Treatment Outcome for a Motor Symbol Sequencing Dysfunction Barbara A. Young, M.A. & Donald F. Burrill, Ph.D. Poster Session - 2000 APA Annual Convention, Washington D.C., August 7, 2000

ABSTRACT

This study investigated the relationship between a treatment program designed to train automatic written motor symbol sequences for a group of 12 learning disabled individuals having difficulty with the writing process and outcome measures on a test developed to measure the rate of learning a repeated sequence of symbols as an automatic motor pattern and standardized tests of writing and copying. Significant positive changes were found from pre- to post-treatment testing on all measures.

SUMMARY

Statement of Problem

Levine (1987) has described a specific learning disability involving difficulty in motor planning and in executing a motor symbol sequence in the written process. Luria's (1966, 1970, 1980) description of the characteristic breakdown of writing associated with damage to the premotor region appears similar to that described for this group of learning disabled individuals. If writing requires proficiency in executing motor symbol sequences, then a treatment program designed to train written motor symbol sequences would be expected to show effects on written performance as measured by standardized tests of writing and copying as well as on performance on a test designed to measure the rate of learning a written symbol sequence (Young & Burrill, 1997).
Subjects

The subjects were twelve right-handed individuals aged 15 to 24 years of average or above-average intelligence identified, through clinical symptoms and performance on a variety of tests, as having a learning disability involving the motor symbol sequencing aspect of writing.

Procedure

In a treatment program the subjects repeatedly copied a series of 6 to 8 characters from Greek, Korean and Chinese symbol sets until each pattern became automatic - that is, until the time required to write the symbol set had diminished to the point at which it stopped changing, as measured either graphically or arithmetically. Once it was established that the subjects were not performing the task any faster, they would learn a new symbol set. Length of treatment ranged from 9 to 19 months (mean, 10.8 months); students worked at the treatment exercise 4 to 8 hours per week (mean, 6 hours); and completed between 6 and 15 symbol sets (mean, 9.8 sets) during the treatment. Prior to and at the end of treatment the subjects were administered a test developed to measure the rate of learning a repeated sequence of symbols as an automatic pattern (Young & Burrill, 1997) as well as the following standardized tests: Differential Aptitude Test clerical speed and accuracy; Test of Written Language handwriting test; and Monroe Sherman Achievement Test textual copying.

The following tests were administered to control for possible general effects of treatment: a test of motor reaction time with each hand involving a double tap to start and stop a stopwatch; and a test of lexical memory which measured the number of single syllable nouns an individual could remember after one presentation.
Results

Initial data analysis of pre- and post-treatment testing shows that performance on the test of motor symbol sequencing improved over the course of treatment. This improvement paralleled improvements on the standardized tests of clerical speed and accuracy, handwriting, and copying text. These results are shown in Figures 1 through 3.

Fig. 1
Fig. 2
Fig. 3

On the three control measures, no significant change occurred over the three administrations for lexical memory and left-hand reaction time. There was a small improvement ($p < .1$) in the right-hand reaction time.

Discussion and Conclusions

At least for individuals identified as having certain specific difficulties with the writing process, the treatment program described in this paper appears to have improved subjects' performance on tests of learning a symbol sequence, clerical speed and accuracy, handwriting, and copying. Lexical memory and left-handed reaction time appear not to have been affected by the treatment; right-handed reaction time showed a small improvement, which may be a result of using the right hand to perform the treatment exercise.

References

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