

Paper guidelines

Overview

Paper topic due: April 15

Paper due: May 6

Please read and follow these instructions carefully.

- There will be one 6-8 page paper due in the last week of class. The paper will include a proposal for a cognitive neuroscience experiment that will resolve an outstanding research question. I will provide a list of several general topics (see below); from this list, you will choose your preferred topic and narrow down your specific research question and experimental approach.
- The paper should include 4 sections:
 - an **introduction** that reviews the literature related to your paper topic (including references to at least 5 *related empirical articles* that you have read);
 - a **methods** section that describes the methods that you would plan to use to address the research question;
 - a **“results”** section that details your hypothesized results;
 - and a **discussion** section that explains how your experiment and hypothesized results would fit into the literature.
- An appropriate experiment proposal will include a feasible neural measure or manipulation (e.g., fMRI, EEG, non-invasive brain stimulation, some kinds of lesions, etc) as well as a cognitive measure or manipulation (e.g., recording responses, using different kinds of stimuli, measuring performance on a particular task, etc). It will also be able to adjudicate between hypotheses that can be motivated by the existing literature.
- We will discuss the papers in class approximately one month before the paper is due.
- You should submit through the course website a brief description of your chosen paper topic and your specific research question at least 3 weeks before the paper is due.
- The nitty gritty: Papers should be double-spaced, with 10-12 point font (standard fonts please), and .75-1 inch margins. All citations and references should follow APA style. The reference list will not be included in the page count.
- Final papers are due on the last day of class, Thursday, May 6, with an automatic extension through Monday, May 10. They should be submitted through the course website. There will be a 10%-per-day penalty for late submissions past May 10.
- **Do NOT put your name on the papers.** We are going to try to grade them “blind” to your identity. Please put only your Eagle ID on the first page or header.

Because the paper is only 6-8 pages long, your introduction, methods, results, and discussion sections are probably going to be shorter than in any of the articles that we’ve read in class. You can estimate that you’ll need 2 pages for the introduction, 2 pages for the methods, 1 page for the predicted results, and 1 page for the discussion (these are only rough guidelines-- exact page allocation can vary).

Picking a paper topic

From this list, you should select one topic and narrow in on a specific research question, which you will address in a proposed cognitive neuroscience experiment. These topics are designed to be relatively general, in that there are multiple questions that could be asked under each individual topic, using different cognitive neuroscience methods, while still putting you on the right track toward an interesting cognitive neuroscience question related to material we've covered in class.

1. How do our *goals or expectations* influence the way that the brain processes *perceptual information*?
2. How does the brain maintain *sustained attention* in the face of *distraction*?
3. How does *emotion or stress* influence the brain mechanisms supporting *episodic memory or imagination*?
4. How does the brain process *music* in ways that are similar to the way it processes *language*?
5. What are the brain processes involved in *making decisions* that are relevant to one's *self vs others*?

An appropriate experiment proposal will include a feasible **neural measure or manipulation** (e.g., fMRI, EEG, non-invasive brain stimulation, some kinds of lesions, etc) as well as a **cognitive measure or manipulation** (e.g., recording responses, using different kinds of stimuli, measuring performance on a particular task, etc). **The point of the experiment should be to understand fundamental principles of how the brain supports specific cognitive processes.** For this reason, I do not recommend proposing a topic that involves investigating differences between clinical populations (e.g., patients with schizophrenia) and controls, because those studies are typically focused on how the disorder affects the brain-- not basic principles of how the brain and mind are related in a general population.

I **STRONGLY** recommend that you select a research question that is only one or two steps removed from an existing paper in the literature. What is the next logical step to be done in a particular research area? In other words, do not try to invent an entirely new area of study. The best studies are often those that build on a foundation of strong research in their area, use known experimental methods, but innovate on them to solve a new problem or answer a new question. This will also make it much easier for you to write your paper, because you can model your methods off of existing methods (being careful not to plagiarize the words they use to describe their methods, and being careful to cite the sources of your ideas). The best topics will overlap with the course material, so that you can integrate your research proposal with knowledge that you have gained from the class.

You should submit through the course website a **brief description** (3-5 sentences) of your chosen paper topic by **April 15**. Your topic description is worth 5% of your total paper grade. I will give you brief feedback on your chosen topic *only* if I notice any major problems with it (e.g., you do not include a neural measure or manipulation, or the study you propose would be clearly unethical and therefore not feasible). If you would like to discuss your paper topic either before or after this point, you can meet with either me or Sandry during office hours.

An example brief description

Note: this is just an example, not drawn from one of the possible topics listed below.

General topic: 3. What is the role of medial temporal lobe subregions in episodic memory?

Specific research question: Are object representations in the perirhinal cortex sensitive to changes in episodic context? An empirical article relevant to this topic is Ritchey et al. 2015. I will propose an fMRI study to test whether context changes affect multi-voxel patterns for objects in the perirhinal cortex, or whether object-related patterns are stable across contexts.

Your papers are due on the last day of class, May 6. If you are unable to submit your paper by the due date, I will give you an automatic extension until Monday, May 10 (no need to contact me). In other words, I want the papers by May 6, and I think it would serve you well to submit them then before the final exam period starts, but you will not be penalized for submitting it late until May 10.

Detailed Instructions by Section

Introduction

- Summarize what we know about your topic-- that is, the key findings from the literature that have motivated your question.
- Summarize what is the gap in the literature that you seek to fill. That is, what don't we know yet?
- State how your experiment is going to fill in the gaps of what we don't know.
- State your hypothesis or hypothesis. Be specific.

Methods

- Describe your proposed experimental task (you can include a task figure if you would like).
- Describe any other key methodological features necessary to understand your study.
- State the experimental conditions in your study.
- State the dependent variables in your study.
- Describe the essential comparisons that you will make to test your hypothesis.

Results

- For every experimental manipulation described in the Methods, describe your predicted results. You can pretend like you found exactly what you expected.
 - If there are two alternative outcomes that you think are equally likely, you may describe both of them.
- You do not need to create any predicted results figures, but if you would find it helpful for describing your predictions, you can.

Discussion

- Assume that your results have turned out as predicted.
- State whether the results support your hypothesis.
- Describe how your results fit within the current literature (i.e., what is already known).
- Describe one strength of your study.
- Describe one limitation or weakness of your study.
- End the paper with one sentence summarizing your conclusions.

Searching for related articles & citing them appropriately

Where should you search for other articles? I recommend Google Scholar (<http://scholar.google.com>) or PubMed (<https://www.ncbi.nlm.nih.gov/pubmed/>). If you search for the target article, you'll find that both sites have links for "similar articles" or "related articles," which is a good place to start.

An *empirical article* is an article that describes the methods and results of a new experiment or set of experiments. All of the team presentation articles that we've read have been empirical articles. A *review article* is an article that summarizes a body of literature and does not include the results of a new experiment (e.g., the Epstein 2008 or Davachi 2015 reviews). Your introduction should cite at least **5 empirical articles**. One of the articles can be, but does not need to be, an assigned article from the course.

You can also cite review articles *in addition* to the 5 empirical articles. However, please note the following rule of thumb when citing a review article: you should cite a review article when you are referring to a general idea advanced by the review article, not when you are referring to a specific experiment or finding. If you cite a review article to refer to a specific experiment, you are not giving credit to the original experimenters.

For example, here is a bad use of a review article citation:

"Researchers have found that the perirhinal cortex is more involved in the retrieval of item details compared to retrieval of context information (Ranganath & Ritchey, 2012)." - a more appropriate citation would have been Diana et al. 2010

Here is an appropriate use of a review article citation:

"Researchers have argued that there are two dissociable systems involved in memory: an anterior temporal system and a posterior medial system (Ranganath & Ritchey, 2012)."

All citations and references should follow APA format.

Information about citations: <https://owl.english.purdue.edu/owl/resource/560/03/>

Information about references: <https://owl.english.purdue.edu/owl/resource/560/06/>

There are software packages and web tools that can help you put citations into APA format, e.g., EndNote, Mendeley, Zotero, or Paperpile.