Proposal Assignment

The aim of the assignment is to ask you to think about the various methods to which you were exposed and the various questions asked about mind/brain. From that reflection, we ask you to develop a research proposal which integrates some of the approaches you saw. Note that you need not have more than one single question of interest (and in fact, it’s probably better if you only have one question). But we’d like to see you go about answering the question with a proposal that combines some of the methods we use in our various labs.

Without biasing you toward any ideas, I thought I’d offer some examples here. These are quick ideas I can conjure up from attending a few of the sessions:

1) representation of sensations in the brain: You could take the descriptions subjects construct from the Galton-style questionnaire reviewed with Bonnie Sherman (St Olaf) and develop a set of tasks in which a behavioral outcome would indicate whether the subject’s representation actually takes the form they describe (i.e., a curvilinear number form, for example), and you could simultaneously record brain activity via a skull cap (Thorsheim’s lab, St Olaf) for processing of the problem and the representation…

2) Face processing of self/other in the brain: Imagine doing Clark Ohnesorge’s (Carleton) task of identifying self or other with morphed images, and at the same time, recording brain activity (Thorsheim’s lab, St Olaf) while the person is responding. Would you expect to find lateralized differences to correspond with decisions about self/other?

3) Memory for space built from situations with different emotional qualities. Imagine training rats on a water maze study (Wiertelak, Macalester) and a sand maze study (Neiworth, Carleton). Rates of learning are different, for sure, but are these memories consolidated differently as well? Could you use either a blocker during learning or a blocker after learning (MK-801) and predict differences in retained memories from an appetitive task vs. one involving survival in the water, when both involve similar inputs about space?

4) Memory for space in both tasks – single cell recordings. See above (#3, Wiertelak, Neiworth) and instead of blocking learning or consolidation, why not see whether cells in the hippocampus fire differently when integrating different

* Carleton students can hand 2 copies of their paper in to Julie Neiworth, by the end of the day, Friday, Sept 30th. Gustavus student can hand 2 copies of her paper in to Janine Wotton by the end of the day, Friday, Sept 30th.
emotional qualities with a similar spatial task (a la Muir, St Olaf or Cousens, Macalester)?

5) Memory for space, context details, and ethanol as a cue. You could propose to run a sand or water maze task and compare learning there with a place conditioning task (Dickinson, St Olaf) and add ethanol (or an internal changed state) to the mix. Does the hippocampus code differently when space and an internal state are associated? And does it matter whether the task is negatively motivating or positively motivating?

6) Can you construct an experiment in monkeys (Neiworth, Carleton) in which you would want to record patterns of activity in the prefrontal cortex (Cousens, Macalester)?

There are certainly other combinations that are possible as well – dwell on the readings given by each institution and the experiences you had to start diving into a research design that would illuminate something about the mind/brain.

Specifics

Length should be 8 – 10 pages, not including references and figures (if you need any). Style should be APA style, as far as a title page, and the sections go. I’ll be more specific about this next.

Organization

Title page: You should include a title, your name, affiliation, and date, centered in the middle of the page (double-spaced). You should including a short “running headline” at the top right corner, along with page number on this and all other pages of the proposal.

Introduction: Write a brief introduction (1 – 4 pages) in which you review some of the articles given in the summer institute that are pertinent to your question of interest. Make sure that you move from review to critical evaluation, to a particular question which has significance to understand the mind and the brain.

Method: You should write a methods section next for the research you propose. It should include a Subjects section (headed in this way), a Materials/Apparatus section, and a Procedure section. If you have not written in this style before, most of the articles you’ve been reading are written in this way, so follow that style of organization. Try to be as specific as you can given your level of background. We don’t expect you to explain how to collect single-cell recordings or brain activity EXACTLY, for example, but you should have an idea what you are trying to get as a dependent variable and where you are going (in the brain) to get it.

Results and Discussion: This can be a combined section in which you discuss possible outcomes and what they would imply (based on the question you posed in the introduction).
**References:** Type them in a list, alphabetically, like you see done in many of the articles. Note that some neuroscience articles use abbreviations for titles of journals – since we enjoy a mix of articles, we will accept either construction.

**Figures:** We welcome photographs and diagrams to help us understand your methods. We also encourage any hypothetical graphs you can make to show us what the data would look like if you are right (or wrong).

References:

We welcome you to use the articles we gave you during your visits to our institutions. In some cases, depending upon what you develop, you may need a few more articles to develop your ideas. Feel free to contact us about this, but seek out individuals who worked in the specific areas in which you are developing your ideas. Also, use the “snowball” method of finding references rather than a random search with broad search terms – are there articles mentioned in the articles we gave you that you need to get in order to write your proposal? Use them!

Additional “FUN” –

We would like to schedule a time soon after you’ve handed in your proposal when we could all get together and you could each describe briefly (5 – 10 minutes) your proposal to the group. We would follow this with a barbecue/picnic/something (most likely at Julie’s house, but we’ll see…) for all. We’ll poll your availability and then keep you posted on the date and time of this event.