PSYCH 381 - Behavioral Neurobiology

Spring 2014

Section 001: B050 JFSB on T Th from 4:00 pm - 6:30 pm

Instructor/TA Info

Instructor Information

Name: Brock Kirwan
Office Location: 1001 SWKT
Office Phone: 801-422-2532
Office Hours: Wed 1:00pm-2:00am
Or By Appointment
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TA Information

Name: Bethany Walker
Office Hours: Only By Appointment
Email: bethanywalker28@gmail.com

Course Information

Description

Behavioral neuroscience is the study of the relationship between brain and behavior. It is also sometimes called physiological psychology or biopsychology. Everything we feel, perceive, think, or do originates in the brain. In a very real sense, you are your brain. Behavioral neuroscience comprises several different disciplines, all of which are concerned with answering one fundamental question: How does the brain produce thoughts, feelings, emotions, and behavior? In other words, how do mental events arise from the physical interactions within the brain? In this course, we'll first discuss the basic biology of the brain (which is the hard part of this class) and then move on to the research methods of biopsychology. We'll then talk about different cognitive functions and how they're supported by the brain.

Prerequisites

PSYCH 307, PSYCH 309, PSYCH 310

Materials

BYU Bookstore 187.60 140.70

Grading Scale

**Grades Percent**

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<th>Grade</th>
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<td>A-</td>
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<td>B+</td>
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Learning Outcomes

1. **The brain, experience, and behavior**

Students will develop their understanding of how the brain influences one’s experience of the world and one’s behavior in it.

*Measurement:* In-class quizzes and/or exams on assigned textbook reading, lectures, and class discussions and written reports and/or in-class presentations of self-selected articles from the scientific literature.

2. **Scientific methods and behavioral neurobiology**

Students will identify scientific methods, especially those of cognitive neuroscience, that are valuable in behavioral neurobiology.

*Measurement:* In-class quizzes and/or exams on assigned textbook reading, lectures, and class discussions and written reports and/or in-class presentations of self-selected articles from the scientific literature.

3. **Diseases, trauma, drug usage, hormones, and genes**

Students will extend concepts and research findings to diseases, trauma, drug usage, hormones, and genes.

*Measurement:* In-class quizzes and/or exams on assigned textbook reading, lectures, and class discussions and written reports and/or in-class presentations of self-selected articles from the scientific literature.
Grading Policy

Your grade will be calculated on the number of points you earn from examinations, quizzes, and other assignments divided by the total number of points possible. A general rule of thumb for undergraduate college courses is "2-3 hours of study out of class for every hour in class". 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. We will award grades of C-, 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.

Writing good exam questions is one of the hardest parts of my job. Inevitably a bad or poorly worded question slips through. I will entertain written challenges to quiz and exam questions up to one week following the return of the quiz or exam to you. Include the question you're challenging, the answer I marked as correct, the answer you gave, and your reasoning for choosing that question. Include relevant passages from the textbook or lecture notes to support your reasoning.

At the end of the semester, there will inevitably be one or two students who are within a percentage point or two of a grade cutoff. You may be tempted to ask if I can "bump you up" those couple of points to the next grade. The answer will be no. Dropping the cutoff by a couple of points for you will mean that now another person will be within a couple of points of the new cutoff. If I lowered the cutoff for you why not lower it for the next student as well, and so on.

Participation Policy

I expect that you will read the material, 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.

Attendance Policy

Attendance is required as we will be dealing with issues and examples not necessarily covered in the text. I will learn your names and expect you will answer questions and offer comments on the material. To help you encode the material covered in class and to help motivate you to do the reading before class, we will have in-class quizzes (10 multipl-choice questions and a short answer) the last 15 minutes of each class. If you miss class, please (a) speak to the TA or me and obtain notes from at least one trusted classmate, (b) check Learning Suite for any newly posted material, and (c) attend office hours for additional clarification when needed. You may drop 2 quizzes, so if you miss an in-class quiz, we'll count that as one of the ones that is dropped. If you know in advance that you need to miss quizzes, please let me know as soon as possible (see Make Up Policy below).

Electronics Use Policy

Part of the BYU Honor Code is to respect others. One simple way to show respect to your classmates and instructor is to refrain from using electronic devices in inappropriate and distracting ways in class. Surfing the Internet in class is disruptive for students sitting around you and has been shown to negatively impact not only your grade but also your neighbors'. Texting in class is disruptive for your instructor, who takes it as a sign that you have mentally checked out of class and considers it the height of rudeness. Cell phone use is not permitted in class. I welcome
the use of laptops/tablets in class to help you take notes or augment our discussion (e.g., looking up relevant information on Wikipedia). I will however ban the use of electronics in class if they are used inappropriately.

The Agreement

By your continued enrollment in this course, you are agreeing to the following:

- You have read and understood the contents of the syllabus for the course and agree to abide by the rules, guidelines and schedule contained within it. In particular, you understand that Dr. Kirwan also agrees to abide by the rules, guidelines, and schedule in the syllabus.
- You will consult the syllabus if you have a question about the course rules, guidelines, and schedule.
- You understand that Dr. Kirwan cannot make special exceptions for you without being unfair to everyone else taking this course.
- You acknowledge that Dr. Kirwan reserves the right to make changes in (a) the course schedule, (b) course requirements, (c) the course grading procedures, and/or any other aspects of the course at any time. Any alterations will be circumspect and will be made in the best interests of the students, the course, and the professor.

Readings

The readings will be assigned from the text and may be supplemented by pdf’s and links posted to Learning Suite. All assigned readings should be completed before the class for which they are assigned. I will prepare my lectures with the assumption that everyone has already read the relevant material. This will allow you to come prepared to ask questions and answer my questions in class.

Make-up Policy

Part of the reason for allowing you to drop two quiz scores is to make allowance for missed quizzes. As such, if you miss a quiz it will count as one that you drop. Since missing more than 2 will negatively impact your grade, you probably don’t want to do that.

As you will see, the dates of the exams are listed on the schedule. If, you miss, forget, or otherwise fail to take an exam – do not email me or the TA asking, “What can I do for you?”. My answer is I am sorry but you cannot take the exam.

Some excuses that are often provided – but are not acceptable.

- I was planning on taking the test on such-and-such a day – but became sick/ill thus I did not take the exam.
- I was traveling or otherwise out of town and missed the exam.
- Weddings, family reunions, etc. are not excuses for missing quizzes or exams.
- As per University policy, early flights home during finals week are not acceptable excuses for taking the exam at a different time.

IF YOU KNOW OF A CONFLICT REGARDING AN EXAM LET ME KNOW BEFORE THE EXAM BEGINS – THEN ARRANGEMENTS CAN BE MADE.

Assignments
Assignment Description

Quiz 1

May
01
Due: Thursday, May 01 at 11:59 pm

In-class quizzes consist of 10 multiple choice questions and one short answer question.

Quiz 2

May
06
Due: Tuesday, May 06 at 12:00 am

In-class quizzes consist of 10 multiple choice questions and one short answer question.

Quiz 3

May
08
Due: Thursday, May 08 at 11:59 pm

In-class quizzes consist of 10 multiple choice questions and one short answer question.

Research Paper-Critical Review

May
13
Due: Tuesday, May 13 at 11:59 pm

The purpose of this assignment is to get you started reading and evaluating primary research papers in cognitive neuroscience. This is going to be a key skill in completing the final research report project.

You will write a brief (600-900 words) paper summarizing a research article and relating it to the information presented in the textbook and lecture. Papers will thus be graded on four content areas, on general mechanics (spelling, grammar) and style, and on your analysis of the research (see the rubric below). Your analysis could include things that you did not like about the paper, things that you thought were particularly good, or future directions that this research could go, for example. Papers should be written at a level that a general scientific audience would understand.

The target article and grading rubric will be provided under the 'Content' tab in Learning Suite.

Quiz 4

May
15
Due: Thursday, May 15 at 11:59 pm
In-class quizzes consist of 10 multiple choice questions and one short answer question.

**Quiz 5**

- May 20
- Due: Tuesday, May 20 at 11:59 pm

In-class quizzes consist of 10 multiple choice questions and one short answer question.

**Research Paper-Topic/Outline**

- May 22
- Due: Thursday, May 22 at 11:59 pm

A topic or thesis statement for your research paper and an outline of the paper. The topic/thesis statement should be a well-organized paragraph (about 150-200 words). The outline can be as detailed as you like. This will be due IN CLASS; please bring a printed copy to class.

**Midterm (MC)**

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

Exams include 75 multiple choice items and two essay questions.

**Midterm (Essay2)**

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

Midterm essay 2 score

**Midterm (Essay1)**

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

Midterm essay 1 score

**Quiz 6**

- May 27
- Due: Tuesday, May 27 at 11:59 pm
In-class quizzes consist of 10 multiple choice questions and one short answer question.

**Research Paper-.annotated Bibliography**

May
29
Due: Thursday, May 29 at 11:59 pm

An annotated bibliography of at least 6 primary research articles that you intend to use as sources for your research paper. Points will be awarded according to the following:

- Number of sources (note that while 6 is an acceptable number, it will only earn an "acceptable" grade.)
- Appropriateness of the types of articles.
  - Are they from peer-reviewed journals?
  - Are they primary research articles (i.e., not review articles or opinion pieces)?
- Appropriateness of the articles for the research topic.
- Completeness of the summaries.

References should be in APA format and summaries should be in paragraph form. For example:


In contextual fear conditioning, normal rats condition to the conjunctive (or hippocampal-dependent) representation of context. In immediate shock experiments, rats must be pre-exposed and then allowed to hang out for a few seconds before shocking them to get contextual fear conditioning to show up. Hippocampal lesions before this training impairs conditioning.

**Quiz 7**

May
29
Due: Thursday, May 29 at 11:59 pm

In-class quizzes consist of 10 multiple choice questions and one short answer question.

**Quiz 8**

Jun
03
Due: Tuesday, Jun 03 at 11:59 pm

In-class quizzes consist of 10 multiple choice questions and one short answer question.

**Quiz 9**

Jun
05
Due: Thursday, Jun 05 at 11:59 pm
In-class quizzes consist of 10 multiple choice questions and one short answer question.

**Quiz 10**

Jun
10
Due: Tuesday, Jun 10 at 11:59 pm

In-class quizzes consist of 10 multiple choice questions and one short answer question.

**Research Paper-Final**

Jun
12
Due: Thursday, Jun 12 at 11:59 pm

How are we able to imagine a scene from a verbal description? What are the cognitive and neural processes involved?

The assignment is to write a research paper that could serve as the introduction to a research article examining those questions. In fact, we are going to carry out an fMRI experiment examining the neural response to verbal descriptions of visual scenes. Essentially, your assignment is to write a literature review of what has been done when subjects are asked to imagine visual stimuli in the fMRI scanner. You must include summaries of at least 6 primary research articles. There are 2 preliminary assignments that should help you refine your thesis/topic and resource selection as part of the writing process. You are encouraged to visit either the FHSS writing center or the University writing center for help with this assignment.

Papers should be a minimum of 2,000 words. Papers should be in APA format including a title page and a reference section (neither of which are included in the 2,000 word count). Do not include an abstract. Do include a section outlining the hypothesized results of an fMRI experiment comparing neural activation when subjects are asked to imagine a scene with neural activation when subjects are presented with abstract verbal stimuli with no imagery component.

To get you started, here's an interesting recent article from *Time* about just this question.

**Quiz 11**

Jun
12
Due: Thursday, Jun 12 at 11:59 pm

In-class quizzes consist of 10 multiple choice questions and one short answer question.

**Final (MC)**

Jun
19
Due: Thursday, Jun 19 at 11:59 pm

Exams include 75 multiple choice questions and 2 essay questions.
Final (Essay1)

Jun 19
Due: Thursday, Jun 19 at 11:59 pm

Essay question

Final (Essay2)

Jun 19
Due: Thursday, Jun 19 at 11:59 pm

Essay question

Schedule

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<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Reading</th>
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<tr>
<td>T - Apr 29</td>
<td>Introduction</td>
<td>Ch 1*</td>
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<tr>
<td>Th - May 01</td>
<td>Nervous System</td>
<td>Pinker, <em>How the Mind Works</em> Ch1 (Under the content tab)</td>
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<td>*Unless otherwise noted, all readings are from Pinel's <em>Biopsychology.</em></td>
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<td>T - May 06</td>
<td>Neurons, Synapses &amp; Neurotransmitters</td>
<td>Ch 4</td>
<td>Quiz 2</td>
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<td>Th - May 08</td>
<td>Methods &amp; Neuroimaging</td>
<td>Ch 5</td>
<td>Quiz 3</td>
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<td>T - May 13</td>
<td>Tour MRI Research Facility</td>
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<td>Research Paper-Critical Review</td>
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<td>Th - May 15</td>
<td>Vision</td>
<td>Ch 6</td>
<td>Quiz 4</td>
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<td>T -</td>
<td>Ochsner &amp; Kosslyn <em>Handbook of Cognitive Neuroscience</em>, Ch 13:</td>
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<td>Date</td>
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<td>May 20</td>
<td>Attention</td>
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<td>May 22</td>
<td>Spatial Attention (under content tab)</td>
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<td>May 22</td>
<td>Language</td>
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<td>May 23</td>
<td>Ch 16</td>
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<td>May 26</td>
<td>Memorial Day Holiday</td>
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<td>May 27</td>
<td>Somatosensation &amp; Motor Control</td>
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<td>May 28</td>
<td>Ch 7.3, Ch 8</td>
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<td>May 29</td>
<td>Brain Damage &amp; Recovery</td>
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<td>May 30</td>
<td>Ch 10</td>
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<td>Jun 03</td>
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<td>Jun 12</td>
<td>Ch 13</td>
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<td>Jun 13</td>
<td>Ch 14</td>
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<td>Jun 17</td>
<td>Research Paper-Final</td>
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<td>Final (Essay1)</td>
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<td>Jun 20</td>
<td>Final (MC)</td>
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### University Policies

#### Honor Code

In keeping with the principles of the BYU Honor Code, students are expected to be honest in all of their academic work. Academic honesty means, most fundamentally, that any work you present as your own must in fact be your own work and not that of another. Violations of this principle may result in a failing grade in the course and additional disciplinary action by the university. Students are also expected to adhere to the Dress and Grooming Standards. Adherence demonstrates respect for yourself and others and ensures an effective learning and working environment. It is the university's expectation, and my own expectation in class, that each student will abide by all Honor Code standards. Please call the Honor Code Office at 422-
2847 if you have questions about those standards.

**Sexual Harassment**

Title IX of the Education Amendments of 1972 prohibits sex discrimination against any participant in an educational program or activity that receives federal funds. The act is intended to eliminate sex discrimination in education and pertains to admissions, academic and athletic programs, and university-sponsored activities. Title IX also prohibits sexual harassment of students by university employees, other students, and visitors to campus. If you encounter sexual harassment or gender-based discrimination, please talk to your professor or contact one of the following: the Title IX Coordinator at 801-422-2130; the Honor Code Office at 801-422-2847; the Equal Employment Office at 801-422-5895; or Ethics Point at http://www.ethicspoint.com, or 1-888-238-1062 (24-hours).

**Student Disability**

Brigham Young University is committed to providing a working and learning atmosphere that reasonably accommodates qualified persons with disabilities. If you have any disability which may impair your ability to complete this course successfully, please contact the University Accessibility Center (UAC), 2170 WSC or 422-2767. Reasonable academic accommodations are reviewed for all students who have qualified, documented disabilities. The UAC can also assess students for learning, attention, and emotional concerns. Services are coordinated with the student and instructor by the UAC. If you need assistance or if you feel you have been unlawfully discriminated against on the basis of disability, you may seek resolution through established grievance policy and procedures by contacting the Equal Employment Office at 422-5895, D-285 ASB.

**Academic Honesty**

The first injunction of the Honor Code is the call to "be honest." Students come to the university not only to improve their minds, gain knowledge, and develop skills that will assist them in their life's work, but also to build character. "President David O. McKay taught that character is the highest aim of education" (The Aims of a BYU Education, p.6). It is the purpose of the BYU Academic Honesty Policy to assist in fulfilling that aim. BYU students should seek to be totally honest in their dealings with others. They should complete their own work and be evaluated based upon that work. They should avoid academic dishonesty and misconduct in all its forms, including but not limited to plagiarism, fabrication or falsification, cheating, and other academic misconduct.

**Plagiarism**

Intentional plagiarism is a form of intellectual theft that violates widely recognized principles of academic integrity as well as the Honor Code. Such plagiarism may subject the student to appropriate disciplinary action administered through the university Honor Code Office, in addition to academic sanctions that may be applied by an instructor. Inadvertent plagiarism, which may not be a violation of the Honor Code, is nevertheless a form of intellectual carelessness that is unacceptable in the academic community. Plagiarism of any kind is completely contrary to the established practices of higher education where all members of the university are expected to acknowledge the original intellectual work of others that is included in their own work. In some cases, plagiarism may also involve violations of copyright law. Intentional Plagiarism-Intentional plagiarism is the deliberate act of representing the words, ideas, or data of another as one's own without providing proper attribution to the author through quotation, reference, or footnote. Inadvertent Plagiarism-Inadvertent plagiarism involves the inappropriate, but non-deliberate, use of another's words, ideas, or data without proper attribution. Inadvertent plagiarism usually results from an ignorant failure to
follow established rules for documenting sources or from simply not being sufficiently careful in research and writing. Although not a violation of the Honor Code, inadvertent plagiarism is a form of academic misconduct for which an instructor can impose appropriate academic sanctions. Students who are in doubt as to whether they are providing proper attribution have the responsibility to consult with their instructor and obtain guidance. Examples of plagiarism include: Direct Plagiarism—The verbatim copying of an original source without acknowledging the source. Paraphrased Plagiarism—The paraphrasing, without acknowledgement, of ideas from another that the reader might mistake for the author's own. Plagiarism Mosaic—The borrowing of words, ideas, or data from an original source and blending this original material with one's own without acknowledging the source. Insufficient Acknowledgement—The partial or incomplete attribution of words, ideas, or data from an original source. Plagiarism may occur with respect to unpublished as well as published material. Copying another student's work and submitting it as one's own individual work without proper attribution is a serious form of plagiarism.

Respectful Environment

"Sadly, from time to time, we do hear reports of those who are at best insensitive and at worst insulting in their comments to and about others... We hear derogatory and sometimes even defamatory comments about those with different political, athletic, or ethnic views or experiences. Such behavior is completely out of place at BYU, and I enlist the aid of all to monitor carefully and, if necessary, correct any such that might occur here, however inadvertent or unintentional. "I worry particularly about demeaning comments made about the career or major choices of women or men either directly or about members of the BYU community generally. We must remember that personal agency is a fundamental principle and that none of us has the right or option to criticize the lawful choices of another." President Cecil O. Samuelson, Annual University Conference, August 24, 2010 "Occasionally, we ... hear reports that our female faculty feel disrespected, especially by students, for choosing to work at BYU, even though each one has been approved by the BYU Board of Trustees. Brothers and sisters, these things ought not to be. Not here. Not at a university that shares a constitution with the School of the Prophets." Vice President John S. Tanner, Annual University Conference, August 24, 2010