Treatment of Intention in Aphasia: Neuroplastic Substrates

B. Crosson (VAMC; UF, Clinical & Health Psychology), M.L. Benjamin (UF, Clinical & Health Psychology), Z. Zlatar (UF, Clinical & Health Psychology), K.M. McGregor, (UF, Psychology), D.B. FitzGerald (VAMC; UF, Neurology), K.D. White (UF, Psychology)

Introduction

Adult animal brains adjust to damage by recruiting areas not previously used to perform an activity, primarily through engaging in the activity impaired by damage [1]. Thus, design of maximally effective rehabilitation for brain damage entails understanding neuroplastic responses to rehabilitation. A new intention treatment was developed to help patients with nonfluent aphasia improve word-finding skills. The treatment involves initiating word-finding trials with a complex left-hand movement and yields faster acquisition of word-finding skills than a comparable attention treatment for word finding [2]. The Brain Imaging, Rehabilitation, and Cognition laboratory is currently conducting a study to determine if the re-lateralization of word-finding produced by the treatment is due to the intention component (complex left-hand movement) or to some other component of treatment.

Experimental

Five subjects with chronic aphasia and word-finding difficulty due to unilateral left-hemisphere stroke have completed the treatment to date. Subjects received an fMRI scan of word-finding activity within one week before beginning treatment, within one week after completing treatment, and three months following the completion of treatment. During fMRI, subjects were given a single category (e.g., birds) and were required to provide one category member (e.g., eagle). Sixty categories were presented in six imaging runs, 10 categories per run. Functional (TR= 1700ms, TE=30ms, FA=70, voxel size=4.0 x 3.75 x 3.75 mm, slices=36, orientation=sagittal, no gap) and structural (TR= 8.1ms, TE=3.7ms, FA=8, voxel size=1 x 1 x 1 mm, slices=160, orientation=sagittal, no gap) images were acquired on the Philips 3 Tesla instrument at the Advanced Magnetic Resonance Imaging and Spectroscopy facility (AMRIS) at the McKnight Brain Institute (MBI) of the University of Florida. Data were analyzed with the 3dDeconvolution program of Analysis of Functional Neuroimages (AFNI) software from NIH and locally developed programs.

Results and Discussion

Data are currently being analyzed.

Conclusions

Given the small number of subjects entered into the study to date, no conclusions are possible at this time. The study will continue another two years.

Acknowledgements

Supported by grant # DC R01 007387 from the NIH and by Center of Excellence grant # F2182C and Research Career Scientist Award # B3470S from the Department of Veterans Affairs Rehabilitation Research and Development Service.

References