

Title: Environmental symbol recognition across neurologically damaged and non-damaged individuals: Building a case for the Environmental Symbol Recognition Test

Objective:

Extensive investigation of visual symbol recognition has been conducted using pictures, graphemes, words, gestures, pantomimes, and sign language to study symbolic processing in brain damaged adults. Patients with aphasia have been found to perform significantly poorer than neurologically normal subjects in all areas except symbolic recognition via iconographic symbols, while patients with TBI have been found to demonstrate cognitive slowing in the processing of visual stimuli. Aphasiologists have incorporated stimuli to assess environmental symbol recognition in measures of functional communication such as the Functional Communication Profile and the Communication Activities of Daily Living (CADL-Editions I and II).

The purpose of this study is to expand a pilot study investigating performance on an environmental symbol recognition test (ESRT). Data on ESRT performance now includes 82 neurologically damaged individuals. The ESRT is a 32 item measure that examines processing of common environmental symbols. After a training period, a test item is presented and the subject selects the associated meaning from group of 4 potential choices. For example, if shown a “Hospital” symbol (white H, on green background) the correct selection would be a picture of a doctor. Foils for that item include a police person, a BMW, and a bus. Further, in this study, to investigate potential correlations between the ESRT and various aspects of verbal and nonverbal language, a subset of neurologically impaired subjects with randomly matched controls were also administered the Aphasia Diagnostic Profiles (ADP).

Participants and Methods: Collected over 8 sites, a neurologically normal control group consisted of 41 subjects while the 82 neurologically impaired subjects included: 26 with TBI, 50 with aphasia, 5 with right hemisphere and 1 with brainstem CVA without aphasia. All subjects provided biographical information through a written or oral interview and all reported negative history of: learning disability, language disorder, drug or alcohol abuse, seizure disorder, or psychiatric illness. Additionally, 34 of the neurologically impaired group were also administered the Aphasia Diagnostic Profile (ADP) for comparison to the ESRT.

The ESRT provides a 6 item training section, then, shifts to a nonverbal assessment format which consists of 32 digital photographs of environmental iconic symbols such as trademarks, logos, environmental pictographs and road signs presented with 4 possible response choices including: target, semantically related foil, bizarrely related foil, and unrelated foil. For instance, a digital photograph of the Pepsi logo with the name removed is presented on the left page with response choices on the right page to include: a purse (unrelated), a glass of Pepsi (target), a plate of French Fries (bizarrely related) and a glass of milk (semantically related foil).

Results: The ESRT was found to be easily administered with high interater reliability, with over 85% of subjects completing the ESRT in approximately 15 minutes. Parametric and non-parametric measures used to analyze raw scores attained on the ESRT and ADP. These analyses revealed that neurologically impaired subjects performed statistically poorer than the neurologically normal group on the ESRT and that performance differed by etiology. Following overall testing, non parametric tests were used to compare performance of the neurologically impaired groups individually with the neurologically normal group. Significant differences existed for the Aphasia and TBI groups compared to the normal group. Additionally, of the 10 subtests on the ADP, raw scores in Phrase Length (Verbal), Auditory Comprehension, Naming, and Gestural Ability were found to statistically correlate with the ESRT score.

Conclusion: Preliminary studies suggest that the ESRT may be a valid, efficient measure for assessment of visual symbol processing in brain damaged adults who have suffered a LCVA or TBI. Although previous research suggests visual symbol impairment on patients with either LCVA or RCVA, the small 5 subject group with RCVA was not found to significantly differ from the neurologically normal group in this study. Therefore, future research may be needed to investigate subsets of the RCVA population in environmental symbol processing. Additionally, it is also suspected that this measure would be valuable in the assessment of other adult neurological cognitive impairments such as dementia and mental retardation.

Due to the exceptional ease of administration and the potential predictive value demonstrated thus far, it is suggested that this measure may be worthy of further comprehensive investigation across duration, severity, and neurological condition.

Discussion will include theoretical framework, methods of investigation, presentation of results (with graphic representations), and discussion of ongoing research.