SCH #5

Systematic, individualized training in copying, tracing, and tracking may improve children's handwriting

Søvik, N. (1984). The effects of a remedial tracking program on writing performance of dysgraphic children. *Scandinavian Journal of Educational Research*, 28, 129–147.

Level: IIB2b

Nonrandomized controlled trial, 2 groups, fewer than 20 participants per condition, moderate internal validity, moderate external validity

Why research this topic?

Some children with no obvious perceptual-motor problems exhibit dysgraphy, or "problems in executing manual writing" (p. 130). Based on previous research with children who had no writing problems (as cited in Søvik, 1984), a feedback oriented, individualized training program in tracing and tracking is expected to improve handwriting skills in children with dysgraphy.

What did the researcher do?

Søvik (1984), of the University of Trondheim (Norway), hypothesized that "an experimental program of systematic and individualized training in tracing, tracking, and copying [would] improve substantially the quality (accuracy) and quantity (speed) of the writing performances of third-graders suffering from dysgraphic problems" (p. 132). He chose 12 third-grade boys from Trondheim, all 9 years old, to participate in a study. All had been identified by their teachers as having manual problems, and all had received low scores on a writing test. The researcher randomly assigned the boys to an experimental group or a **control group** (see *Glossary*).

The experimental group participated in general exercises and individualized exercises involving tracing, tracking, and copying. In the general exercises, the researcher presented a model figure, letter, word, or word group, and the boy traced it. The boy then had to track the researcher's drawing or writing of the model. Tracking involved copying model lines or letters by following the motions of a person drawing or writing them and making adjustments according to feedback from the person. Finally, the boy copied the model as accurately as he could. The researcher repeated the procedure three times for each model presented. The individualized exercises were similar in structure to the general ones but emphasized tracking. The equipment used provided sensory feedback to the boys on the accuracy of their efforts.

The researcher was interested in the following outcome areas: *accuracy of writing* (as rated by three trained people) and *speed of writing* (as indicated by the number of letters written in one minute). Assessments were made before the study began and after it ended, both as a group in the boys' classroom and individually in the laboratory. The assessments in the laboratory took place immediately after the study ended; the assessments in the classroom about 2 weeks later.

Both groups also were given a series of ability tests before the study began to collect data that would help the researcher diagnose the boys' problems and individualize the training accordingly.

What did the researcher find?

The experimental group scored **significantly** (see *Glossary*) higher than the control group on the tests of writing accuracy conducted in the laboratory. This improvement also was evident in post test scores collected in the participant's classroom 2 weeks after the intervention ended.

What do the findings mean?

For therapists and other providers, the findings suggest that systematic, individualized training in tracing, tracking, and copying improves the quality of writing among children with dysgraphy.

What are the study's limitations?

The study has several limitations. First, the sample size is small and may lack the power to detect true differences between intervention groups. Second, the researcher did not report whether the test administrators were **blind** (see *Glossary*) to the group assignments. If they were not, they may have unconsciously influenced the results. Third, it is unclear whether participants may have been involved in unrelated programs or activities that may have influenced the results.

Glossary

blinded/blinding—Blinding refers to the practice of keeping members of the research study unaware of which group a participant is assigned to (treatment or control) in the study. Single blinding usually refers to keeping study participants unaware of whether they are receiving the experimental or the sham treatment. Double blinding usually refers to keeping the participants and those who are administering the treatment unaware of who is receiving the experimental and who is receiving the sham treatments. In some cases, where it is impossible to blind those administering treatment, the individuals who are administering the outcome measures can be blinded to group status.

Studies in which blinding does not occur can have significant biases. When the participants know that they are receiving the experimental treatment, they often get better because they think they ought to (this is often referred to as the placebo effect). When researchers know that a participant is receiving the experimental treatment, they often subconsciously favor those participants when evaluating them on outcome measures. For instance, when timing a participant in the treatment group, researchers may unknowingly stop the watch a little faster or slower so the treatment participant seems to do better.

control group—A group that received special attention similar to that which the treatment group received, but did not receive the treatment.

significance (or significant)—A statistical term, this refers to the probability that the results obtained in the study are not due to chance, but to some other factor (such as the treatment of interest). A significant result is one that is likely to be generalizable to populations outside the study.

Significance should not be confused with clinical effect. A study can be statistically significant without having a very large clinical effect on the sample. For example, a study that examines the effect of a treatment on a client's ability to walk may report that the participants in the treatment group were able to walk significantly longer distances than the control. However, if you read the study you may find that the treatment group was able to walk, on average, 6 feet, while the control group was able to walk, on average, 5 feet. Although the outcome may be statistically significant, a clinician may not feel that a 1-foot increase will make his or her client functional.

Terminology used in this document is based on two systems of classification current at the time the evidence-based literature reviews were completed: <i>Uniform Terminology for Occupational Therapy Practice—Third Edition</i> (AOTA, 1994) and <i>International Classification of Functioning, Disability and Health (ICIDH-2)</i> (World Health Organization [WHO], 1999). More recently, the <i>Uniform</i>
Terminology document was replaced by Occupational Therapy Practice Framework: Domain and Process (AOTA, 2002), and modifications to ICIDH-2 were finalized in the International Classification of Functioning, Disability and Health (WHO, 2001).
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