Transfer of Nonverbal Learning Between the Two Cerebral Hemispheres

Jasmin Ashkpoor, Yuan Hang Li, and Eran Zaidel
Department of Psychology, University of California at Los Angeles
Contact: jasminashkpoor@ucla.edu

2008 Psychology Undergraduate Research Conference

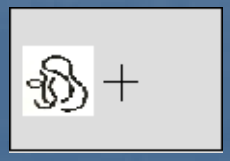
Introduction

- The Continuous Visual Memory Test (CVMT) (Trahan & Larrabee, 1988) measures learning and memory of spatial patterns.
- We adapted the CVMT to lateralized presentations in order to study learning within each hemisphere and transfer of learning between the hemispheres.
- We hypothesize that the Right Hemisphere (RH) is superior to the Left Hemisphere (LH) in learning the spatial patterns (Milner, B. & Taylor, L. (1972); Kelley, W.M. et al., 1998).
- We hypothesize that there will be an asymmetric transfer of learning, better from the RH to LH than vise versa, if and only if there is hemispheric specialization with the RH superior to the LH.

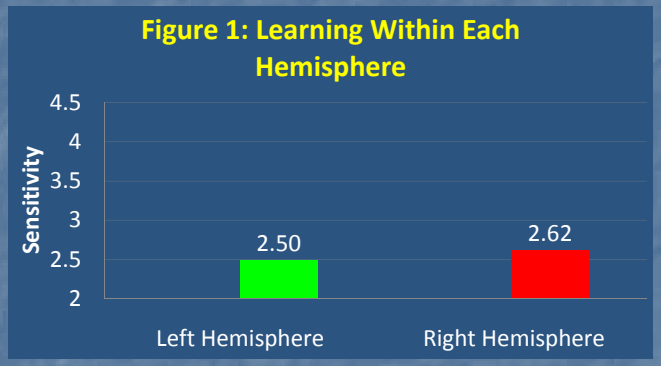
Method

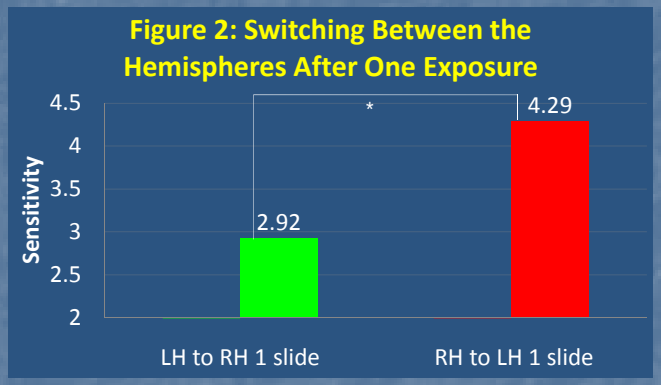
- Participants: 20 right handed undergraduate students from the University of California, Los Angeles (15 female).
- Materials: Stimuli taken from the CVMT were presented tachistoscopically (300ms) to the left or right visual hemifield.
- Task: Subjects classified each stimulus as 'old' or 'new' using right hand two choice button presses.
- Procedure: Trials consisted of 'old' or 'new' patterns; seven 'old' patterns recurred six times each. Patterns recurred either exclusively in the LVF, or exclusively in the RVF, or first in the LVF then in the RVF, and vise versa. Patterns "switched visual fields" either after one exposure or after two exposures.

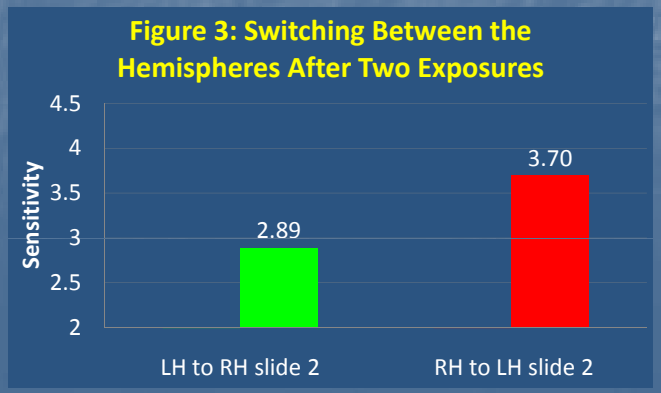
Task: Is the image shown New or Old?



Sample Stimuli :







Results

- There were no differences between the two hemispheres in learning spatial patterns ($p > 0.05$) (Figure 1)
- However, there was a significant advantage for the transfer of learning from the RH to the LH after one exposure ($p = 0.009$) (Figure 2), and there was a near significant advantage after two exposures ($p = 0.057$) (Figure 3).

Discussion

- Although there were no significant hemispheric differences in learning the patterns, there was an asymmetry in the transfer of learning.
- Better transfer of learning from the RH to the LH may reflect (1) a 'more robust' representation of the learned material in the RH, or (2) transfer of learning through an asymmetric callosal channel, stronger from RH to LH than vise versa.

Conclusion

- RH learning was not superior to LH learning, but transfer of learning was better from the RH to the LH than vise versa.
- Hemispheric specialization may be independent of asymmetries of interhemispheric transfer.

References

- Kelley, W.M. , et al. (1998). Hemispheric specialization in human dorsal frontal cortex and medial temporal lobe for verbal and nonverbal memory encoding. *Neuron*, Vol. 20, 927-936.
- Milner, B. & Taylor, L. (1972). Right-hemisphere superiority in tactile pattern-recognition after cerebral commissurotomy: Evidence for nonverbal memory. *Neuropsychologia,* Vol. 10, 1-15.
- Trahan, D.E., & Larrabee, G.J. (1988). *Continuous Visual Memory Test: Professional manual.* Odessa, FL: Psychological Assessment Resources.