

Tips for reading Bird et al., 2015

Simple Writer Abstract.

We know that going over things that happen again and again in our minds makes us lay down memories better. We also know that when things that are not simple happen, we make use of what we have learned about the world in the past to understand them. But up until now we have not paid enough attention to learning what happens in the brain in these situations. In grown up people who were not sick we looked at what happens when we show people movies and they work hard to go over and over the movies and then are asked to remember bits of them them out loud (1) or without talking while we take pictures of their brains (2). We saw that one week later, everyone remembered many more things about the movie bits they went over again and again than the movie bits they did not go over. When people had to remember movie bits out loud we saw that the way they talked about all of the memories was a lot the same, which made us think that they were remembering the meaning of things as much as the things as they happened. When we looked at pictures of their brains while they remembered, we saw that the way the small bits of the brain were working harder or less hard in middle-back parts of the brain, and in the middle of the brain near the ears, went up or down in the same way when they were watching and going over the same movie. Also how much the bits in the middle back part went up or down in the same way when watching and going over the movies told us how much people would remember later on. This probably means that the picture in their minds of what was in the movie was getting clearer. We think that these pictures in the mind put together new things that are happening with things people already know about how things usually go in the world, which we call "schemas." We think that the back-middle parts of the brain help us make memories stronger by showing the memories over again along with what people know about the world. That gives us memories of not so simple things that happen that stick together, and that we will probably not forget, but do not bend, and are more like our memories of the meaning of things.

Glossary of Memory terms

Encoding

Initial perception of an event (includes attention & pattern recognition)

Consolidation

Laying down and strengthening over time. Can occur at the level of the synapse (short term) or at the level of the brain system (longer term).

Retrieval

Calling it back up later

Reinstatement

When the brain helps consolidate a memory by playing the pattern of neuronal or voxel activation that represented the event offline later on.

Semanticization

When general knowledge is pulled out from repeatedly rehearsed events and stored separately, resulting in semantic knowledge that is independent of knowledge of how you learned it.

Reading tips

For this study, specifically be able to answer the following questions:

Introduction:

- What mechanisms of memory consolidation do the authors describe?
- What do the authors say makes memories of complex events different from memories of simple stimuli?
- What is a schema?
- What medial parietal regions play a role in long term memory, and what specific contribution do the authors say they make?

Methods:

- How was memory recall measured?
- What conditions did they use representational similarity analysis (RSA) to compare?

Results:

- What were the main results for the behavioural study illustrated in **Figure 2**?
- What potential confound in this experiment do the authors mention? Why don't they think it's a problem?
- In Experiment 2 what did they use RSA to examine?
- ******SKIP the section on the univariate results!!!******
- Multivariate results: What region showed a different pattern in the multivariate vs. univariate analyses and what do the authors say about it?
 - ******Other than that discrepancy, which is reported with the RSA results, DO NOT bother with the long list of brain regions activated in the univariate analyses that are illustrated in Figures 3 and 4!!!******
- DO know this: What are the main RSA results as illustrated in **Figures 5 and 6**?

Discussion:

Note that the first paragraph of the Discussion is a useful very general summary of the main results! If you really want to understand it well, translate it into simple words using Simple Writer.

- What is the authors' explanation of the main behavioural results? What are some alternative explanations they describe?
- How do they interpret the RSA results?
- What do they propose as a role for the posterior cingulate cortex and similar regions?

Other than that, try to answer these questions as practice for the final.

- **Context.** What is the "big picture" context of the present research? That is, what is it about the brain/mind that compelled these researchers to carry out the present study?
- **Specific Question.** What was/were the specific question(s) addressed in the research?

- **Question in Context.** Based on what is already known from past empirical research, how does that leave an open question that is addressed in this study? What is the main hypothesis, if there is one?
- What were the independent (IV) and dependent (DV) variables?
- Who were the participants and how many were there?
- What were the stimuli?
- What were the instructions for participants?
- Stimulus presentation: What did they see, when, for how long, and in what order?
- What were the results in order of importance and relevance to initial question(s)?
- What were the conclusions that the authors claim are most directly implied by the results and most relevant to the questions at hand, in order of importance? How do these of results speak to the hypotheses and research question? That is, connect the results to the hypotheses.
- Do you think the evidence fully supports the authors' claims? If not why? If so how? Give reasons.
- Identify any methodological flaws. Again support your claims.
- Synthesize what the findings tell us about how the mind/brain works in relation to course readings and *class discussions*. Think of at least one broad follow-up question that would lead to greater understanding of this area of research