

Hall, L., & Case-Smith, J. (2007). **The effect of sound-based intervention on children with sensory processing disorders and visual-motor delays.** *American Journal of Occupational Therapy, 61*, 209–215.

Hall and Case-Smith investigated the effectiveness of a sensory diet and therapeutic listening program on children with sensory processing disorders and visual-motor delays (Level III). A 4-week sensory diet program was followed by an 8-week therapeutic listening program in addition to the sensory diet. **Mixed results were obtained on the sensory profile, a measure of visual motor integration, and a measure of handwriting following a treatment of a sensory diet and therapeutic listening.** The authors reported that their results suggest that the therapeutic-listening program in combination with a sensory diet facilitated substantial improvement in children's behavior.

Miller, L. T., Polatajko, H. J., Missiuna, C., Mandich, A. D., & Macnab, J. J. (2001). **A pilot trial of a cognitive treatment for children with developmental coordination disorder.** *Human Movement Science, 20*, 183–210.

This team of researchers conducted a Level I study to evaluate the efficacy of a cognitive approach (Cognitive Orientation to Daily Occupational Performance [CO-OP]) as compared to current sensorimotor occupational therapy practices in improving the functioning of children with DCD. Both groups received 10 individualized 50-minute treatment sessions. CO-OP group participants were instructed in ways to use cognitive strategies to solve their motor problems. **The authors reported that while both groups, those using a cognitive approach and those using a sensorimotor approach, demonstrated improvement following intervention, gains made by the first group in their performance of problematic motor activities (e.g., handwriting, shoe tying, or skipping) were significantly larger.** Limitations in the study included significant differences in the two groups at the pretest on some measures, with the CO-OP group being more impaired. However, a co-variate analysis showed that this had no significant effect on the results.

Robin, A. L., Armel, S., & O'Leary, K. D. (1975). **The effects of self-instruction on writing deficiencies.** *Behavior Therapy, 6*, 178–187.

Robin and his colleagues designed a study to compare the effects of self-instruction and direct training on children's handwriting. The participants were 30 kindergarten children in a local elementary school. They represented the 15 lowest scorers from two classrooms on a handwriting test administered to all kindergartners. The children's teachers confirmed that these children had handwriting deficiencies. Seventeen were boys; 13 were girls. Their average age was 5.5 years. The researchers randomly assigned the children to one of three groups: self-instruction, which included feedback, reinforcement, and self-instruction training; direct training, which included

feedback and reinforcement; or control. Equal numbers from each class were assigned to each group. Experimenters worked individually with the children in the direct-training group about three times a week for 7 weeks (for a total of 20 sessions). During each session the children copied two training letters seven times each. As they worked, the experimenters gave them feedback on their responses and praise for the correct ones. Experimenters trained the self-instruction group in a five-step procedure for guiding themselves to copy the letters. The procedure involved, among other activities, the children talking aloud to themselves about what they had to do and how to do it. The children then copied letters as the direct-training children did, and received similar feedback and praise. While both intervention groups performed significantly better than the control group on the training letters, the self-instruction group performed significantly better than the direct-training group.

**The findings suggest that self-instruction plus direct training is more effective than direct training alone in improving children's handwriting deficiencies.**

Polatajko, H. J., Mandich, A. D., Miller, L. T., & Macnab, J. J. (2001). **Cognitive orientation to daily occupational performance (CO-OP): Part II—The evidence.** *Physical & Occupational Therapy in Pediatrics, 20*(2/3), 83–106.

Using audited existing data on CO-OP, its effectiveness was studied to determine whether the effects reported in earlier studies could be replicated in a clinic by different therapists working with different children (Level III). **The results of this review suggest that the effects of the CO-OP method on the children's performance of motor activities, documented since 1994, are replicable.**

Pless, M., & Carlsson, M. (2000). **Effects of motor skill intervention on developmental coordination disorder: A meta-analysis.** *Adapted Physical Activity Quarterly, 17*(4), 381–401.

A meta-analysis (Level I) was conducted to evaluate the effectiveness of interventions for children with DCD. Interventions reviewed were subdivided into a) general ability (e.g., facilitation of balance and other physical abilities, training of specific perceptual and motor tasks), b) sensory integration, and c) specific skills (e.g., combination of correctly performed practice of functional skills, appropriate repetition, sufficient guidance and time to facilitate skill retention and generalization). **The authors report that their results provide evidence supporting the use of specific skills approaches that are based on the contemporary understanding that specific motor control and motor learning underlies skilled movement.**

Søvik, N. (1981). **An experimental study of individualized learning/instruction in copying, tracking, and handwriting based on feedback principles.** *Perceptual and Motor Skills, 53*, 195–215.

This Level I randomized controlled trial tested whether third graders receiving feedback-oriented, individualized training in copying, tracing, and tracking would improve their performance of these skills more substantially than third graders not

receiving such training; (2) learn more about the relationships between copying, tracing, tracking, and handwriting; and (3) test whether third graders receiving feedback-oriented, individualized instruction in copying, tracing, and tracking would improve their skills in free handwriting more substantially than third graders not receiving such instruction. The participants were 36 third graders, all 9 years old. The teachers used individualized instruction in handwriting in the classroom with all 24 participants from the two experimental classes for 6 weeks. In addition, half of the participants, six boys and six girls, went to a laboratory once a week during the 6 weeks for 60 minutes at a time. There they received individualized training in copying, tracing, and tracking. The training focused on three psychomotor skills (“fluid” intelligence, “crystallized” intelligence, and visuo-motor ability) and was based on feedback principles. The 12 participants from the control classes received conventional instruction in handwriting for 6 weeks. The outcome areas of interest were *accuracy of copying, tracing, tracking, and handwriting* (as rated by three trained people) and speed of handwriting (as indicated by the number of letters written in 1 minute). All the participants were tested before and after the intervention in all these areas. The two experimental groups scored significantly higher than the control group in accuracy of copying, tracking, and writing. Further, the experimental group receiving laboratory instruction in addition to classroom instruction scored significantly higher than the experimental group receiving classroom instruction only. **The findings indicate that individualized training in copying and tracking may improve children’s skills in these areas and in handwriting.**

Swanson, H. L., & Sachse-Lee, C. (2000). **A meta-analysis of single-subject-design intervention research for students with LD.** *Journal of Learning Disabilities, 33*(2), 114–136.

A meta-analysis (Level I) was aimed at providing an overview of different interventions for students with learning disabilities. Interventions included in the analysis were direct instruction, strategy instruction, and combined approaches. **The results revealed that no significant main effects for the intervention model (i.e., every intervention produced positive effects).** Just the same, **the authors noted that sensory–motor interventions (more specifically related to handwriting) obtained the lowest effect size when compared to other approaches.**

Kavale, K., & Mattson, P. D. (1983). **One jumped off the balance beam: Meta-analysis of perceptual-motor training.** *Journal of Learning Disabilities, 16*(3), 165–173.

A meta-analysis (Level I) was conducted to assess the efficacy of sensory–motor training (no population mentioned). **The results suggest that sensory–motor training is not an effective pediatric intervention approach.** Limitations, as noted by Nolan (Nolan, J. E. (2004). Analysis of Kavale and Mattson's "Balance Beam" study (1983): Criteria for selection of articles. *Perceptual and Motor Skills, 99*, 63–82.) uncovered methodological flaws concerning study selection, completeness of data, and analysis value. These flaws bring uncertainty about their result. However, Nolan did not re-do the statistical calculations involved necessary for a meta-analysis; consequently, it is unknown at this time whether the results obtained by Kavale and Mattson would have

been different if a more rigorous methodology had been followed.