

Study guide for Martinez et al.
Final exam article
PSYC106 Summer Session II 2013

ABSTRACT

This summarizes the paper in a very dense fashion. Probably, little will sink in when you first read it. However, after working through this study exercise, you should fully understand the abstract upon a second (or third) reading. It crystallizes the main points, but leaves out details.

INTRODUCTION

1. First paragraph. What factors are known to influence recovery from brain damage? What information about EE and brain injury appears to be uncertain? What are the authors referring to when distinguishing “functional recovery” as opposed to tissue damage (e.g., gliosis etc)?
2. Second paragraph. What does reducing sensorimotor experience do to functional recovery? What is the novel combination of manipulations that the authors are using in this study?
3. The last paragraph succinctly states the question they plan on addressing.

METHODS

1. Paragraph 1: Assures they had appropriate permissions to do work.
2. Animals and experimental protocols
 - Understand how the 7 groups of rats were treated, including the timing of the procedures. The most critical information about experimental design is also contained in Figure 1. What do I-SE, I-EE etc each mean?
 - What is the rationale for sectioning (cutting) C5 and C6 dorsal roots (rhizotomy)?
 - Why were separate groups of rats used for behavior and for histology (assessment of brain tissue)?
3. Surgery
 - The first paragraph contains unimportant details.
 - Cortical compression: without worrying about the details about *how* the brain damage was created, what type of damage (i.e., what, where?) was produced?
 - What is S1-FL?
 - Rhizotomy: how did they check to see what the rhizotomy did in the short term?
4. Histology and immunocytochemistry
 - When in the experiment were the brains collected?

The details about how the brains were bathed in various solutions are not relevant here.

The staining for GFAP is to allow identification of glial cells. The details of how this is done are not important.

What does GFAP have to do with gliosis?

5. Behavioral testing

Horizontal ladder beam walking test: What does this test assess?

What variables did they use in this test and what do the scores indicate?

Forelimb asymmetry test: What does this assess?

What variables did they use in this test and what do the scores indicate?

Adhesive removal test: Same questions

6. Statistical analysis.

What does it mean for a comparison to be “statistically significant?” The exam will not focus on questions of statistical testing. However, a p value < 0.05 means that the authors should treat the effect as not likely caused by chance.

RESULTS

1. *Tissue loss and gliosis*

What parts of the brain were damaged? How did it change over time?

What affected gliosis? For factors that mattered, roughly what percent change was there?

What do the various panels of Figures 2 and 3 show?

2. *Behavioral assessments*

Paragraph 1: In the absence of brain injury, did the various treatments affect behavior?

Why were only some groups examined shortly after injury?

What effects did the injury have on behavioral tasks in the first few days?

Foot-faults. How did these scores change over time for different groups? What is shown in Figures 4A and 4B? What is different about these two figures? What data are shown in both graphs? What factors appear to be important for recovery of function? At the end of the recovery period, how different were the groups? Was anyone fully recovered?

Paw preference test. Same questions (except referring to Figures 4C and 4D)

Adhesive removal test. Same questions (and Figures 5A, B)

DISCUSSION

1. How is the overall pattern of results summarized in the first paragraph?

2. *Anatomical effects*

How do the present results on tissue size compare with previous studies?

How unprecedented is the current finding that rhizotomy + injury increased gliosis?

3. ***Behavioral effect ...***

How novel is the use of the behavioral tasks in this study?

“Aspiration” is vacuuming out some tissue.

How do the authors describe the sensory deprivation caused by their manipulations?

Which are the tests of sensorimotor skills versus tactile sensitivity they are referring to?

How do the authors describe the effects of EE in paragraph 4 of this section?

4. ***Potential mechanisms ...***

What several different possible mechanisms allowing recovery do the authors mention? (This is dense material!!!)

What monkey studies do the authors cite for precedents?

What is the take-home message in the last paragraph?

A few important terms to know (there may be others, of course)

astrogliosis

infarct

ischemia

GFAP-Ir

rhizotomy

NGF