Reviewer's report

Title: Brain regions essential for improved lexical access in an aged aphasic patient: A case report

Version: Date: 20 April 2006

Reviewer: Bruce Crosson

Reviewer's report:

General
This paper presents fMRI data on a case of Wernicke's aphasia imaged both before and after Constraint-Induced Aphasia Therapy. Comparisons are made between correct response and error response trials. The most intriguing finding is the importance right inferior frontal cortex (Brodmann's areas 45, 47) on correct response as opposed to error trials, especially comparing post-treatment correct responses to pre-treatment error responses for the same items. This is a potentially important paper both because there are few functional imaging papers addressing changes induced by aphasia therapy and because it used a unique methodology, comparing correct-response to error trials. Nonetheless, there are several concerns that can be raised regarding the manuscript. These comments all fall into the category of major revisions.

-----------------------------------------------------------------------------------

Major Compulsory Revisions (that the author must respond to before a decision on publication can be reached)

1. The most ubiquitous activation for correct-response compared to error trials was right inferior frontal gyrus (Brodmann's areas 45, 47). Yet, when activity for correct responses was compared to baseline visual fixation, this area showed no activity. This pattern calls into question the stability of the correct-response vs. error comparisons. Thus, it should be addressed in the discussion. Is it possible that activity actually falls below baseline in this area during error trials, accentuating an otherwise non-significant increase in activity during correct response trials?

2. The most critical analysis (correct-response trials for post-treatment imaging where the items produced errors on pre-treatment imaging) was done on the basis of 10 items, which raises further concerns about stability. Can the authors provide evidence that an analysis based upon this small of a number of trials will provide stable results?

3. The area activated on correct-response trials as opposed to error trials includes right pars triangularis, the very area that Naeser sought to inactivate using rTMS. This point deserves some discussion. Could it be that differences in the current case (Wernicke's aphasia) vs. Naeser's cases (nonfluent aphasias) account for this discrepancy? There is some evidence that this region in the left hemisphere of normal subjects is more involved in semantic than phonological processes (Devlin et al., Journal of Cognitive Neuroscience, 2003). Could this have any bearing on why this area appears to be active in this particular patient?

4. Evidence suggests there is considerable variability in areas responsible for recovery of language function in aphasia. The authors should caution readers that findings from this case might not generalize widely. Replication would be needed to assess this issue.
5. The authors neglected to site a number of important studies on aphasia and neuroplasticity. Pulvermuller's original paper on Constraint-Induced Aphasia Therapy (Stroke, 2001) should be cited. Musso and colleagues' (Brain, 1999) paper supports the importance of the right hemisphere in aphasia therapy for patients with Wernicke's aphasia. Crosson and colleagues' (Journal of Cognitive Neuroscience, 2005) paper supports the importance of right frontal cortex in successful naming therapy. Cornelissen and colleagues' (Journal of Cognitive Neuroscience, 2003) and Belin and colleagues' (Neurology, 1996) papers present somewhat different viewpoints.

Major Essential Revisions (such as missing labels on figures, or the wrong use of a term, which the author can be trusted to correct)

Discretionary Revisions (which the author can choose to ignore)

What next?: Unable to decide on acceptance or rejection until the authors have responded to the major compulsory revisions

Level of interest: An exceptional article

Quality of written English: Acceptable

Statistical review: No

Declaration of competing interests:

I declare that I have no competing interests.