NACS642 Spring 2018 Group Project

For many years, a central component of NACS642 has been the group project, in which the class will be divided into small groups, each of which will implement an MEG experiment. In our experience, there is simply no other way than hands-on experience to fully grasp the unique challenges of cognitive neuroscience research. We will be working closely with Anna Namyst, the current MEG lab manager, to implement this project.

This year I am making several changes to the group project:

(1) I will be requiring that at least one component of your experiment tests hypotheses that can be evaluated solely on the basis of event-related responses in the MEG sensors. This is a simple and powerful measure, so it means that a successful pilot result does not depend on grappling with complex analysis methods (although you are welcome to do this in addition if you enjoy it!)

(2) I will be strongly encouraging you to design an experiment that turns in some way on hemispheric lateralization. This is an encouragement and not a requirement, but the reason for it is related to the previous point: the MEG measure is particularly good at distinguishing whether neural activity stems from left or right hemisphere at precise points in time. Therefore, if you can come up with a question—whether the area is vision, audition, object recognition, attention, prediction—where the hypotheses make predictions about the strength of activity in the left vs. right hemisphere, then you’re more likely to get informative pilot results.

(3) I will dedicate one full class period to discussing and workshopping project ideas.

You are free to design whatever kind of paradigm you wish. The MEG lab supports Matlab, PsychoPy, and Presentation stimulus presentation software. Although Anna and I can point you to existing examples used by other groups, in the end of the day your group is responsible for developing your stimulus presentation script and getting it running in the MEG lab. If your group does not feel comfortable with this, you can develop a paradigm that involves the visual presentation of text, as my lab has developed presentation software for which you can just ‘plug in’ stimulus text files.

Your paradigm will ideally be no longer than about 20-30 minutes, because this will allow two groups to pair up within a single experimental session.

We will run volunteers from among ourselves and our friends, and we are not planning to publish the data or otherwise use it for science, so IRB approval is not needed for data collection.

Overview of Steps

Group project proposals

The project proposal does not need to be long, but it should include a definition of the problem to be examined, a literature review section, a materials section, a procedure section, and an analysis section. I suggest dividing the literature review across the whole group, so that everyone is responsible for summarizing one or two papers.
Scheduling participants
Since all the facilities can be difficult to book, make sure requests are submitted far in advance.

Presentation scripts and materials
A completed version of your scripts and materials is due first; then a finalized (tested) version. Tested means tested in the MEG facility!

Data collection
Will happen in mid-April; see course schedule. I would like you to aim for at least n=5.

Data analysis
Will happen in late April, after data is collected.

Class presentations
Should include all of the same sections as the proposal, plus results and commentary on the strengths and weaknesses of this method for answering your questions of interest.

Not every task has to be divided exactly equally among group members, but I expect EVERYONE to be present for at least one data collection session. I would also very much like it if every member could get to do a bit of data analysis, although this is not mandatory.

At the end of the semester, you will each be asked to evaluate your own contributions to the project and the contributions of the other members of your group.