PSYCH 711R - fMRI Design & Analysis
Spring 2014

Section 001: 147 MB on M W from 12:00 pm - 2:30 pm, 112 SWKT on M W from 12:00 pm - 2:30 pm
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Section 007: 147 MB on M W from 12:00 pm - 2:30 pm, 112 SWKT on M W from 12:00 pm - 2:30 pm

Instructor/TA Info

Instructor Information
Name: Brock Kirwan
Office Location: 1001 SWKT
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TA Information
Name: Malia Anderson
Office Hours: Only By Appointment
Email: maliamay@gmail.com

Course Information

Description
Functional magnetic resonance imaging (fMRI) is a non-invasive neuroimaging technique that allows one to track brain activity more or less in real time as a subject completes a cognitive task. MRI is a recent technology and fMRI is an even more recent use of that technology. While it has traditionally been used to establish functional localization (i.e., mapping what brain regions are involved in what tasks), fMRI can also be used to answer important questions such as how the brain goes about solving these tasks (i.e., what are the computations the brain performs). fMRI has been used widely in the field of cognitive neuroscience, but it has also been applied in fields such as economics, marketing, sociology, and information systems to name a few.

In this course, we will first cover the basics of MR physics in order to establish how fMRI works. We will then discuss considerations for fMRI experimental design. If resources permit (i.e., if the scanner is ready in time), we will collect some fMRI data. We will spend the bulk of the course working on fMRI data analysis. Note that in order to run your own scans at the BYU MRI Research Facility, you will need to complete the safety training (which we'll do in this course) as well as hands-on scanner training (which we will not have time to cover in this course). Most people will not need to do this latter step as they will not be running scans on their own.

Materials

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Grading Scale

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Learning Outcomes

1. **Child Assessment: Identify methods and measures**
   Students will identify the most commonly used methods and measures for assessing behavioral, emotional, social, and psychological functioning in children and adolescents.
   Measurement: Multiple choice, fill-in-the-blank, and short-answer quizzes and exams.

2. **Critically evaluate common reasons for referral**
   Students will critically discuss and evaluate the most common reasons for which children and adolescents are referred for assessment, including diagnosis of behavioral and emotional disorders and the diagnosis of learning disabilities.
   Measurement: Short essay exams and in class group discussion activities.

3. **Summarize and evaluate treatment plans**
   Students will summarize and evaluate treatment plans for common behavioral, emotional, and learning disorders found in children and adolescents, founded in evidence-based assessment practices.
   Measurement: In class group presentation project/Short essay exam questions.

FMRI Proficiency
All students will become proficient with the basics of MR physics, MRI safety procedures, fMRI experimental design, and fMRI analysis.

Grading Policy
Your grade will be calculated on the number of points you earn from assignments divided by the total number of points possible. A general rule of thumb is “2-3 hours of study out of class for every hour in class”. For undergraduate courses, a 'C' is an acceptable grade and a 'B' a good grade, while an 'A' represents an outstanding level of accomplishment even in comparison with peers who are often
excellent students. For graduate courses, a 'B-' or better is considered a passing grade. We will award grades of D, UW, or E only after individual consideration concerning whether the student's performance in the course merits such a grade. As a general rule: an adequate answer will receive an adequate grade. What this means is that if you merely answer the question on an essay exam, you may not receive full points. Full points are reserved for exceptional answers where you demonstrate that you have a full understanding of the concept being tested.

**Participation Policy**

I expect that you will read the material and work through examples as listed in the course schedule *prior to class*. This is expected so you will better understand the topic and in order for us to have more productive discussions in class. This will also help you better understand and retain the material. I will post the lecture slides on Learning Suite at least one day before each class to give you time to download the slides and bring them to class. A major part of this course will be working through fMRI data analysis in class. As such, I will award points based on attendance and participation.

**Electronics Use Policy**

**The Agreement**

Daily participation points. These are easy points to earn: come to class on time and prepared, stay the whole time, ask questions, contribute to the course.

**Participation 2**

| May 05 | Due: Monday, May 05 at 11:59 pm |

Daily participation points. These are easy points to earn: come to class on time and prepared, stay the whole time, ask questions, contribute to the course.

**Participation 3**

| May 07 | Due: Wednesday, May 07 at 11:59 pm |

Daily participation points. These are easy points to earn: come to class on time and prepared, stay the whole time, ask questions, contribute to the course.

**Exam 1**

| May 09 | Due: Friday, May 09 at 12:59 pm |

Take-home, open book exam.

**Participation 4**

| May 12 | Due: Monday, May 12 at 11:59 pm |
Daily participation points. These are easy points to earn: come to class on time and prepared, stay the whole time, ask questions, contribute to the course.

**Participation 5**

**May 14** Due: Wednesday, May 14 at 11:59 pm

Daily participation points. These are easy points to earn: come to class on time and prepared, stay the whole time, ask questions, contribute to the course.

**Participation 6**

**May 19** Due: Monday, May 19 at 11:59 pm

Daily participation points. These are easy points to earn: come to class on time and prepared, stay the whole time, ask questions, contribute to the course.

**Participation 7**

**May 21** Due: Wednesday, May 21 at 11:59 pm

Daily participation points. These are easy points to earn: come to class on time and prepared, stay the whole time, ask questions, contribute to the course.

**Exam 2**

**May 23** Due: Friday, May 23 at 11:59 pm

Three take-home open-book exams through the course.

**Participation 8**

**May 28** Due: Wednesday, May 28 at 11:59 pm

Daily participation points. These are easy points to earn: come to class on time and prepared, stay the whole time, ask questions, contribute to the course.

**Participation 9**

**Jun 02** Due: Monday, Jun 02 at 11:59 pm

Daily participation points. These are easy points to earn: come to class on time and prepared, stay the whole time, ask questions, contribute to the course.

**Participation 10**

**Jun 04** Due: Wednesday, Jun 04 at 11:59 pm
Daily participation points. These are easy points to earn: come to class on time and prepared, stay the whole time, ask questions, contribute to the course.

**Participation 11**

| Jun 09 | Due: Monday, Jun 09 at 11:59 pm |

in class participation

**Participation 12**

| Jun 11 | Due: Wednesday, Jun 11 at 11:59 pm |

Daily participation points. These are easy points to earn: come to class on time and prepared, stay the whole time, ask questions, contribute to the course.

**Participation 13**

| Jun 16 | Due: Monday, Jun 16 at 11:59 pm |

Daily participation points. These are easy points to earn: come to class on time and prepared, stay the whole time, ask questions, contribute to the course.

**Research Proposal**

| Jun 16 | Due: Monday, Jun 16 at 11:59 pm |

The final project for the class will be to write a formal research proposal for your first fMRI experiment. This will be something that you should be able to turn around and include in a grant or IRB application. Details and a rubric for the assignment will be provided on Learning Suite. The project will be due the last day of the final exam period.