QUALITATIVE ANALYSES OF VERBAL FLUENCY PERFORMANCE IN PERSONS WITH RIGHT HEMISPHERE DAMAGE

Introduction

In the context of ongoing debates on the arguable role of right hemisphere in lexico-semantic processing, we investigated the clustering, switching, and time-course of lexical retrieval in right hemisphere damage (PwRHD). "Clustering refers to the production of words within the semantic or phonemic subcategories and switching refers to the ability to shift between the clusters" (Troyer, Moscovitch, & Winocur, 1997, p. 140). Time course analysis permits variation in retrieval process with passage of time. Previously, Beausoleil, Fortin, Le Blanc, and Joanette (2003) investigated the time course of lexical retrieval in people with RHD and reported that their participants retrieved maximum words at the beginning of the trial, a pattern similar to that exhibited by people with left hemisphere damage and non-brain damaged groups of their study. However, the clustering and switching remain to be investigated in people with right hemisphere damage.

Methods

A group of 22 persons with CT/MRI-evidenced lesion in the right hemisphere cortical areas were selected to the clinical group. An equal number of age, gender, and literacy matched normal participants served as control group. All participants were required to retrieve as many names they could from eight semantic categories (animals, vegetable, birds, fruits, vehicle, clothes, furniture, & verbs (concrete actions words)) and three phoneme categories (*p*, *a*, & *s*) within 60 seconds. The audio-recorded responses were orthographically transcribed by three speech-language pathologists. A score of one (1) was provided to each accurate response and zero (0) to each inaccurate response. The transcribed data was analyzed for clusters, switches, and the time course of lexical retrieval. For the analysis of clusters and switches, the guidelines set forth by Troyer et al. (1997) were used. To analyze the time course of lexical retrieval, the 60 seconds response time was divided into four 15 seconds quarters and the number of accurate responses under each quarter was calculated.

Results

The between-group comparisons were performed using paired *t*-test. The RHD group obtained significantly lower accurate scores compared to the control group under semantic ($p < 0.001$) and phonemic ($p < 0.05$) conditions. However, the RHD group showed significantly small cluster size only in the semantic condition ($p < 0.05$), not in phonemic condition ($p > 0.05$). Further, the clinical and control groups did not differ in terms of the number of switches under both the tasks. The time course of lexical retrieval was compared between the two groups across four time quadrants using repeated measures ANOVA under the semantic and phonemic criteria. Under the semantic criterion, the comparison of scores showed a significant main effect for the groups (F (3, 126) = 469.99, $p < 0.001$) ($\eta^2 = .918$), but not for the interaction between the groups and time quadrants ($p > 0.5$). Similarly, the phonemic condition

showed a significant main effect only for the groups (F (3, 126) = 291.64, $p < 0.001$) (η^2 = .874), but not for the interaction between the groups and time quadrants ($p > 0.5$).

Discussion

The comparison of accurate scores contradicted the previous findings that persons with RHD perform poorly in the semantic, but not in the phonemic criterion (Joanette & Goulet, 1986). Impaired performance on phoneme fluency task, in turn, supported the findings from several other investigations (e.gs., Adamovich & Henderson, 1984; Albert & Sandson, 1986; Bolter, Long, & Wagner, 1983). Analysis of clusters revealed that clinical group showed significantly smaller mean cluster size compared to the control group. Considering the assumptions behind the clustering in verbal fluency tasks that it involves accessing and using a word store (Chertkow & Bub, 1990; Wixted & Rohrer, 1994), the reduced number of clusters in PwRHD could be taken as an evidence for their impaired access and retrieval of category exemplars from the semantic store. The results from analysis of switches revealed that the cognitive strategies of word retrieval did not differ between the two groups. Finally, the absence of interaction between the group and time quadrants in the time course of lexical retrieval reveals that, the two groups showed a similar pattern of word retrieval across the time quadrants. Thus, the present study showed that persons with RHD exhibited impaired word retrieval. Further, it showed that the impaired performance was not associated with any cognitive strategies employed in word retrieval process.

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