



## Effects of a weighted vest on problem behaviors during functional analyses in children with Pervasive Developmental Disorders

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### ABSTRACT

Weighted vests are a specific form of Sensory Integration Therapy (SIT) (Honaker, 2005a) that are intended to help individuals resolve sensory related issues thereby decreasing the symptoms (e.g., hyperness, lack of attention, etc.) of the sensory issue and are also often recommended as an intervention for problem behaviors exhibited by children with Pervasive Developmental Disorders (PDD). The effects of 5% and 10% total body weight vests on problem behaviors in children with PDD were investigated during functional analysis conditions (Iwata, Dorsey, Slifer, Bauman, & Richman, 1982/1994). Though results indicated there was no functional relationship between the SIT of 5% or 10% weighted vests and participants' problem behaviors, a further analysis indicated there was a functional relationship between the problem behavior and the operant-based intervention of functional communication training. Thus, though the problem behaviors appeared to be unresponsive to SIT (i.e., weighted vests) these same problem behaviors could be altered with interventions that have been grounded in rigorous, empirical scientific research findings.

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Each spring at Idaho State University an interdisciplinary team (Interdisciplinary Evaluation Team—IET) evaluates a number of children with problem behaviors then meets with the child's parents and health providers to make recommendations as to interventions that may help with reducing/replacing the problem behaviors. In one such meeting the occupational therapists (OT) recommended the Sensory Integration Therapy (SIT) of a weighted vest to help reduce the problem behavior for a child with Pervasive Developmental Disorders (PDD). In discussion with this OT and based upon a review of survey data, OT's recommend weighted vests for management of problem behavior of children with autism 82% of the time (Olson & Moulton, 2004a). This lead us to question what effects this highly recommended intervention would have on problem behavior of children with PDD.

Ayres (1972a,b) proposed that learning disorders and behavior problems are a result of an assumed deficit in neural functioning and defined SIT as a means to address deviance in the development of the brain, neural functioning, and subsequent remedial therapies. Since that time, practitioners have implemented multiple SIT interventions (e.g., lights, vibrating toys, swings, weighted vests, etc.) in an attempt to reduce problematic behaviors and increase learning. Occupational therapists have become the main proponents of SIT.

Based upon survey research, Watling, Deitz, Kanny, and McLaughlin (1999) found that 96% of the responding OT's reported using SIT evaluation procedures frequently and 82% reported using SIT interventions frequently with individuals

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who have autism. The authors concluded that with such a high prevalence of OT's using SIT with individuals who have autism the efficacy of the approach should be studied.

In other survey research, [Case-Smith and Miller \(1999\)](#) provided data from 292 OT's using SIT interventions with children having PDD. The findings indicated that OT's who reported more confidence in SIT used it more frequently and had larger improvements in sensory deficit areas than in other rated areas. In addition, OT's focusing on child-centered play reported the use of SIT produced larger improvements in sensory deficits and play skills. Based on these findings, Case-Smith and Miller concluded that more scientific-based research was needed to explore the effects of SIT as an intervention for problem behaviors of children with PDD.

A specific form of SIT is a weighted vest. Weighted vests are intended to help reduce problem behaviors associated with dysfunction in the proprioceptive and tactile systems. The weight in the vest is intended to supply proprioceptive and tactile stimulation for the wearer of the vest. The intended effects of this type of stimulation are increased attention, work completion, and time on-task ([Fertel-Daly, Bedell, & Hinojosa, 2001](#); [Honaker, 2005a](#); [VandenBerg, 2001](#)), and a decrease in problem behaviors (e.g., SIB's) ([Carter, 2005](#)). So, if an individual is exhibiting problem behaviors, providing stimulation to the individual's central nervous system via a weighted vest can bring about changes. If a change in behavior is observed (i.e., desired behavior increases and/or undesired behavior decreases) it is thought to be a result of the individual's central nervous system processing sensory information better. However, this relationship is hypothetical and is difficult, if not impossible, to observe.

[Olson and Moulton \(2004a\)](#) reported survey findings regarding OT's usage of weighted vests. In a mail survey (68% response rate), 56.6% of OT's indicated they use a weighted vest. Of the OT's that reported using weighted vests, 82% of them reported using weighted vests for individuals with autism. Additionally, OT's reported greater effects across a variety of behaviors (e.g., increased on-task, increased eye contact, decreased rocking, etc.) as a result of using weighted vests. In a follow up phone survey, [Olson and Moulton \(2004b\)](#) reported that about 70% of the respondent OT's believed observed changes in behavior (whether an increase in desired skills such as eye contact or a decrease in undesired skills such as hitting) was partly due to the weighted vest.

## 1. Weighted vest research

[VandenBerg \(2001\)](#) used a pre/post-design to assess the effects of a 5% total body weight vest with four children with Attention Deficit Hyperactive Disorder (ADHD). Data presented by the author suggested that a weighted vest increased the duration of on-task behavior for the children. However, the experimental design limits readers to draw a definitive conclusion regarding the relationship of the independent variable and the dependent variable. The experimental design was a pre/post-design and the children performed varying tasks labeled as fine motor tasks (e.g., cutting, pasting, coloring, drawing, etc.) that could be differentially preferred by each child creating a confounding variable across tasks.

[Fertel-Daly et al. \(2001\)](#) used an ABA reversal design to study the effects of a weighted vest with children with PDD and attention deficits on duration of on-task behavior and distractions. Although the authors concluded that the use of a weighted vest "appeared to be beneficial for clinical use" (pg. 639), it was unclear whether or not the vest was truly responsible for the observed effects. Specifically, results of whether or not the weight the child wore during intervention was responsible for the effects on the dependent variables or if the child was experiencing some other form of physical fatigue due to the addition of the weight to the body remained unanswered. Also, the authors noted that data obtained after the weekend was different from that obtained throughout the week (i.e., data obtained at the beginning of the week was consistently higher for distractions and lower for time on-task) suggesting that other confounding variables were not ruled out.

[Honaker \(2005a,b\)](#) conducted a case study of using a weighted vest with a child to increase work completion (e.g., journal writing and work sheet completion) and to decrease the time spent playing inappropriately with classroom materials. Based upon the results of this 2-week pilot study, the author concluded that more proprioceptive activities might be beneficial in addition to the current weighted vest treatment. However, as mentioned with previous research ([Fertel-Daly et al., 2001](#); [Honaker, 2005a,b](#); [VandenBerg, 2001](#)), the experimental design in this study had major limitations that prevent consumers from developing definitive conclusions regarding the relationship of the independent variable and the dependent variable.

In a study using a more rigorous design, [Carter \(2005\)](#) assessed the effects of a weighted vest on self-injurious behaviors (SIB) for an individual with autism. The author evaluated the effects of the weighted vest using a reversal design embedded within a multi-element design. Effects of the vest were assessed in analogue conditions ([Iwata, Dorsey, Slifer, Bauman, & Richman, 1982/1994](#)) when the child exhibited symptoms of a sinus infection and when symptoms were not present. Carter reported higher incidences of SIB present when sinus infection symptoms were observed than when absent, and that the weighted vest did not affect occurrences of SIB. Results of this study indicated that the SIB was functionally related to an environmental variable (i.e., presence of symptoms thought to be a sinus infection) and not the weighted vest or other environmental variables associated with the analogue conditions (e.g., attention from the researcher).

[Stephenson and Carter \(2009\)](#) provided a summary of weighted vest research that included some of the above-mentioned articles but had additional articles and data sets not included here. Of the reviewed articles, the effects of weighted vests were mixed across the studies. However, the authors note the studies suggesting positive effects of the vest had experimental design limitations prohibiting definitive conclusions (as has been suggested by these authors with the current research review). Stephenson and Carter suggest that further research for weighted vests should include: (1) participant

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