



AOTA Evidence Briefs

School-Based Interventions

*A product of the American Occupational Therapy Association's
Evidence-Based Literature Review Project

SCH #1

Individualized training in copying and tracking may improve children's skills in these areas and in handwriting

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.

Level: IB1b

Randomized controlled trial, fewer than 20 participants per condition, high internal validity, moderate external validity

Why research this topic?

On the basis of his own research and that of others, Søvik (1981), of the University of Trondheim (Norway), hypothesized that feedback principles drawn from cybernetics would "explain a child's (and a teacher's) behavior in a learning situation and his interactions with various instructional variables in a reasonable way" (p. 196).

What did the researcher do?

The researcher designed a study to (1) test 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 researcher does not define or describe the terms "copying," "tracing," and "tracking." However, a complete description of the experimental program is available elsewhere (see Søvik, 1981 for reference).

The participants were 36 third graders from the town of Trondheim, all 9 years old. To recruit the participants, the researcher randomly chose four classes from all classes of third graders in the town (each with 23 to 29 children). He designated two of the four classes as experimental, the remaining two as control. He grouped the members of the classes by sex and handwriting skill (above or below average). He then randomly chose 18 boys and 18 girls, equal numbers of them representing the two levels of handwriting skill. Twelve of the boys and 12 of the girls were from the two experimental classes; the remaining six were from the control classes.

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.

What did the researcher find?

The two experimental groups scored **significantly** (see *Glossary*) higher than the **control group** (see *Glossary*) 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.

What do the findings mean?

For therapists and other providers, the findings suggest that individualized training in copying and tracking improves children's skills in these areas and that the training transfers to handwriting. More research is needed on whether individualized training in tracing has similar effects. However, the training in tracing also transfers to handwriting.

What are the study's limitations?

The study has three limitations. First, the researcher did not report whether the teachers or the test administrators were **blind** (see *Glossary*) to the group assignments. If they were not, they may have unconsciously influenced the results. Second, the researcher did not address whether the control or experimental groups were involved in additional activities or situations that may have influenced the results. Third, the researcher reports the individualized training program was not successful for all participants; however, he fails to clarify this important finding.

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: *Uniform Terminology for Occupational Therapy Practice—Third Edition* (AOTA, 1994) and *International Classification of Functioning, Disability and Health (ICIDH-2)* (World Health Organization [WHO], 1999). More recently, the *Uniform 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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For more information about the Evidence-Based Literature Review Project, contact the Practice Department at the American Occupational Therapy Association, 301-652-6611, x 2040.



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