

## Letter to the Editor

---

# The effects of strategy training on acquisition of new verbal information in patients with acquired brain lesions

Eliane Correa Miotto\* and Manoel Jacobsen Teixeira

*Department of Neurology, Hospital das Clinicas, University of Sao Paulo Medical School, Sao Paulo, Brazil*

Dear Sir,

We read with great interest the recent paper published by Aragon et al. [1] in *NeuroRehabilitation*. In their study, participants were required to remember the last word of a series of sentences with target words presented in a self-generated or provided condition. The authors demonstrated that self-generation techniques aimed at improving learning and memory benefitted patients with traumatic brain injury and healthy subjects in terms of number of words recalled. They also suggested that further research into the effects of rehabilitation programs designed to improve memory including such techniques was warranted. We have recently demonstrated evidence of this hypothesis in patients with acquired brain injury [2]. The brain correlates of strategy memory training were investigated using functional magnetic resonance imaging (fMRI) and neuropsychological tests. Patients with acquired brain lesions in the prefrontal cortex including the dorsolateral and bilateral orbitofrontal cortex were evaluated before and after semantic strategy training using a word list-encoding paradigm. The strategy training consisted of generating and remembering words according to their common features or categories. After training, subjects were instructed to remember and

generate spontaneously words according to their categories during the presentation of a series of new word lists in a related way as Aragon et al.'s self-generation words paradigm according to their adequacy for each sentence. Results showed a significant improvement in memory recall after training. The improvement was more evident in a condition that allowed subjects to group words according to their categories as opposed to a condition where no such category generation was possible. Greater activity in left inferior and medial frontal gyrus, precentral gyrus and insula was found after training in patients with predominantly left dorsolateral prefrontal lesions. Higher activation was found in the left parietal cortex, right cingulate, and precuneus after training in patients with predominantly bilateral orbitofrontal cortex lesions. The activation of these specific areas within the memory and executive networks was associated with compensatory brain mechanisms [3]. These findings corroborate and expand on Aragon et al.'s results [1] of memory improvement and benefit from verbal learning strategies in patients with acquired brain lesion. They also indicate that these techniques can be applied to cognitive rehabilitation of memory not only in Anglo or Hispanic samples but also in Latin America and Portuguese speakers in the US and other countries.

---

\*Corresponding author: Eliane Correa Miotto, Av Dr Eneas de Carvalho Aguiar 255, CEP 05403-900, São Paulo – SP, Brazil. E-mail: ecmiotto@usp.br.

### Conflicts of interest

None.

**References**

- [1] C.J.R. Aragon, J.C. Arango-Lasprilla and M.P. Bartolome, The effect of cognitive impairment on self-generation in Hispanics with TBI *NeuroRehabilitation* 30 (2012), 55-64.
- [2] E.C. Miotto, C.R. Savage and J.J. Evans, Semantic strategy training increases memory performance and brain activity in patients with prefrontal cortex lesions. *Clin Neurol Neurosurg*, (2012) <http://dx.doi.org/10.1016/j.clineuro.2012.05.024>.
- [3] G. Berlucchi Brain plasticity and cognitive neurorehabilitation. *Neuropsychological Rehabilitation: An International Journal* 21 (2011), 560-578.