

Using a Weighted or Pressure Vest  
For a Child with Autistic Spectrum Disorder

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## Abstract

The purpose of this study was to assess the effects of a weighted vest and a pressure vest on increasing attention and decreasing self-stimulatory behavior in a child diagnosed with Autism Spectrum Disorder (ASD). Weighted or pressure vests are a commonly used intervention practice by occupational therapist for children who exhibit self-stimulation behaviors and very little research substantiates the usefulness of this intervention. The research hypothesis was that the use of either a weighted vest or a pressure vest would increase attention to task, and decrease self-stimulatory behaviors in children with sensory seeking behavior. This single subject study utilized an alternating treatment design with a four-year-old boy attending school in a self-contained classroom. Results showed that neither the weighted vest, nor the pressure vest significantly increased the child's attention, nor were they effective in decreasing the child's self-stimulatory behaviors from the baseline condition. These results indicate that further research should be done to investigate the usefulness of using weighted vests as an intervention practice for children who exhibit self-stimulatory behaviors. Educators need to be aware of this intervention technique and the lack of research to support its effectiveness before allowing this to be used with a child in their classroom.

## Using a Weighted or Pressure Vest For a Child with Autistic Spectrum Disorder

Children who are diagnosed with Autism Spectrum Disorder (ASD) often demonstrate decreased attention to task as a result of persistent self-stimulatory behaviors. These self-stimulatory behaviors can be defined as any behavior which is non-purposeful and repetitive, and may include rocking, twirling, spinning, arm or hand flapping, tapping, and squinting (American Psychiatric Association, 2000). Self-stimulatory behaviors are believed to be a child's attempt to calm and modulate his or her arousal level during times of general over arousal (King & Grandin, 1990). Because self-stimulatory behaviors can greatly interfere with a child's ability to attend to a task, it is believed that a decrease in these behaviors would result in improved attention.

Attention is a state that reflects a person's receptivity to information (Ruff & Lawson, 1991). A person needs to be in an appropriate arousal state in order to have attention to a task. If a child is demonstrating numerous self-stimulatory behaviors s/he is showing that s/he is not in an appropriate arousal state and, therefore, attention is decreased. This state of over arousal can be caused by inefficient sensory processing (Yack, Aquilla, & Sutton, 2003). In order to increase a child's attention it is necessary to help that child achieve an appropriate arousal state.

Proprioceptive input can have powerful calming and organizing effects on the nervous system (Yack et al., 2003). It has been suggested that proprioceptive input in the form of deep pressure calms children by modulating their central nervous system processing of sensory information (Grandin, 1992; McClure & Holtz-Yotz, 1991). This calming and organizing of input helps to lower arousal levels in children to a more appropriate state, which is a standard of Sensory Integration Therapy (SI). In one case study, a reduction in stereotypic, self-stimulatory behaviors was observed after the application of a pressure garment to the child's trunk and arms

(Zissermann, 1992). Edelson, Edelson, Kerr, and Grandin (1999) reported that deep pressure in the form of Grandin's Hug Machine had an effect on attentional behaviors and reduced self-stimulatory behaviors in children with autism. Fertel-Daly, Bedell, and Hinojosa (2001) measured the effects of using a weighted vest with preschoolers diagnosed with PDD. In that study, four out of five children displayed a decrease in the duration of self-stimulatory behaviors while wearing the vest. All five children demonstrated an increase in focused attention while wearing the vest during a fine motor task. Joe (1998) also reported that children with developmental disabilities and autism demonstrated a decrease in self-stimulatory behaviors, became less distractible, and demonstrated increased attention to task while wearing weighted vests. Other researchers have voiced concerns over the use of SI therapy for young children with multiple disabilities (Din & Lodato, 2001).

It is common practice for occupational therapists to use weighted vests and pressure garments during the course of treatment for sensory processing disorders. Recent studies suggest the effectiveness of both of these measures (Fertel-Daly et al., 2001; VandenBerg, 2001; and Zissermann, 1991). No studies to date have compared the two conditions to determine which is more beneficial. The purpose of this case study was to examine the effects of using a weighted vest versus a pressure garment on a preschooler who has autism and other disabilities.

#### Method

*Subject and Setting.* The participant in this study was a four-year-old boy, Kyle, who had a diagnosis of Autism Spectrum Disorder. Additionally, Kyle has strabismus in both eyes. He exhibited self-stimulatory behaviors including mouthing of his hand or objects, jumping up and down, tapping either objects or himself. Kyle attended class in a self-contained setting for children with autism and other sensory processing impairments in a private school.

### *Materials*

*Weighted vest.* The weighted vest used in this study was the Bear Hug Vest™ with the addition of the Bear Hug Weighted Wrap™ by Southpaw Enterprises. The Bear Hug Weighted Wrap™ distributes ½ pound weights in 16 sections in the vest across the chest region. Using recommended practices in the field of occupational therapy and according to Kashman and Mora (2002) and VandenBerg (2001) the total amount of weight used in the vest was 3 pounds or @ 10% of his body weight (i.e. he weighed 32 pounds). The vest was worn for 30-minute increments every two hours over the entire school day. Kyle was assessed after having worn the vest for at least 15 minutes in one of the 30-minute increments.

*Pressure Vest.* The pressure vest used in this study was the Bear Hug Vest™ by Southpaw Enterprises. The pressure vest was used to apply pressure to Kyle's torso area and also had two straps that went over his shoulders. The vest applied pressure to this area of his body, the same areas that were affected by the weighted vest. The vest was worn for 30-minute increments every two hours over the entire school day. Kyle was assessed after having worn the vest for at least 15 minutes in one of the 30-minute increments.

### *Behavior Definitions*

Two dependent variables were identified for this study: attention to task and self-stimulatory behaviors. *Attention* was defined as either answering a question that is asked of him, participating in the academic activity with behavior that is appropriate to the context, and/or having his eyes oriented to the leader of the activity for at least 10 seconds of the 15-second interval. *Self-stimulatory behaviors* were broken down and defined in the following categories. Fingers breaking the plane of the mouth and being left in the mouth for more than two seconds (i.e., one thousand one, one thousand two) is the definition of mouthing. Tapping or hitting

objects is defined as using hands or objects to tap another object or to tap against himself for more than two seconds (i.e., one thousand one, one thousand two); repetitively jumping up and down more than once and is not appropriate to the context was the definition used for jumping.

*Baseline.* The goal of baseline data collection was to determine Kyle's current level of attention during circle time, as well as the self-stimulatory behaviors exhibited. Kyle was observed for in 15-second intervals over a ten minute period during morning circle time after having worn the vest for at least 15 of the 30 minutes. Circle time consisted of teacher led songs, and other activities to enhance skills development, such as calendar, counting activities, or shapes. The children in the classroom took turns selecting the next activity in circle time when offered choices by the teacher. Teachers were no instructions on their behavior other than to do whatever they would normally do during their circle time routine.

#### *Alternating Treatment Vest Intervention*

The intervention consisted of alternating treatments of wearing a weighted vest, a pressure vest and no vest during the morning circle time activity. Teachers were provided with a schedule of which days to put the weighted or pressure vest on Kyle, and which days to not put a vest on him. Kyle was given the vest (weighted or pressure) 15 minutes prior to the beginning of circle time and it was removed 15 minutes later (after data collection was completed). Teachers were given no other instructions about their behavior.

#### *Observation system*

Observers were trained through written instructions, practice, and feedback prior to beginning observations. All of the observational sessions were videotaped and a stopwatch was used to time intervals. Attention to task and self-stimulatory behaviors were recorded for a 10-minute period on a partial interval basis and non-occurrence was measured on a whole interval

basis (Cooper, 1987). An event was defined as an opportunity for the child to exhibit attention to task. An opportunity began when the academic activity begins and ends 15-seconds after the onset of the interval.

#### *Interobserver agreement*

Interobserver agreement was calculated for 20% of the sessions across both baseline and the alternating treatment intervention. For reliability purposes, the 10-minute sessions were divided into 40, 15-second intervals. The formula used to calculate inter-observer agreement for occurrence was number of agreements divided by number of agreements plus number of disagreements multiplied by 100%. Interobserver agreement for occurrences of attention was 83% (range, 73% to 93%). Interobserver agreement for nonoccurrence of self-stimulatory behavior was 86% (range, 73% to 94%) and inter-observer agreement for occurrences of self-stimulatory behaviors was 91% (range, 88% to 95%).

#### *Experimental Design*

An alternating treatment design (Alberto & Troutman, 1995) was used to measure the effects of the intervention, specifically, the use of a weighted vest vs. a pressure vest vs. no vest to increase attention and decrease self-stimulatory behaviors. This design was chosen because it is well suited for examining the effectiveness of more than one treatment on a behavior. The alternating treatment design does not establish a functional relationship between the interventions and any change in behavior, instead the design can identify if one treatment is more effective than another treatment (fractionation). A follow up design would have to be employed to establish a functional relationship if either intervention were found to be effective.

## Results

Figure 1 shows the percentage of observed intervals with self-stimulatory behaviors across baseline, and the alternating treatment vest intervention. Self-stimulatory behavior was during 70% of the observed intervals during the baseline condition. Self-stimulatory behavior remained unchanged when weighted vest intervention was applied (71%), as well as when the pressure vest was used (69%). Self-stimulatory behavior was observed 77% when no vest was used during the alternating treatment intervention.

Figure 2 shows the percentage of observed intervals with attention to task. Attention to task increased from an average of 32% during baseline to an average of 45% when the weighted vest intervention was used. When the pressure vest was introduced, attention to task increased to 50%. During the no vest condition, attention to task averaged 40%.

## Discussion

This study constitutes an effort to find an intervention for children with ASD, which will help to increase their attention to tasks and decrease their self-stimulatory behaviors. Neither the use of the weighted vest nor the pressure vest appeared to be beneficial for Kyle to decrease his self-stimulatory behavior. A very modest increase was observed in his attention to task when these vests were used. There are several reasons that may account for results of this study.

First, no formal protocol for the amount of weight used in vests was found to be uniformly accepted by Occupational Therapists. The amount of weight varies in published research from a minimum of one pound to a maximum of 15% of the child's body weight (Fertel-Daly et al., 2001; Kashman & Mora, 2002; and VandenBerg, 2001). This intervention used the formula of 10% of Kyle's weight, or 3 pounds. Other interventions have utilized other



formulas for determining the weight of the vest. The amount of weight used in this study may not have been sufficient to produce an effect.

Secondly, the time period for wearing the vest varies from study to study. Wearing times varies through the research and from recommended practices from a minimum of 20-30 minutes to a maximum of wearing the vest for two-hour periods (Fertel-Daly et al., 2001; Kashman & Mora, 2002; and Vandenberg, 2001). Kyle wore the weighted vest or the pressure vest for fifteen minutes prior to the observed activity. The amount of time he wore the vest may have been insufficient to produce an effect.

An additional factor was Kyle's visual problems (strabismus). This may have interfered with the data collector's ability to determine Kyle's attention by examining his eye gaze; although reliability was satisfactory (83%). Future studies focusing on children with visual problems should involve direct participation in hands-on activities, not a group activity, with verbal, as well as physical responses.

The results of this study should be interpreted with caution. Because only one participant was observed, these results should not be generalized. The use of weighted vests and pressure vests continued to be used as part of Sensory Integration (SI) therapy. This study adds to the inconsistent literature base, with some studies concluding that SI therapies did not produce improvements in attention and learning or reducing self-stimulatory behaviors (Hoehn & Baumeister, 1994; Vargas & Camilli, 1999).

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Figure 1. Percentage of observed intervals with self-stimulatory behavior.

Figure 2. Percentage of observed intervals with attention to task.



