LETTER-PREDICTION RESPONSES OF ADULTS WITH LATERALIZED CEREBRAL LESIONS

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INTRODUCTION

In 1963, the Social and Rehabilitation Service, Department of Health, Education, and Welfare funded research to develop and test the Language Retrieval Unit (Abnett, Black, Jancosek, and Johnson, 1966). This unit was designed to provide a method for automating a procedure which could be used for letter and word predicting. A teletype typewriter was modified with an external keyboard which activates the typing mechanism in the same manner as the regular keyboard. The subject sits before the typewriter with the external keyboard on the right or left side, depending upon his preference. Preprogrammed punched tape provides the signal for activating the typing mechanism. This predetermined program would cause the typewriter to print out the message, which alternately prints and stops as the program tape dictates. This method provides the subject with practice in predicting or guessing words or letters, as determined by programming. This study is an outgrowth of research using the Language Retrieval Unit.

Letter prediction, as it was used in this study, involved reading and/or predicting letters which had been deleted from words within paragraphs. The subject matter of the paragraphs was restricted to "Our Country and its Governmental Structure." The assumption was made that the process of selecting missing letters was, at least in part, some type of cognitive activity. This activity might be viewed as processing stored information for meaningful language usage. The success of predicting correct letters is influenced by the context of the paragraph. If accuracy of responses in letter-prediction tasks followed other than a chance course, it was assumed that cortical activity directed the selection procedure.

Previous research has indicated that patients' selection of letters was not random and their interest was sustained throughout the task (Black, Gubrina, Cinquini, Ancona, and Jancosek, 1965). One of the purposes of this investigation was to ascertain whether changes in language behavior would result from practice in letter predicting using paragraphs as stimulus material.

PROCEDURE

Three groups of adults--aphasic, non-aphasic, and normal--selected from the Domiciliary of the Veterans Administration Center, Dayton, Ohio predicted letters deleted from words within ten short paragraphs. The letters deleted were judged redundant based on predictions of groups of college students predicting the paragraphs letter by letter. The paragraphs were written at the fifth-grade reading level and included information about our country and its governmental structure. Each individual received 20 experiences by predicting the redundant letters from each of the ten paragraphs two times.

Each group was given the Porch Index of Communicative Ability (PICA) (Porch, 1967) before participating in the letter-prediction task, and the aphasic and right brain damaged groups were readministered the test after the task. The normal group obtained nearly perfect scores, making it unnecessary to repeat the test. The mean overall score for the aphasic group was 11.6, for the right brain damaged group 14.7, and for the normal group 15. Performance by the right brain damaged group indicated minor distortions on the graphic tests with essentially normal responses on other tests. Performance by the aphasic groups showed dysfunction in all communication areas--gestural, graphic, and verbal. The aphasic groups mean performance in the three modality scores was: gestural, 13.2; verbal, 12.4; and graphic, 9.3. These means were all above the 55th percentile relative to the PICA standardization group.

The typical patient in the aphasic group was 40 years old, had completed the tenth grade, and was suffering from the residual symptoms of a cerebral vascular accident, which had occurred 12 or more months before the initial examination. He was able to produce speech with reduced efficiency, and he had difficulty in naming objects and forming complete sentences.

RESULTS

Statistical treatment of the data indicated the subjects differed significantly in the number of errors made predicting letters between the first and second exposure to the paragraphs. The decrease in errors, suggesting improvement, occurred within all three groups. As might be expected, the order of success in letter prediction was: the normal group first, right brain damage group second, and the aphasic group last.

An analysis of variance for the 20 trials indicated that subjects continued to improve over successive exercises. Further, a significant difference in PICA score obtained before and after the letter-prediction tasks was noted.

The successive experiences of predicting letters in paragraphs resulted in a statistically significant ($p < .01$) reduction in the time required to complete the paragraphs. The 20 para-

graphs required a mean of ten hours for each subject in the aphasic group, five hours for the non-aphasic group, and three hours for the normal group.

Test-retest differences on the PICA were minimal for the right brain damaged group. Their retest PICA scores continued to reflect difficulty in the Graphic area only. Most of the errors were classified as distortion. The aphasic group, on the other hand, showed improved PICA scores in the Verbal, Graphic, and Gestural modalities following presentation of the 20 experiences of letter-prediction.

DISCUSSION

Several conclusions can be drawn based on the results of this study. First, letter-prediction exercises using paragraph material can be used as a successful treatment task with aphasic patients. Second, letter-prediction exercises using paragraph material produce performance which differs among groups of aphasics, right brain damaged, and normal adults. Third, improvement in Gestural, Verbal, and Graphic skills, as measured by the PICA, indicates a general change in aphasic patients not limited to specific skills. If the changes reflected only improvement of reading ability, one might not expect other skills to change. Similarly, if the change in percentage correct was due to a generalized improvement in spelling, one might find no change in Gestural or Verbal responses. Fourth, letter-prediction using paragraph material, provided aphasic adults with tasks which contributed to a change in overall communicative skills as measured by the PICA. No other therapy was given during the pre- and post-test interim.

The letter-prediction task can be viewed as a process of searching through a storage of information, extracting usable data from the storage, and processing the results to produce a meaningful response. This becomes a pursuit of correct responses utilizing our symbol system. As the percentage of correct responses increases, it is assumed that the pursuit has become more successful. Response improvement leads to some general improvement in utilizing the symbol system since Gestural, Verbal, and Graphic subtest scores increased for the aphasic group. The data supports Wepman's belief (1951) that sometimes the paragraph rather than the sentence is the best level for retraining, and the therapist should not insist on accuracy but stress and encourage any effort to express meaningful levels from material read.

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