

Review of the Literature

ATTENTION and SELF-REGULATION

Fertel-Daly, D., Bedell, G., & Hinojosa, J. (2001). **Effects of a weighted vest on attention to task and self-stimulatory behaviors in preschoolers with pervasive developmental disorders.** *American Journal of Occupational Therapy*, 55, 629–640.

Fertel-Daly, Bedell, and Hinojosa examined the effectiveness of a weighted vest for increasing attention to a fine motor task and decreasing self-stimulatory behaviors in 5 preschool children with pervasive developmental disorders. Observation of behaviors during fine motor activity included duration of a focused attention to task, number of distractions, and duration and type of self-stimulatory behaviors. Positive results were reported overall. **Test results show that the greatest impact was seen in a reduction in the number of distractions while wearing the vest.** There are numerous limitations inherent in the design of this study. For example, some behaviors did not return to baseline after the intervention.

Hall, C. W., & Kataria, S. (1992). **Effects of two treatment techniques on delay and vigilance tasks with attention deficit hyperactive disorder (ADHD) children.** *Journal of Psychology*, 126, 17–25.

These researchers designed a Level II study to test the effects of two treatments, behavior modification and cognitive training, on children when they were on and off medication. The study also sought parents' and children's views on the acceptability of the treatments. Eighteen boys and 3 girls participated. Their average age was 7.6 years. All were taking methylphenidate (Ritalin). The children were randomly assigned to one of three groups: behavior modification, cognitive training, or control. All performed two game-like tasks on a portable electronic unit called the Gordon Diagnostic System. One task, Delay, called for a child to delay his or her response for at least 6 seconds and thereby earn a reward. The other task, vigilance, called for the child to focus on a display of flashing numbers and press a button every time he or she saw one specific number followed by another specific number. Children in the behavior modification group received a nickel for every two correct responses on the two tasks. Children in the cognitive training group received training in how to approach the tasks. Children in the control group simply performed the tasks, without reinforcement and without training. The researchers were interested in the following outcome areas: *capability of sustained attention* (as measured by the number of correct responses on the vigilance task); *impulsivity* (as measured by an efficiency ratio computed from responses on the delay task and separately by the number of errors of commission on the vigilance task); and *perceptions of treatment acceptability* (as measured by the Intervention Profile—Parents Questionnaire, a modification of the Intervention Rating Profile–15). Assessors evaluated the children's performance on the Gordon Diagnostic System before the study began (using standard procedures), then twice more over the next 6–8 weeks. In the

second assessment, some of the children in each group were tested while they were on medication, the others while they were off medication (at least 24 hours). In the third assessment, the children previously tested while they were on medication were tested while they were off medication, and the other children were tested while they were on medication. **Results suggest that cognitive training combined with medication may reduce impulsivity in children with ADHD. When the cognitive training group was on medication, their impulsivity, as reflected by performance on the delay task, improved significantly.** On capability of sustained attention, there was a trend (a difference approaching but not reaching significance) toward better performance by the children in all three groups when they were on medication. On impulsivity, as reflected by performance on the vigilance task, there was a trend for children in the behavior modification group to perform better in the medication-alone condition than in the combined or intervention-alone conditions.

VandenBerg, N. L. (2001). **The use of a weighted vest to increase on-task behavior in children with attention difficulties.** *American Journal of Occupational Therapy, 55*, 621–628.

An examination of the effect of deep touch pressure using weighted vests on visual attention for fine motor activities in 4 children with ADHD was conducted. All 4 students demonstrated a significant increase in time on task during a fine motor activity while wearing the weighted vests compared to baseline without the vest. **The results suggest that using a weighted vest will increase on-task behavior in children with attention difficulties.**

Abikoff, H., Courtney, M. E., Szeibel, P. J., & Koplewicz, H. S. (1996). **The effects of auditory stimulation on the arithmetic performance of children with ADHD and nondisabled children.** *Journal of Learning Disabilities, 29*, 238–246.

This study aimed to evaluate the effects of external auditory stimulation on the academic performance of children with ADHD. The participants in the study were 40 boys in grades two through six, of whom 20 had ADHD and 20 did not. Their average age was 9.9 years. The experimental procedure took place over 2 days. On the first day, all the children took the Vocabulary subtest of the WISC–R, the Arithmetic subtest of the WRAT–R, and the Arithmetic Screening Test. Also on the first day, the children provided the titles of their favorite songs and the names of the artists who performed them. The researchers then prepared 10-minute audiotapes of each child’s favorite music. On the second day of the experimental procedure, all the children took three arithmetic exams at the grade level indicated by their performance the previous day on the Arithmetic Screening Test. The researchers administered the exams under three conditions: (1) 10 minutes of background music (the child’s favorite), (2) 10 minutes of background speech (a nightly business report on local television), and (3) 10 minutes of silence. They assigned the children with ADHD to one of six groups, each of which experienced a different sequence of the three conditions: music-speech-silence, music-silence-speech, speech-music-silence, speech-silence-music, silence-music-speech, silence-speech-music. Each child without ADHD was paired with a child with ADHD by grade and followed the same sequence as his partner. The outcome areas of interest were *number of problems attempted, number of correct answers, and accuracy.* **The**

researchers found Children with ADHD benefit in arithmetic performance from background music of their own choice. The children with ADHD had significantly more correct answers under the music condition than under the speech or silence condition. Further, the children with ADHD who experienced music as the first condition attempted significantly more problems and had significantly more correct answers than the children with ADHD who experienced music second or third. They also attempted significantly more problems than the children without ADHD who experienced music first or second, and they had significantly more correct answers than those children, regardless of sequence

Candler, C. (2003). **Sensory integration and therapeutic riding at summer camp: Occupational performance outcomes.** *Physical & Occupational Therapy in Pediatrics*, 23(3), 51–63.

Candler examined the effectiveness of a 1-week summer day camp on occupational performance in 12 children with sensory modulation disorder. The program included sensory integration therapy and therapeutic riding. For this program, the purpose of the riding experience was to teach riding skill for intrinsic enjoyment, posture, balance, and quality of life. **The results indicate that the majority (nine out of 10 families) that participated in post-intervention interviews reported an improvement in performance and/or satisfaction for at least one of their goals.**

Leemrijse, C., Meijer, O. G., Vermeer, A., Adèr, H. J., & Diemel, S. (2000). **The efficacy of Le Bon Départ and sensory integration.** *Clinical Rehabilitation*, 14(3), 147–259.

The effects of Le Bon Départ (LBD) treatment and sensory integration (SI) treatment on the motor performance of 6 children diagnosed with DCD (crossover design) was studied. LBD is a form of therapy in which music and rhythm play a prominent role. **Results demonstrated that during LBD and SI treatment, scores on all measures improved significantly.** However, when gains made during LBD were compared to gains made during SI, only scores on a rhythm measure showed a significant difference between interventions. The limitations of this study include its small sample size, lack of randomization, lack of a control group and heterogeneity of the diagnoses/problems.

Zentall, S. S., Falkenberg, S. D., & Smith, L. B. (1985). **Effects of color stimulation and information on the copying performance of attention-problem adolescents.** *Journal of Abnormal Child Psychology*, 13, 501–511.

This study investigated whether added stimulation would improve the performance of hyperactive adolescents on a copying task. The participants in their study were 32 boys junior and senior high school boys. All had taken a 20-minute story-copying test. Of the 32 selected, 16 had attention problems and poor handwriting (as indicated by scores of 6 or below on the Test of Written Language). The other 16 had low scores on the Conners scale. The task in all cases involved the boys copying word lists, city and state lists, and paragraph stories in two 17-page booklets, A and B. Some copies of each booklet were low stimulation, and some were high. Low-stimulation booklets contained black letters printed on white paper. Color was added to black letters to produce high-stimulation booklets (two colors per page, alternating by line). Half the

subjects also received added “information” in their high- and low-stimulation booklets. The outcome areas of interest to the researchers were *performance* (as measured by number of errors on the first page, the middle page, and the last page completed; and the number of pages completed); and *behavior* (as reflected in sliding movements of the buttocks and 45° torso movements forward or backward, both noted by observers). **Results showed that Adding color as a stimulant on a copying task improves the performance of adolescents with attention problems.** The adolescents with attention problems made **significantly** more errors on the first page with black letters than on the first page with color-added letters. They also made significantly more errors on the middle page with black letters than on the middle page with color-added letters. Those in the attention problem group who worked with color-added letters during the first session and black letters during the second session made significantly more errors than those in the attention problem group who worked with black letters during the first session and color-added letters during the second session. For both groups, color added to relevant detail resulted in significantly less movement than when black emphasis was added to relevant detail. The findings suggest that adding color to a copying task reduces errors among adolescents with attention problems.