. Searched 7 databases for key terms and hand searched reference sections of included articles and selected journals. Inclusion criteria: published in a peer-reviewed journal Exclusion criteria: not published in a peer-reviewed journal (materials from conferences/presentations, dissertations, theses.)	Interventions: ASI, single-sensory SBIs (weighted vests, dynamic seating, ...), multi-sensory SBIs, and modification of environment. Outcomes: 15 published assessment tools for higher-level studies and observation for lower-level studies (attending, challenging, in-seat/on-task/off-task behaviors, SBI, and stereotypy.)	Single-sensory SBI studies (including 7 weighted vest studies) showed little to no effect; authors suggest indiscriminate vest use not effective for kids with ASD.	Small number of ASI studies with small sample sizes and no follow-up evaluation. SBI studies low-level, non-replicable; participant need for SBI not determined, non-blinded parent reports, non-standardized outcome tools, limited description of participants, SBI may have reinforced target behaviors.
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Abbreviations:

AJOT	American Journal of Occupational Therapy
AOTA	American Occupational Therapy Association
ADL	activity of daily living
ASD	autism spectrum disorders
ASI	Ayres Sensory Integration
CAT	critically appraised topic

I	intervention(s)
O	outcome(s)
OT	occupational therapy
SBI	sensory-based intervention
SIT	sensory integration therapy
RCT	random control trial
WV	weighted vest(s)

Summary of Key Findings:

Summary of Experimental Studies:

Of the six single subject experimental studies published since 2005, four showed results indicating no effect for weighted vest usage and two showed mixed or inconclusive results evidence to support weighted vest usage to increase the on-task behavior and decrease self-injurious behavior of school-aged children with ASD. Many of the experimental studies included used small sample sizes and failed to control for possible confounding factors. Additionally, weighted vest protocols differed across studies, and many articles did not describe their protocol sufficiently.

Summary of Systematic Reviews:

Five systematic reviews were analyzed, including two of experimental studies and three of mixed design studies. Three systematic reviews (one of experimental studies and two of mixed design studies) provided some evidence to support the use of weighted vests as a sensory-based intervention for students with ASD in the classroom. Those three systematic reviews, published after 2005, included studies published prior to 2005. While most of the studies included in these three systematic reviews showed no effect for weighted vest usage related to the target outcomes, the experimental systematic review showed inconclusive results and the two mixed design systematic reviews included positive quantitative evidence and two experimental studies with positive results (Morrison, 2007 and Stephenson & Carter, 2009). Thus, compared to the more recent experimental studies discussed in the summary above, older research shows some positive results for weighted vest usage, while the more current research fails to do so.

Implications for Consumers:

The parents of children with ASD should not rely upon weighted vest interventions for increasing the on-task of behavior and decreasing self-injurious behavior of their children as current evidence does not support their efficacy. These parents should share this information with their IEP team if the topic arises so that more effective interventions may be pursued.

Implications for Practitioners:

As weighted vests are generally ineffective in increasing on-task behavior and decreasing problem behaviors (most commonly self-injurious behavior for children with ASD, practitioners should consider forgoing their implementation. If a particular child has had success with a weighted vest program in the past, close monitoring should be conducting to illuminate the factors that are contributing to the positive outcome.

Implications for Researchers:

While the current evidence is unfavorable for weighted vest interventions in the treatment of ASD, larger studies using randomization, sub-groupings by demographic or clinical factors, and control groups could determine more specific weighted vest protocols (e.g. fit of the vest, placement of weight, vest material). In addition, inclusion criteria for study participants (e.g. only using the vests for children with a specific type of sensory profile or need) may inform weighted vest recommendations. Linking specific inclusion criteria to successful outcomes could refine the weighted vest wearing protocol, which, too, may lead to informed recommendations. The potential long term benefits of weighted vest interventions should be examined in longitudinal studies. As our results were confounded by a lack of common outcome measures and data collection procedures as well as differing protocol across studies,

future studies may want to consider creating or replicating studies using more standard outcome measures.

Bottom Line for Occupational Therapy Practice/ Recommendations for Best Practice:

School based occupational therapists should share with team members and colleagues that weighted vests have been found to be generally ineffective at increasing on-task behavior and decreasing self-injurious behavior for children with ASD. Best practice entails refraining from their prescription and, if used, outcomes should be closely monitored. After reviewing the literatures it is felt that school based occupational therapists should search for more effective evidence based interventions, or continue using the evidence based interventions that they are already familiar with.

References

- Barton, E. E., Reichow, B., Schnitz, A., Smith, I. C., & Sherlock, D. (2015). A systematic review of sensory-based treatments for children with disabilities. *Research in Developmental Disabilities, 37*, 64-80. doi:10.1016/j.ridd.2014.11.006
- Carter, S. L. (2005). An empirical analysis of the effects of a possible sinus infection and weighted vest on functional analysis outcomes of self-injury exhibited by a child with autism. *Journal Of Early And Intensive Behavior Intervention, 2*, 252-258.
- Case-Smith, J., Weaver, L. L., & Fristad, M. A. (2015). A systematic review of sensory processing interventions for children with autism spectrum disorders. *Autism: The International Journal Of Research And Practice, 19*(2), 133-148.
- Cox, A. L., Gast, D. L., Luscre, D., & Ayres, K. M. (2009). The effects of weighted vests on appropriate in-seat behaviors of elementary-age students with autism and severe to profound intellectual disabilities. *Focus On Autism & Other Developmental Disabilities, 24*(1), 17-26.
- Davis, T. N., Dacus, S., Strickland, E., Copeland, D., Chan, J. M., Blenden, K., ... Christian, K. (2013). The effects of a weighted vest on aggressive and self-injurious behavior in a child with autism. *Developmental Neurorehabilitation, 16*, 210-215. doi:10.3109/17518423.2012.753955
- Hodgetts, S., Magill-Evans, J., & Misiaszek, J. (2011). Effects of Weighted Vests on Classroom Behavior for Children with Autism and Cognitive Impairments. *Research in Autism Spectrum Disorders, 5*(1), 495-505.
- Morrison, E. E. (2007). A review of research on the use of weighted vests with children on the autism spectrum. *Education, 127*, 323-327.
- Quigley, S. P., Peterson, L., Frieder, J. E., & Peterson, S. (2011). Effects of a weighted vest on problem behaviors during functional analyses in children with Pervasive Developmental Disorders. *Research In Autism Spectrum Disorders, 5*(1), 529-538.

Reichow, B., Barton, E. E., Sewell, J. N., Good, L., & Wolery, M. (2010). Effects of weighted vests on the engagement of children with developmental delays and autism. *Focus On Autism And Other Developmental Disabilities*, 25(1), 3-11.

Stephenson, J., & Carter, M. (2009). The use of weighted vests with children with autism spectrum disorders and other disabilities. *Journal of Autism and Developmental Disorders*, 39(1), 105-114.

Watling, R., & Hauer, S. (2015). Effectiveness of Ayres Sensory Integration® and sensory-based interventions for people with autism spectrum disorder: A systematic review. (2015). *American Journal of Occupational Therapy*, 69, 6905180030. doi:10.5014/ajot.2015.018051

Weighted Vest Research Involvement Plan

Discussion with our collaborator, Sue Folker, OTR/L, identified the need for knowledge translation to occupational therapists, parents and teachers in her school district, Tacoma Public Schools (TPS). Ms. Folker previously reported that in her experience weighted vests have been indiscriminately prescribed by teachers and occupational therapy practitioners in the TPS district. She also reported that in her professional opinion weighted vests were not an effective intervention for increasing on-task behaviors or decreasing self-injurious behavior, and yet they continue to be used in practice. The research results, which did not support the use of weighted vests, confirmed her perception, however those perceptions are not shared by other practitioners and teachers within her district. Therefore, Ms. Folker recognizes the value of sharing this information with other professionals and families in her school district.

Initial suggestions from Ms. Folker regarding knowledge translation to other TPS practitioners included an in-service given by the student researchers during their monthly meeting. Another knowledge translation activity our collaborator suggested was a fact sheet for teachers and parents. Further conversation included considerations such as timing, scheduling, and preferences. This narrowed the project to a presentation of the results by Sue at the waiver day on March 21st, which is a full-day education and training day for TPS, OTRs and COTAs. The presentation would include discussion among the practitioners and a follow-up survey distributed by our collaborator at the meeting.

Our recommendation to remove weighted vest interventions could affect the knowledge translation process in the TPS district in several ways. Our recommendation would add no cost to the TPS. In fact, TPS may save money by terminating future weighted vest purchases. A departmental factor that may facilitate the knowledge translation process is the fact that the district OTR's and COTA's convene monthly for professional development during their waiver day, as mentioned above. The meeting coordinators agreed to let Sue share the evidence we found by providing the OT practitioners with our fact sheet, and sharing a few copies of the entire CAT at the March meeting.

Finally, individual occupational therapists, teachers, and/or parents may hold strong pre-existing opinions regarding the effectiveness of weighted vests based on their own personal experiences or background knowledge. These opinions could either support or hinder the knowledge translation process. For example, Sue already had a suspicion that weighted vests were generally not effective as a long-term solution for increasing the on-task behaviors and decreasing the self-injurious behaviors of children with ASD in the classroom. On the other hand, others may have had experiences that suggest the contrary; these individuals may argue that the research in the CAT is of low quality/rigor, and therefore may not reflect the true potential of weighted vests as a classroom tool to increase desired classroom behaviors. These individuals may continue to use weighted vests if they feel they are effective for children, however, we hope to see if these therapists might be able to identify what is it about a particular child that seems to make the intervention effective for him/her/them. This information may point to a common factor between the children for whom weighted vests are effective, which could then be used to aid in deciding which children might benefit from weighted vest interventions in the future.

Knowledge Translation Activities

The next step of the process consisted of drafting up a survey and fact sheet to be used by our collaborator at the upcoming in-service. The work period allotted for the writing process, approximately 10 days, matched the authors' break period. Thus, an online word processor that allows real time editing by collaborators was used to draft each document. The project collaborator emailed suggestions for the survey, which were adapted for use by the authors. The clinician fact sheet was drafted by two of the authors, and reviewed by the third author. The parent/teacher fact sheet was completed one author, and reviewed by the other two authors. It became difficult to translate the information from the clinician fact sheet adequately to the parent/teacher fact sheet. In achieving the target reading level for the brochure (6th grade), some key points became less clear, such as the implications of research limitations. Those issues were not necessarily apparent to the authors before the deadline by which they needed to give these items to their collaborating clinician to be presented at the in-service.

The short deadline did not allow sufficient time for the documents to be reviewed. The time sensitivity of the in-service required that the documents be finalized before the project chair was able to provide feedback on them. The result was a survey with questions that were relevant, but which were not necessarily worded or formatted in the most effective way possible. The two fact sheets conveyed the main points from the CAT table in a compact package, but did not necessarily express the nuances of the research findings that had been summated through rigorous effort. These documents were appraised by the project chair after they had been distributed at the TPS in-service and her judgement was that they would have been improved with some minor edits. In hindsight, the authors should have made an effort to complete the documents five days sooner so that the project chair could have had time to review them.

The project collaborator conducted the in-service on the specified date. She presented a summary of the research findings to a room of TPS occupational therapists, along with the fact sheets. There was no count of the number of occupational therapists in attendance, but it was estimated to be between fifteen and twenty. As the authors were not able to attend due to other academic obligations, the collaborator provided a verbal report of the meeting. She reported that the previous speaker went drastically over time, leaving her only five minutes of her scheduled twenty minutes to give her presentation. That result was unfortunate for this research project. However, the authors had considered the possibility of no time being given to the collaborator for the presentation, so in that respect the outcome was acceptable.

Fourteen surveys were completed by the occupational therapists who attended the in-service. After their retrieval, they were sorted and analyzed by the authors. Upon initial review, it was determined that the in-service was a success. Regarding the practitioners' intent to change their implementation of weighted vests, seven said 'yes', four said 'maybe' or 'somewhat', and two said 'no' (See Table 1). Six respondents said that they would share the evidence with teachers and/or families, while one respondent said that he/she/they would not (See Table 1). Outcomes indicated that the rushed data sheets, surveys, and in-service ultimately found successes despite limitations. However, upon close analysis, some of the survey respondents may not have fully understood the full scope and implications of the research findings. Better written fact sheets, surveys, and a more in-depth in-service likely would have been more

effective in conveying the research findings, and, in turn, conveying the results to the authors of this study. Six out fourteen respondents to the clinician survey indicated that weighted vests are effective (at least in some cases), while ten suggested that they would consider using weighted vests for children with ASD in the future (See Table 1). Six out of fourteen practitioners suggest that they would be more cautious about implementing weighted vest interventions, while four suggested that they might be more cautious (See Table 1).

After an initial analysis of the surveys, a meeting was scheduled with the project chair at which discussion was had regarding the successes and failures of the knowledge translation process. It was confirmed that the surveys would have been more effective had their questions been piloted. Too many surveys did not provide objective data that could be processed with descriptive statistics. Thus, inferences had to be made in some cases and results based on survey responses had to be interpreted cautiously.

The qualitative information collected via the surveys provided important insights to inform future research and practice. Perhaps most significantly, all clinicians directly or indirectly responded that they would continue implementing weighted vests, despite any reservations they had regarding their effectiveness. Looking more closely, the completed surveys suggested that sensory based interventions are often thought to be child-specific, defying consensus appraisal. For example, one respondent said the research findings aligned with her experience “to some extent”, and that she only tried weighted vests with “specific kids.” Another respondent said that the research “partially” aligned with her experience, as “some students respond positively.” She followed with a statement that the research findings may change the way she uses weighted vests. Those comments represent the theme that sensory based interventions may be effective for specific children on a case-by-case basis. For the clinicians who had some positive clinical experience with weighted vests, the mostly research findings which failed to show effectiveness did not dissuade them from continuing with this intervention. For example, one responded that the research findings aligned with her experience that “they don’t work for all kids,” but that she would “probably not” change her decision to use them.

Reluctance to use and skepticism surrounding sensory based interventions was another theme that was found in the completed surveys. For one respondent, the research findings validated her “reluctance to utilize weighted vests.” Several respondents said that they would be more cautious with their prescription of weighted vests, or at least that they would share the research findings with staff and parents. Yet, despite this skepticism surrounding the effectiveness of weighted vests, all clinicians suggested that they would continue to use weighted vests for children, at least on a trial basis. That choice aligns with the perception that weighted vests may be effective for specific children, and therefore outcomes must be measured each time that they are used.

Tasks/Products and Target Dates

Tables of Tasks/Products and Target Dates:

Task/Product	Deadline Date	Steps w/ Dates to achieve the final outcome
Fact sheet	March 20 th	Draft to collaborator for feedback by 03/16/16
Survey	March 20 th	Draft to collaborator for feedback by 03/16/16

Post-In-Service Weighted Vest Research Survey for OT Clinicians

1. Do you feel the research findings on the use of weighted vests is aligned with your own experiences? Please explain.

2. Will these research findings change the way you are using weighted vests as an intervention for increased focus, attention, and behaviors?

3. If you plan to continue using weighted vest interventions, what type of children will you use vests for:

- Age of children: _____
- Diagnoses of children: _____
- Outcomes addressed (e.g.: self-injurious or aggressive behaviors, in-seat behavior, etc...): _____

4. Would you like to have a copy of the fact sheet to share with classroom staff or families? Please explain how you would use this or why you would not want to use this.

5. Overall, are you satisfied with this presentation experience? Why or why not?

Thank you for your feedback!

Brochure for OT Practitioners

University of Puget Sound

Occupational Therapy Program, March 21, 2014

Luna Blossom, OTS, Arielle Langworthy, OTS & Sarah Steckel, OTS

Is the Vest Best?

Research Overview

We researched the efficacy of weighted vests for increasing on-task and decreasing self-stimulatory classroom behaviors of children with ASD. We searched in 12 electronic databases and included articles published in peer-reviewed journals since 2005.



Quantitative Evidence

Six experimental studies showed little positive evidence to support weighted vest use to increase on-task behavior and decrease self-injurious behavior of school children with ASD. Most studies used small sample sizes and failed to control for confounding factors.

Systematic Reviews

Five systematic reviews found minimal evidence to support the use of weighted vest interventions for students with ASD. Some systematic reviews published post-2005 included studies published pre-2005, including studies with negative results, inconclusive results, and, rarely, positive results.

Implications for Practice

Parents, teachers, and occupational therapists of children with ASD should not rely upon weighted vest interventions to increase on-task behaviors and decrease self-injurious behaviors in the classroom, as current evidence does not support their efficacy. If used, outcomes of weighted vest interventions should be monitored and children who show positive outcomes should be observed to determine whether certain personal factors may be contributing to successful outcomes.

Brochure for Parents/Teachers

University of Puget Sound

Occupational Therapy Program, March 21, 2014
Luna Blossom, OTS, Arielle Langworthy, OTS & Sarah Steckel, OTS



Is the Vest Best?

Research Outline

We studied the use of weighted vests to help students with autism. We focused on how they helped students stay on-task at school. Also, we looked at how useful they are in reducing self-harm. We searched 12 catalogs and picked 11 studies published after 2005.

Experimental Studies

We looked at six experiments. They showed little proof in favor of weighted vests. The researchers decided that they did not help the children stay on-task or reduce self-harm. But, the experiments might not have been big enough. On average, they only included about 4 students. Also, the researchers did not study other possible causes for the students' behavior.

Research Summaries

We looked at five research summaries. Each one combined the work of many experiments. The authors decided that weighted vests did not help children with autism stay on-task or reduce self-harm. Some of the authors looked at experiments done before 2005. Some of the older experiments were in favor of the vests.

Our Conclusion

Parents and teachers should not count on weighted vests helping children with autism. The research showed that they did not help them stay on-task or reduce self-harm. Some parents and teachers might have positive experiences with weighted vests. If they choose to keep using them, we suggest that they keep track of those students. Different causes, like the type of vest, or the type of student, might make a difference. Also, the length of time might matter. The goal is to better understand why they are working or not working.

How Outcomes of Activities Were Monitored

Outcomes addressed with a survey distributed to district occupational therapists during a professional development meeting on March 21st:

- Comparison of clinicians' experiences with prescribing weighted vests in the classroom vs. the research findings, with data specific to the outcomes addressed by the clinicians.
- Clinicians' initial responses to the research findings, and their plans to continue or not continue prescribing weighted vests in the classroom.
- Clinicians' choices to distribute fact sheets to families and staff, with information regarding their choice.

A follow up interview was conducted with the collaborating clinician regarding the translation of evidence to practice. Questions in the interview were similar to those posed in the survey.

Evaluation of the Effectiveness of Knowledge Translation Tasks and Products

To evaluate the effectiveness of the knowledge translation tasks and products, the authors conducted a brief interview with the collaborator and reviewed the completed surveys. The scheduling issue that prevented the authors from attending the in-service detracted from the effectiveness of that particular knowledge translation task. Outcomes might have been more effective if the authors could have attended the in-service to present the research findings in a more thorough manner. Had this been the case, the authors could have answered specific questions regarding the research process that the collaborator may not have been aware of. One survey respondent mentioned that she wished that she had heard from us directly. Another respondent mentioned that the in-service generated a lot of questions. While the collaborating clinician is skilled and experienced, and took an active interest in the research findings, the authors may have been able to answer questions with greater nuance and detail. The density of the CAT table, with all the corresponding discussions and edits that were involved, resulted in an expert understanding on the part of the authors that could not be conveyed by our lesser involved, though perceptive, collaborator.

The brevity of the in-service was another issue that detracted from the quality of the knowledge translation process. That unfortunate aspect of the in-service may have been unavoidable. The collaborating clinician had emailed the organizers of the meeting seventeen days in advance. From the forwarded email discussion regarding that request, the in-service was a late addition to the meeting that the organizers were not sure they would be able to squeeze in. If the in-service had needed to be delayed to April, as was discussed as a possibility in that email discussion, the knowledge translation process would also have been negatively affected as the authors may not have had enough time to properly synthesize the completed surveys. In light of that fact, a five-minute long in-service was the best outcome that could have been achieved given the circumstances.

The brevity of the in-service was buttressed by the fact sheets. While other portions of the meeting were conducted, and during short breaks, the attendees could have looked over the fact sheets to arrive at a more comprehensive understanding of the research findings. Moreover, attendees who may have missed the short presentation by our collaborator could have picked up a fact sheet, thereby becoming informed in that manner. Three out of the thirteen attendees who responded to the question, “Overall, are you satisfied with this presentation experience? Why or why not?” stated their approval of the handouts, saying that they were “helpful,” “clear,” and “very good.” It appears that the quality of the handouts may have made up for the limited presentation time. On the other hand, some responses on the handouts brought up some questions as to their effectiveness. One respondent mentioned that she “[felt] like some research [was] missing,” and that she “[didn’t] think looking at six studies [was] enough to make final conclusions.” It is clear from her statements that the fact sheets were not successful at conveying the fact that the authors had analyzed six experimental studies in addition to five systematic reviews, which summarized many more studies. In the fact sheet, the Systematic Reviews section should have started with the phrase, “In addition,” in order to make it clear that those five systematic reviews were included alongside the six experimental reviews. Perhaps, if that had been the case, she may have considered our research findings to be more than a “great start,” and she might have been left with greater impression that the study was significant enough to change her decision about using weighted vests.

Overall, the in-service and the fact sheets were a success. Nine out of fourteen respondents stated on their surveys that they were satisfied with the presentation experience. Others said that it was “helpful,” “inspired lots of questions,” and was “interesting.” Six out of fourteen respondents stated on their surveys that they would share fact sheets with parents and staff. Others stated that they “might” share them. To the authors, that represents the ultimate knowledge translation success. The clinicians out in the field are equipped to spread the information culled from the dozens of studies reviewed by the authors. As they share the research findings with parents and staff, perhaps those individuals will, in turn, share the evidence themselves.

While the in-service and the fact sheets were a success, the survey was less so. As discussed with the project chair, the wording and format of the questions made the results difficult to quantify. On questions that were intended for a “yes” or “no” response, several respondents left comments that did not directly answer the question. Along those lines, the question that asked if clinicians planned to continue using weighted vests did not include a space to clearly indicate their intentions. Instead, respondents indicated the various situations and populations for which they would consider using weighted vests. While it can be inferred that these clinicians intend to continue using weighted vests, since each respondent wrote in some qualitative information on that item, their intentions are not entirely clear. The survey could have been more effective had it been piloted before being distributed at the in-service. However, despite the ambiguity of some items, the survey provided rich and detailed information.

Analysis of Overall Project

Overall, this project has been a valuable learning experience. It felt particularly meaningful during the CAT process of the assignment to be working with a collaborating clinician and knowing that our results would be of particular interest to her based on her OT experience in her practice setting. It was also exciting that we were able to share our results with other OT practitioners in her district, and incredibly interesting to hear their perception of our research. One thing that was difficult in writing our CAT paper was submitting it to both the project chair and the faculty coordinator. At times we received quite different--sometimes even contradictory--feedback from each of the experts reviewing our CAT,

each one making valid points based his or her own perspective. This made editing our paper difficult, as our work was being evaluated by both of these individuals. It may have been more helpful had we been assigned one definitive person who was guiding our process, or if we had a clearer picture of who had the final say (i.e.: whose feedback we should have been prioritizing) during each stage of our project.

Another thing that was difficult was that, in retrospect, it feels that we had a great deal of time to work on our CAT and very little time to work on and carry out the knowledge translation and involvement plan pieces. For example, had we had more time we might have been able to pilot our survey on one or two practicing clinicians and to subsequently add new items to the survey or rephrased existing items. For example, we realized it would have been useful if we had added a question asking about clinicians' length of experience in the school, or if we had provided yes and no options for clinicians to circle in response to yes/no questions--instead we left lines for clinicians to write on, and we ended up receiving answers that were somewhat ambiguous, making it difficult to categorize responses clearly.

Despite having a few difficulties in this project, it was a wonderful experience and our collaborating clinician was very accommodating and grateful for our work. It was nice to see that our research seemed to reinforce what she had experience in her practice. Based on the feedback we've received from her so far, and from some of the comments made by her peers on survey items, it might be interesting to see future projects look at the use of weighted vests for children with alternate diagnoses (e.g.: ADHD) or to look at the effectiveness of alternate sensory-based tools that therapists are using in schools, including weighted lap blankets and compression vests. Another interesting project, as many practitioners stated they would continue to use weighted vests, might be to develop an easy to use data-collection tool that OT practitioners, teachers, or paraprofessionals could use to determine whether weighted vests are effective when used, and if so, whether there is a certain type of child for whom they are effective. Beyond weighted vests and other sensory interventions, our collaborating clinician had many other areas of interest that she would likely be happy to see developed in the future, such as the use of psychosocial frames of reference or treatment methods by school-based occupational therapists.

Appendix

Table 1

Survey Results for Tacoma Public Schools In-service:

Survey Question	Yes	No	Maybe	N/A
Will these research findings change the way you are using weighted vests as an intervention for increased focus, attention, and behaviors?	7	2	4	1
Would you like to have a copy of the fact sheet to share with classroom staff or families?	6	1	0	7
Do you feel the research findings on the use of weighted vests is aligned with your own experiences?	6	2	3	3
Overall, are you satisfied with this presentation experience?	9	0	0	5

Table 2

Survey Results for Tacoma Public Schools In-Service: Weighted Vest Use for Diagnoses

Survey Question	ASD	ADHD	Developmental Delay	Sensory Processing
If you plan to continue using weighted vest interventions, what diagnoses of children will you use vests for?	11	6	4	6

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