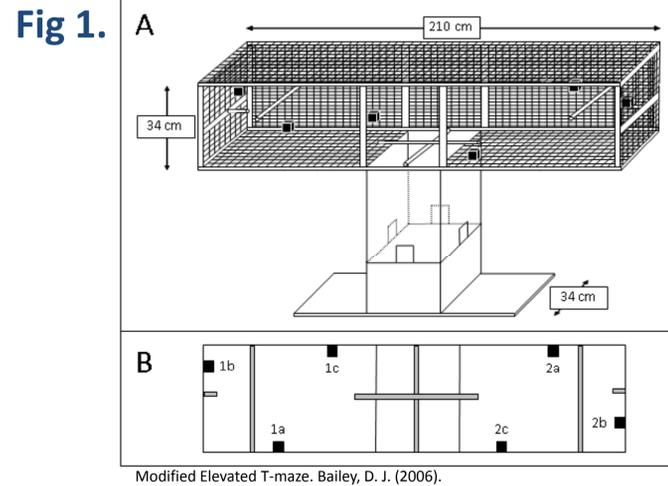


Does Minor Brain Damage have Major Effects on Learning?

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Introduction

The zebra finch hippocampus is involved in memory acquisition and retention (Bischof et al., 2006). Estrogen provision can improve memory acquisition (Oberlander et al., 2004). In response to minor neural insult, zebra finches upregulate aromatase (estrogen synthase) at the site of injury, locally providing estrogen and quelling apoptosis (Saldanha et al., 2005). **Does local provision of estradiol via injury induced aromatase in the hippocampus improve visual-spatial memory function?**



Results

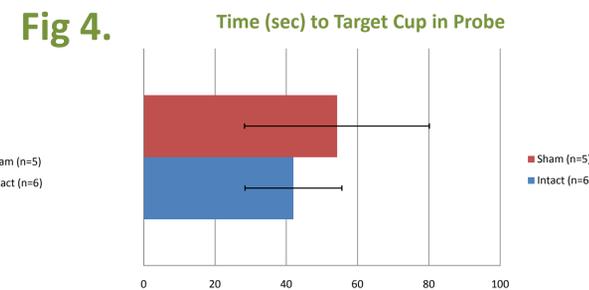
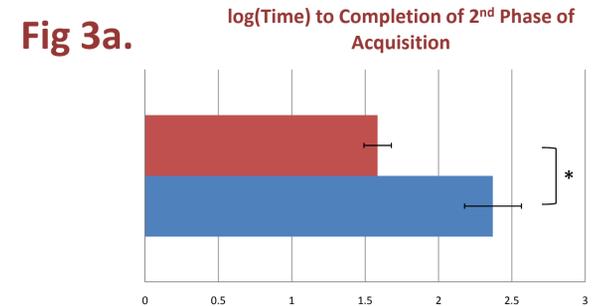
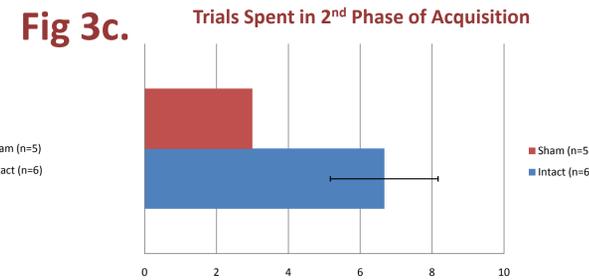
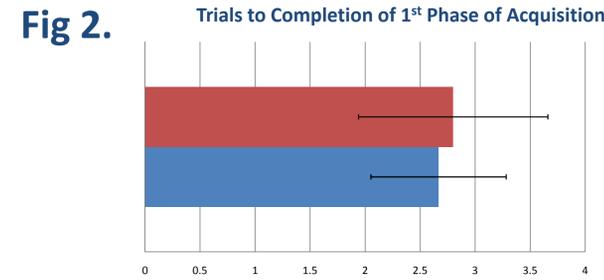


Fig 2. reveals that the trials spent in Phase 1 are insignificant between groups. Thus, both groups seem equally motivated to find the baited up. Figs 3. indicate that mechanically lesioned birds perform significantly better than intact controls in 3 measures: time to acquisition, errors made during acquisition, and total number of trials dedicated to acquisition. There is a non-significant difference in memory accuracy (Fig 4) between intact and shams. Because the four electrolytically lesioned birds in this study did not acquire the task, they were left out of the analysis shown here.

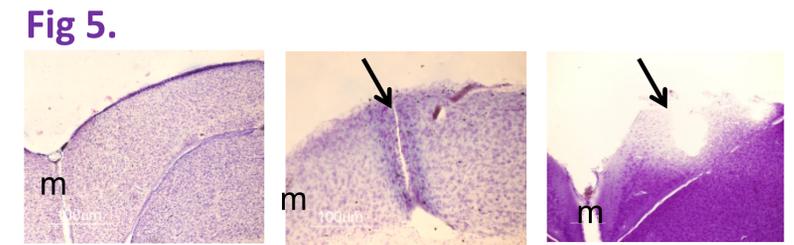


Fig 5: Representative right hemisphere pictures of (from left to right) an intact hippocampus, sham lesioned hippocampus, and an electrolytically lesioned hippocampus. m=midline.

Summary and Conclusions

- Ablating the brain decimates visual-spatial learning ability
 - Minute mechanical lesions improve acquisition of visual-spatial memory, but do not improve the accuracy of memory
 - **A little brain damage is not always a bad thing—if you are a zebra finch**
- Future Directions:
- Aromatase immunocytochemistry to visualize aromatase enzymes around injury site
 - Oviduct and follicle measures to measure circulating estradiol

Experimental Design and Method

