Neuroscience 281: Traumatic Brain Injury

Location: Science Hall 109
Loras College: M/W 2:30 – 3:50
Department of Psychology/Neuroscience: Fall 2016

Instructor: Jake Kurczek, PhD
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E-mail: jake.kurczek@loras.edu
Office Hours: By appointment


Class Website: You will be able to find PDFs of the lectures and discussions posted on eLearn

Course Goals and Overview

It is difficult to fully understand how the brain functions under completely normal working conditions. One technique used to investigate brain functioning through clinical cases where there has been trauma in a specified region of the brain. Thus, in people with traumatic brain injuries (TBI) neuroscientists can locate the region of trauma and any change in functioning of the individual. This course is designed to explore the brain through various historical cases and provide a deeper understanding of neuro-functioning from resulting deficits in dissociated brain regions. Clinical cases will be provided as we travel from the frontal lobe to the temporal lobe, parietal lobe, occipital lobe and beyond.

- To provide an opportunity to work through scientific controversies by analyzing, comparing and contrasting theories and research
- To provide an opportunity to work through the scientific process through writing research paper
- To practice and improve your writing and presentation skills

Course Requirements and Policies

Course web page. Lecture slides, assignments and readings are available on the course web page - eLearn.
Lecture Attendance. Students are required – and expected - to attend all of the classes for this course. While I will not enforce a daily attendance policy, a failure to attend will reflect poorly in your participation/question portion of your final grade. A portion of this grade is reflected in the critical thinking journals, which are randomly distributed throughout the course. If you are going to miss a lecture, please do your best to let me know before class.

Absences and Make-ups. It is expected that you will turn in each assignment and take each examination at the scheduled time. A make-up exam can be taken only for excused absences. Unless highly unusual circumstances prevail, approval for excused absences must be obtained prior to the scheduled exam. If you fail to take an examination (an unexcused absence), you will receive a score of zero for that exam.

Posting of Lectures. PDF’s of the lectures will be posted on the eLearn page for your reference. I will do my best to post lectures within 24 hours after the lecture. This is for both practical (I’m often working on these until the last minute) and pedagogical (I like you to take your own notes) reasons. Please note that these PDFs are not comprehensive in their information as much of what we study in class is through discussion and activities.

Academic Integrity. Loras College’s policy: “Dishonesty (cheating, plagiarism, etc.) in class and/or assigned work will result in total loss of credit for the class and/or assigned work. Dishonesty in examinations, which are not final examinations, will result in total loss of credit for the examination. Dishonesty in final examinations will result in the grade of Fail for the course. All cases of student dishonesty are reported in writing to the Associate Vice President for Academic Affairs by the faculty member. The student may appeal cases of dishonesty to the Associate Vice President for Academic Affairs.”

Cell phones, etc. Please turn off or silence all electronic devices during class. I will remember to do the same. Feel free to use a computer/tablet for taking notes in class. If you want to record a lecture for personal use, please get my permission and do not post or share it publically.

Students with disabilities. Loras College is committed to supporting the learning process for all students. Please contact me as soon as possible if you are having difficulties in the course. There are also many resources on campus available to you as a student. Disability services: In accordance with federal law, if you have a diagnosed disability or believe that you have a disability that might require reasonable accommodations, please discuss your needs with me at your earliest convenience. Documentation of your disability must be on file with the Lynch Office, 120 Academic Resource Center, (563-588-7134) for you to receive accommodations.

Getting Help. If you find that you are having difficulties with the any of the material please contact me as soon as possible! Do not wait until late in the course. It is difficult to significantly improve your grade if there are only a few weeks left in the course. I am happy to help you. If you are not able to see me during office hours we can make other arrangements. You can also find resources at various centers including the Library (Guides), Writing Center, Office of Academic Support and Student Counseling Center.

Assignments
• Group Quiz
There will be a group quiz covering the first third of class. The quiz questions may include the following question formats: multiple-choice; fill-in-the-blank; matching; true/false; short-answer sections and essay. Everything that is presented in lecture and in the readings will be fair game for the quiz. Note also, that some of the lecture material will be non-overlapping with the readings, as lectures are designed to augment, or expand upon, the readings.

• Daily Reflections / Case Study
In addition to the Mindstorms book and course readings, I’d like you to pick up a case study written by a survivor of TBI or their family member in order to get a better first person experience/description of TBI.

For each day (starting 9/26) I'd like you to write down your thoughts/reactions about the readings. These should include critical thoughts about the readings (e.g., what and why you agree or disagree with, what did you find interesting or confusing, etc.) rather than summaries. You should also tie in updates from the case you are reading. Post these to eLearn (Subject Topic Forums) the night before class (9:00PM) so that I can 1) read them before class & 2) possibly assemble them all together, print them out and hand them out in class for all to see. - There are 19 opportunities, so my plan is to take your top 12.

• Discussion Leader
Students will be expected to be the "discussion leader" for 2 different days of articles/topics distributed over the semester, beginning – 9/26. One of your discussion leads will be with a partner. The second will be by yourself. On days you are the discussion lead you do not need to write a reflection or post questions. The job of the discussion leader is to provide some structure to the discussion of the issues that week. This could be a PowerPoint or handouts, sets of questions for discussion, etc. The point is not for the leader to do all of the talking that day, rather to facilitate discussion. Feel free to consult with me about this. - We'll use the articles/topics I've chosen, but if you find a different (better??) article that you think would fit that week's topic you may submit it to me for possible substitution for an assigned article. I'll need these at least 1 week in advance for review and dissemination to the other students (and if the article is available in electronic format that would be helpful).

• Class Participation
This is a reading and discussion based course. I expect that everybody come to class having read the articles and put some thought into them. To facilitate the discussion (starting 9/26), in addition to the reaction/reflection papers, I'd like everybody to come up with at least 2 questions about each of the readings/concepts and post these to eLearn (Pre-Class Qs) the night before class (9:00PM). The discussion leader for the day does not need to post questions to eLearn the night before their presentation. Class participation will be based on active participation in the discussions and also the submission of these questions the night before class.

• Annotated bibliography (AB)
I'd like you to search for your articles on the topic that your white paper is on, read them, and prepare a brief (e.g., 1 paragraph to 1 page) summary, as well the full reference. Make sure to
spend the majority of your annotation describing what you’re taking from the article and why it is important to you, don’t just summarize it. You’ll need a minimum of 9 articles included in the bibliography for full credit and these are due each week (starting 10/5). Assigned articles do not count towards the minimum 9 articles.

- Research Paper and Infographic

The major project for this course is a 10-15 page (content – excludes title page, abstract, references) white paper and associated infographic. White papers are authoritative reports that provide information and recommendations on issues. Your final paper will include an introduction (literature review) and a proposals section. While an exhaustive literature review is not required, review is necessary for providing context in which to understand the proposals. Each time you turn something in, it should be in APA style.

On September 14th, you will turn in a 1-2 page paper that includes you research question and briefly describes at least 2 academic studies that you are using as a basis for your research question.

On September 28th, we will go through a demo of the research process. You will turn in the first five sources for your paper. In the demo we will analyze each other’s sources for academic rigor and contribution to the topics. We will also work to brainstorm and share resources for each other going forward.

On October 26th you will send your literature review draft to a writing partner. Then on 10/31 we will discuss those literature reviews in class. The first half of the class will be with your writing partner face to face and the second half of the class will be open for you to get feedback and tips from the rest of the class.

On November 16th you will send your proposals to a different writing partner. Then on 11/23 we will discuss those proposals in class. The first half of the class will be with your writing partner face to face and the second half of the class will be open for you to get feedback and tips from the rest of the class.

On November 30th you will turn in your infographic. The infographics will be the public presentation of the findings of your white paper. You want to communicate the information in a fun, informative and interesting way.

During finals week, you will turn in the final draft of your paper (15-20 pages of content). This paper should be a revised and improved edition of your white paper and now include an abstract together with your introduction, proposals and references.

*Your final paper will be graded using the following criteria:*
  a) Identification of gaps in literature
  b) Analysis of supporting research studies
  c) Clear description of proposal
  d) Quality of evidence based proposal
  e) APA style
Infographic

One of the most important skills to acquire in any scientific field is the ability to think critically about a given topic. Beyond thinking critically is the ability to break difficult information down into more understandable information. Infographics allow you to communicate information in a fun and understandable way. It is important for scientists to share information and educate others about the things that they study. Follow me @LorasNeuro for links to up-to-date research and news articles about TBI. You are strongly encouraged to share updates and information using the hashtag #HowDuBrainsWork.

Your infographic will be graded using the following criteria:

- Content
- Public Understanding
- Graphics
- Attractiveness
- Mechanics

Research Presentation

Psychology conferences typically host symposium sessions, in which researchers construct talks to present their research findings from a recent study or studies. The last week of class, starting December 5-7th, will consist of an academic symposium. During the session, each student will present a PowerPoint slideshow describing their white paper proposals that they have developed over the course of the semester. The presentation should include the following: literature review, hypotheses, method, and references. Each presentation should be 12 minutes with 5 minutes for questions. You should post your presentations to eLearn by December 4th.

The presentations will be graded using the following criteria:

- Clear description of research proposal
- Overall attractiveness of presentation
- Quality of information presented
- Oral description/presentation to audience

Grading. Grades will be based on the total points shown below.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
<th>Points</th>
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<tbody>
<tr>
<td>A / 4.0</td>
<td>93% and above</td>
<td>100 pts</td>
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<tr>
<td>A- / 3.7</td>
<td>90-92%</td>
<td>90 pts</td>
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<tr>
<td>B+ / 3.3</td>
<td>87-89%</td>
<td>80 pts</td>
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<tr>
<td>B / 3.0</td>
<td>83-86%</td>
<td>70 pts</td>
</tr>
<tr>
<td>B- / 2.7</td>
<td>80-82%</td>
<td>60 pts</td>
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<tr>
<td>C+ / 2.3</td>
<td>77-79%</td>
<td>50 pts</td>
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<tr>
<td>C / 2.0</td>
<td>73-76%</td>
<td>40 pts</td>
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<td>C- / 1.7</td>
<td>70-72%</td>
<td>30 pts</td>
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<tr>
<td>D+ / 1.3</td>
<td>67-69%</td>
<td>20 pts</td>
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<tr>
<td>D / 1.0</td>
<td>63-66%</td>
<td>10 pts</td>
</tr>
<tr>
<td>D- / 0.7</td>
<td>60-62%</td>
<td>0 pts</td>
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<tr>
<td>F</td>
<td>59% and below</td>
<td>0 pts</td>
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Grading Criteria:

- Discussion Leader = 100 pts 14.3%
- 1 Solo
- 1 Group
- Class Participation = 125 pts 17.85%
- Reflections
Neuroscience
Traumatic Brain Injury – Instructor: Jake Kurczek Fall 2016

Questions
In-Class
Group Quiz = 100 pts 14.3%

White Paper
Research Presentation = 30 pts 4.2%
Annotated Bibliography = 45 pts 6.4%
Infographic = 100 pts 14.3%
Intro Draft and Review
Proposal Draft and Review
Final = 200 pts 28.6%

Total = 700 pts 100%

Late Work. Late assignments will be docked 10% for everyday after the assigned due date.

Important Dates
9/5 – Labor Day, No class
9/16 – Last Day to Drop
10/17 – 10/18 – Fall Free Days
10/28 – Last Day to Drop (receive W)
11/23 – 11/25 – Thanksgiving Break
12/9 – Last Day of Classes
12/12 – 12/15 – Finals Week

Schedule*

<table>
<thead>
<tr>
<th>Day</th>
<th>Topic</th>
<th>Assignment</th>
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</thead>
<tbody>
<tr>
<td>8/29</td>
<td>Course Intro</td>
<td></td>
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<tr>
<td>8/31</td>
<td>Anatomy/Neurons</td>
<td></td>
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<tr>
<td>9/5</td>
<td>LABOR DAY</td>
<td>NO CLASS</td>
</tr>
<tr>
<td>Date</td>
<td>Topic</td>
<td>Details</td>
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<tr>
<td><strong>9/19</strong></td>
<td>Infographics and Review</td>
<td><strong>Topic Proposal Due</strong></td>
</tr>
<tr>
<td><strong>9/21</strong></td>
<td>Group Quiz</td>
<td><strong>Group Quiz</strong></td>
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</tbody>
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| **9/26** | Types of Traumatic Brain Injury | **Discussion Leader Starts**  
MS - CH 1,2  
<p>| <strong>9/28</strong> | How to Research | |</p>
<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Notes</th>
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</thead>
<tbody>
<tr>
<td>10/17</td>
<td><strong>Fall Free Days</strong></td>
<td>NO CLASS</td>
</tr>
<tr>
<td>10/24</td>
<td>TBI Time course / Sequela Group</td>
<td>MS - CH 5</td>
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<tr>
<td>10/26</td>
<td>Emergency and Acute Care Rehabilitation</td>
<td>MS - CH 9/10</td>
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<tr>
<td></td>
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<td><strong>Literature Review Draft Due</strong></td>
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<td></td>
<td></td>
<td><strong>Infographic Outline Due</strong></td>
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<tr>
<td>10/31</td>
<td>Peer Review</td>
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<tr>
<td>11/2</td>
<td>TBI and the Mind - Memory</td>
<td>MS - CH 6</td>
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<tr>
<td>11/7</td>
<td>TBI and the Mind – Executive Functions</td>
<td>MS - CH 6</td>
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<tr>
<td>11/9</td>
<td>TBI and Social Interaction</td>
<td>MS - CH 7</td>
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<tr>
<td>Date</td>
<td>Topic</td>
<td>Reading Material</td>
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<tr>
<td>11/23</td>
<td>Peer Review</td>
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<tr>
<td>12/5</td>
<td>Presentations</td>
<td><strong>Presentations Due 12/4</strong></td>
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<tr>
<td>12/7</td>
<td>Presentations</td>
<td></td>
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<tr>
<td>12/12 – 12/15</td>
<td>Finals Week – Wednesday&lt;br&gt;12/14 12:15PM</td>
<td><strong>Final White Paper Due</strong></td>
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Advocacy/White Paper Topics

Traumatic brain injury is often called the “silent illness” or an “invisible disability” because it is difficult to actually see the problems that individuals with TBI face. Beyond the problems of not being recognized are issues surrounding variability. If you take three people with similar backgrounds and gave them the same TBI, you could observe three very different outcomes. With this variability it is difficult to find consistent (i.e., statistically significant) trends which makes it near impossible to receive research funds. With a lack of funding and a lack of understanding, it is often difficult for individuals and families with TBI to navigate life after a TBI. How do you work with insurance for rehabilitation if they don’t know how best to help you? How do we measure a TBI that doesn’t use self-report measures? For your advocacy white paper and infographic, I’d like you to explore a complication within the experience of TBI. Your infographic will be an entertaining way to explain the issue to the public, while the white paper will be a more academic way to suggest solutions to the issue or problem. For your topics, let’s go beyond the idea that athletes get concussions and choose topics that we can explain to people to help them. The idea of a white paper is to lay out goals and suggestions to change something and make it better.

Potential Topics

Combat related TBI
  - Impact of modern warfare
  - Incidence of TBI in military population
  - Blast injuries

Recovery and Treatment
  - Novel Treatments
  - Modern prevention
TBI recovery-concussion/mTBI – complications in the population
TBI recovery- moderate/severe
Patient education
Symptom management
Treatment for moderate-severe TBI
Community integration and long-term recovery
PTSD treatment w/TBI
Factors impacting recovery for PTSD and TBI
Insurance Issues – Long-term vs short-term care
Post-concussive symptoms & Post-concussive Syndrome (PCS)
TBI and college students
Measuring TBI/Concussion – Issues with current practices
Bauby suffered a stroke that left him nearly completely paralyzed. He composed this book by using eye blinks to signal the letters one by one and is a testimony to the powerful drive of communication.

The story of a mother and daughter after a traumatic brain injury.

A story by a teenager who sustained a TBI and her recovery.

The author describes her experience with her husband after he suffers a TBI.

The author recounts his personal battle with a brain hemorrhage, neurosurgery, and epilepsy.

The story of a love affair before and after being t-boned by a bus.

Gardner describes his purpose in writing this book: "to demonstrate that a host of critical issues in psychology can be illuminated by a thoughtful study of the behavior and testimony of brain damaged individuals." He addresses aphasia, alexia, and memory impairment.

A father’s story about his 16 year old son’s brain injury and recovery.

It is a story about the ability to overcome insurmountable odds with dignity and tenacity and a splash of humor.

A neurologist discusses what he learned from patients about neurological disorders any how people contend with them.

Continuing beyond his book, Toscanini’s tumble, Klawans describes patients with a variety of neurological disorders.

The author shares insights into temporal lobe epilepsy as a medical, historical, and artistic phenomenon. The three people with this disorder include a corporate executive, a small-town attorney, and a prison inmate and mental patient.

A reflection on her life as it relates to her brothers and what happened to them.

A film producer whose life was turned upside down when his car was broadsided and sent careening into a tree.

A daughter’s story about her father’s traumatic brain injury.

After a traumatic brain injury, PJ gained an insight into the resilience of the spirit and the unexpected joys of everyday life.

The story combines observations of a neuropsychologist and the experiences of Zasetsky who was injured in World War 2.

The author uses clinical experiences to tell about the practice of neurology, how neurological disorders affect people, and what these disorders reveal about the brain.

Head Cases describes the dark side of brain injury through a sequence of stories from the world of brain damage.
A view from inside of a terrible injury, Su describes her experiences after a TBI erased the first 22 years of her life.

A neurologist is followed as he diagnoses and treats disorders. Noonan shares the doctor and patients' perspectives with personal insights and graphic information on diagnosis and treatment.

The author, a doctor, describes the aftermath of a brain injury that stripped her of her profession.

After his wife sustained a sever brain injury he has been studying how people recover from serious brain injuries and live purposeful lives.

A story of a wife's experience after her husband sustained a brain injury in a car accident.

A story about a mother whose son sustains a brain injury when he his hit by a drunk driver.

Sacks describes his experiences with a variety of patient with wonderment and affection. The cases include individuals with sensory agnosia, aphasia, autistic savant syndromes, Tourette's syndrome, etc..

Sacks examines the lives of a colorblind painter, a man with frontal lobe syndrome, a surgeon with Tourette's syndrome, a man with visual agnosia, an autistic savant, and a woman who has overcome many consequences of autism.

This book combines a review of scientific and clinical background with autobiographical accounts of the best long-term recoveries of patients with TBI.

The story is about a wife and her husband after he sustained a brain injury.

A memoir about living with a brain injury.

The story is about a wife and her husband after he sustained a brain injury.

A discussion of brain injury, describing what it is, how it is caused, and what can be done to treat, cope and prevent it.

This is a story about marriage, family, war and nation after ABC anchor Bob Woodruff sustains a brain injury while reporting abroad.

*Feel free to suggest your own*