Psychology 360*:
The Psychology of Sleep
Winter Term 2021

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Lectures: Weekly (1 lecture/week; asynchronous) lectures are posted on onQ

Labs: **A:** lab sessions posted on onQ (see details below)

Aims and Learning Outcomes:

After successful completion of PSYC 360, students should be able to

a) summarize the behavioral, physiological, neurobiological characteristics and mechanisms of sleep in various species
b) summarize the evolution of sleep and critically discuss the potential functions of sleep
c) identify factors that affect sleep quality
d) apply methods to quantify sleep parameters and quality in humans
e) describe and discuss the nature of sleep disorders and their treatments**.**

Text: The required readings for the course consist of review articles and book chapters selected to complement the topics covered in the lectures. They are available on the Psyc 360 onQ web site.

Assessments:	Bi-weekly quizzes (best 5 of 6):	10%
	Lab projects:	50%
	Final exam:	40%

Bi-weekly Quizzes (6): The goal of the activity is to encourage regular review of online lectures and posted readings. Every second week (Monday of the week) of the term, you will receive a list of some questions that relate to the lecture material and assigned readings. You will have until the Friday (3 pm) of that week to answer the questions. Answers will be submitted by email to your TAs. (2% per quiz, the best five (5) of the six (6) quizzes will count toward the final grade; for a total of 10% of the final grade).

Laboratory Projects:

1. Completion of sleep diary and written laboratory report: *"Factors influencing sleep quality in adults"* (25%).
2. Overnight sleep EEG recordings life stream (attendance mandatory) and submission of a sleep hypnogram (10%).
3, *Sleep Myths: Are current and popular conceptions about sleep more fact or fiction?* Independent research project to critically evaluate a common idea, hypothesis, or widely accepted notion regarding sleep. You will post the results of your research as a narrated PowerPoint slide show. You will also comment and post three (3) questions in response to one presentation of another student in the course (15%).

Details regarding the laboratories will be provided in the lab manual (see below) for each project.

Final exam: The exam will consist of a take-home exam at the end of the semester. You will have a one-week period (Friday, April 9 to Friday, April 16 to complete and submit the exam *see below for policy on deadlines and late submissions). Material from lectures, laboratory sessions, and the required readings will be examined.

SCHEDULE OF LECTURES AND TOPICS

Date	Topic
SECTON I:	INTRODUCTION TO SLEEP
Week of Jan. 11	Course introduction: Why care about sleep?
Week of Jan. 18	History of sleep research and sleep medicine
SECTION II:	THE NEUROBIOLOGICAL BASIS OF SLEEP
Week of Jan. 25	Neurobiology of waking and slow wave sleep
Week of Feb. 1	The phenomenon of REM sleep I: Neurobiology
Week of Feb. 8	The phenomenon of REM sleep II: Dreaming
SECTION III:	FUNCTION OF SLEEP
Feb. 16-19:	**READING WEEK**
Week of Feb. 22	Evolution and comparative aspects of sleep
Week of Mar. 1	Sleep and learning/memory
Week of Mar. 8	Sleep and synaptic plasticity
Week of Mar. 15	Sleep as homeostatic mechanism
SECTION IV:	SLEEP LOSS AND SLEEP DISORDERS
Week of Mar. 22	Sleep for health, emotion, and cognition
Week of Mar. 29	Sleep disorders and their treatments I
Week of Apr. 5	Sleep disorders and their treatments II
April	**FINAL EXAM (take-home exam)**

SCHEDULE OF LABS, LAB ASSIGNMENTS, and Quizzes

Week 1	Jan. 11-17	no lab
Week 2	Jan.18-24	hand out and discuss sleep diary
		Quiz #1: due date to submit answer, Friday, Jan. 22, 3 pm
Week 3	Jan. 25-31	due date to submit sleep diary, Jan. 31*
Week 4	Feb. 1-7	no lab
		Quiz #2: due date to submit answer, Friday, Feb. 5, 3 pm
Week 5	Feb. 8-14	lab session: hand out sleep diary data; discuss lab report
		Feb. 14: due date for “Sleep Myth” proposal*
	Feb. 15-21	**READING WEEK**
Week 6	Feb. 22-28	lab session: lab report writing strategies
		Quiz #3: due date to submit answer, Friday, Feb. 26, 3 pm
Week 7	Mar. 1-7	lab session: "The EEG: What does is measure? What does it mean?"
Week 8	Mar. 8-14	**lab session: Overnight polysomnography sleep experiment live stream (date TBD)**
		Mar. 14: due date for lab reports; submit by email to TA*
		Quiz #4: due date to submit answer, Friday, Mar. 12, 3 pm
Week 9	Mar. 15-21	lab session: workshop on “Effective Presentation Techniques”
		TBD: due date to submit hypnogram and analysis
Week 10	Mar. 22-28	no lab
		Quiz #5: due date to submit answer, Friday, Mar. 26, 3 pm
Week 11	Mar. 29-Apr. 4	Mar. 31: due date for Sleep Myth presentation; uploaded to onQ Discussion Forum*

Week 12	Apr. 5-11:	Apr. 5: due date to submit questions regarding your assigned Sleep Myth presentations; uploaded to onQ Discussion Forum* Apr. 8: due date for each presenter to answer questions submitted regarding your own presentation Quiz #6: due date to submit answer, Friday, Apr. 9, 3 pm
Final Exam	Apr. 9-16:	Final take-home exam Due date to submit exam, Friday, Apr. 16, 11:59 pm*

***Policy on deadlines and late submissions:**

All late submissions will be penalized (5% deduction from the grade for the affected lab project for each day late; this applies to the completed lab project, but also the deadlines for signing up or submitting proposals. For lab projects with multiple deadlines, separate penalties will be added up and deducted from the final project grade). Projects, proposals, or sign-ups that occur between 1 min to 24 hours after the stated deadline are considered 1 day late; submissions received from 24 hours and 1 min to 48 hours late are considered 2 days late; etc.

Academic Integrity

Academic integrity is constituted by the five core fundamental values of honesty, trust, fairness, respect and responsibility (see http://www.academicintegrity.org/fundamental_values_project/index.php). These values are central to the building, nurturing and sustaining of an academic community in which all members of the community will thrive. Adherence to the values expressed through academic integrity forms a foundation for the "freedom of inquiry and exchange of ideas" essential to the intellectual life of the University (see the Senate Report on Principles and Priorities)

Students are responsible for familiarizing themselves with the regulations concerning academic integrity and for ensuring that their assignments conform to the principles of academic integrity. Information on academic integrity is available in the Arts and Science Calendar (see Academic Regulation 1), on the Arts and Science website (see http://www.queensu.ca/artsci/academics/academic-integrity), and from the instructor of this course.

Departures from academic integrity include plagiarism, use of unauthorized materials, facilitation, forgery and falsification, and are antithetical to the development of an academic community at Queen's. Given the seriousness of these matters, actions which contravene the regulation on academic integrity carry sanctions that can range from a warning or the loss of grades on an assignment to the failure of a course to a requirement to withdraw from the university.

Web-based academic resources: http://www.asus.queensu.ca/acsfacts
Academic integrity regulations: http://www.queensu.ca/artsci/integrity/instructor/education.html

Disability Accommodations Statement

Queen's University is committed to achieving full accessibility for people with disabilities. Part of this commitment includes arranging academic accommodations for students with disabilities to ensure they have an equitable opportunity to participate in all of their academic activities. The Senate Policy for Accommodations for Students with Disabilities was approved at Senate in November 2016 (see https://www.queensu.ca/secretariat/sites/webpublish.queensu.ca.uslcwww/files/files/policies/senateandtrustees/ACADACCOMMPOLICY2016.pdf). If you are a student with a disability and think you may need academic accommodations, you are strongly encouraged to contact the Queen's Student Accessibility Services (QSAS) and register as early as possible. For more information, including important deadlines, please visit the QSAS website at:
http://www.queensu.ca/studentwellness/accessibility-services/

Academic Consideration for Students with Extenuating Circumstances

Queen's University is committed to providing academic consideration to students experiencing extenuating circumstances that are beyond their control and are interfering with their ability to complete academic requirements related to a course for a short period of time. The Senate Policy on Academic Consideration for Students in Extenuating Circumstances is available at http://www.queensu.ca/secretariat/sites/webpublish.queensu.ca.uslcwww/files/files/policies/senateandtrustees/Academic%20Considerations%20for%20Extenuating%20Circumstances%20Policy%20Final.pdf

Each Faculty has developed a protocol to provide a consistent and equitable approach in dealing with requests for academic consideration for students facing extenuating circumstances. Arts and Science undergraduate students can find the Faculty of Arts and Science protocol and the portal where a request can be submitted at: http://www.queensu.ca/artsci/accommodations. Students in other Faculties and Schools who are enrolled in this course should refer to the protocol for their home Faculty.

If you need to request academic consideration for this course, you will be required to provide the name and email address of the instructor/coordinator. Please use the following:
Instructor/Coordinator Name:
Instructor/Coordinator email address:

Discussion Guidelines

University is a place to share, question and challenge ideas. Each student brings a different lived experience from which to draw upon. To help one another learn the most we can from this experience please consider the following guidelines.

1. Make a personal commitment to learn about, understand, and support your peers.
2. Assume the best of others and expect the best of them.
3. Acknowledge the impact of oppression on the lives of other people and make sure your writing is respectful and inclusive.
4. Recognize and value the experiences, abilities, and knowledge each person brings.
5. Pay close attention to what your peers write before you respond. Think through and re-read your writings before you post or send them to others.
6. It's ok to disagree with ideas, but do not make personal attacks.
7. Be open to being challenged or confronted on your ideas and to challenging others with the intent of facilitating growth. Do not demean or embarrass others.
8. Encourage others to develop and share their ideas.

Copyright of Course Materials

This material is copyrighted and is for the sole use of students registered in Psyc 360*. This material shall not be distributed or disseminated to anyone other than students registered in Psyc 360*. Failure to abide by these conditions is a breach of copyright, and may also constitute a breach of academic integrity under the University Senate's Academic Integrity Policy Statement.

Grading Scheme and Grading Method

All components of this course will receive numerical percentage marks. The final grade you receive for the course will be derived by converting your numerical course average to a letter grade according to Queen's Official Grade Conversion Scale:

Queen's Official Grade Conversion Scale

Grade	**Numerical Course Average (Range)**
A+	90-100
A	85-89
A-	80-84
B+	77-79
B	73-76
B-	70-72
C+	67-69
C	63-66
C-	60-62
D+	57-59
D	53-56
D-	50-52
F	49 and below

PSYCHOLOGY 360:

The Psychology and Neuroscience of Sleep

LAB MANUAL

Winter Term 2021

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Lab #1: Sleep Diary and Lab Report

Goal:

The first goal of this lab is to demonstrate the use of a common self-report technique (the sleep diary) to track sleep quality over a 7-day period, and to identify the influence of various life-style factor on sleep. The second goal is to summarize, analyze, and present the data collected in the sleep diaries in a written APA-style lab report.

Lab Report Writing: in Psychology 360

There are several approaches to organizing the content and style of reports of scientific data. The following are some suggestions that you may want to pay special attention to, seeing as they have been written by your TAs who will be marking your assignments.

Structural Requirements

The report **should not exceed 10 double-spaced typed pages in length**, but this page limit does not include the abstract, figures, tables, and references. All citations and references must be written in **APA format (6th edition)**. Please include a running head and short title along with the page number. Figures and tables, if required, should be located at the end of the paper after the references.

Content Organization

Your paper should include the following sections in the following order: Title Page, Abstract, Introduction, Method, Results, Discussion, References, Tables and Figures. Label the sections as such. Subheadings may be used in the Methods sections covering information such

as Animals, Surgery, Testing Procedure, Statistics, or anything else you deem appropriate. Subheadings may also be used for the Results and Discussion sections, though much more sparingly. We encourage you to refer to the methods sections of published journals to determine what information should be included in your paper.

Style Suggestions

Be concise. Superfluous information will be frowned upon with **haughty derision**.

For your reading audience, assume a general knowledge of the brain, behaviour, cognition, and sleep, as well as the basic methodologies used to investigate them. Terms such as “standard procedures” are insufficient to describe your experimental methods, while excessive detail (e.g., repeating every question of the sleep diary) are too detailed for this report.

The Introduction should be constructed such that general issues and problems relating to the experiment lead into more specific ones, ending into the scientific questions that require attention. This should be followed by a clear statement of purpose for the present study. The introduction should end with experimental hypotheses addressing the questions raised in the preceding paragraphs.

When stating “facts” in the introduction, **always** reference your sources. You do not need to cite very general statement. If you are unsure about whether or not a citation is needed, it probably is (feel free to ask your TAs). Try to avoid quoting directly from a published source, but rather paraphrase the ideas and findings in your own words. Similarly, avoid verbatim extraction of anything in this booklet, such as descriptions of experimental methods.

The methods section should be an entirely fact-based description of the procedure you followed, the subjects and materials you used, and the analysis of the data you carried out. By convention, the methods are written in the **past tense.** Be sure to take notes of all procedure details in labs.

The results section is purely factual, consisting of the findings (and statistical significance) from every experimental procedure and/or analysis described in the methods. This

section **should not** include any interpretations of the results. Illustration through figures can make the results more meaningful for the reader, and figures are almost invariably preferable to tables. At the end of the results section, the reader should be able to interpret your findings, without referencing your discussion section.

The discussion section is the section in which you demonstrate your understanding of the purpose for the study, the results obtained, how they relate to the hypotheses, and the possible implications your results have to other studies or to the field in general. This section will be scrutinised most heavily by your reader. Statements of interpretation of your results should always be worded tentatively (e.g., "These results **suggest/imply** that sleep duration is decreased by…." **not** "These results **prove/claim/show…**."). Alternative explanations of the results and limitations of the study can also be provided in this section. You should also include future directions for research throughout the discussion, especially near the final paragraphs. The paper should conclude with a summary of your findings and a reiteration of your "take-home message".

All figures and tables should include brief captions describing their content. Figures should be simple and illustrate no more than one or a few major points. The figures and tables should be placed at the end of the report, after the references section.

Some Resources:

http://www.sleepfoundation.org/primary-links/how-sleep-worksMethods
http://www.mayoclinic.org/sleep/art-20048379
http://www.nature.com/nature/journal/v498/n7455/pdf/498427a.pdf
http://news.discovery.com/human/health/could-we-get-by-without-sleep-130703.htm
http://news.discovery.com/human/health/sleep-loss-deprivation-health-effect-20130624.htm
http://sleep.stanford.edu
http://www.newscientist.com/article/dn24002-poor-sleep-makes-food-more-appealing.html

You are also expected to find other, current articles or resources related to this topic.

Written Assignment Marking Scheme

Abstract: **/5**

Is the abstract the correct length (maximal 250 words; 1 point)?

Does it summarize the basic methods, purpose, results, and conclusions (1 point each) effectively?

Introduction: **/15**

Is the background literature reviewed thoroughly (with *at least 10* different citations) (10 poins)?

Is there a good rationale for why you are doing the current experiment? (3 points)

Are the hypotheses and predictions clearly outlined? (2 poins)

Methods: **/20**

Are the subjects (2 points), materials (2 points), and procedures (8 points) and data analyses (8 points) clearly and completely described?

Results: **/15**

Did you use an appropriate statistical test describe the statistics clearly? (5 points)

Are the results presented clearly, and do they follow logically from your figures? (10 points)

Discussion: **/20**

Did you link your findings with the current research and with your predictions?

Did you include interpretations of the results?

Did you suggest limitations of the current study and future directions?

Did you discuss the implications of the results? (5 points each)

References: **/5**

Are all references in the list in the text and vice versa?

Are all references and citations in APA (edition 6) format?

(-0.5 point for each error)

Figures and Tables: **/5**

Are all figures clearly constructed and do they show the effects found in the study? Are all figures and tables in APA format (including captions, titles, etc.)

Handed in on time? **Yes/No**

[Not included this year: Attitude/lab Participation: **/5**
You are required to attend and participate in labs,
Were you consistently late? Did you demonstrate a positive attitude in the lab?]

APA Style: **/10**
Title, running head, page #s, subtitles, citations.

Extra comments:

Total /95

Lab #2: Overnight Sleep-EEG Lab

Overview:

Please note: COVID-19 Update.

The goal of the lab is to demonstrate to students the procedures involved in a typical overnight polysomnography sleep experiment in real time. We (the TAs and instructor) will broadcast a live stream from the Neuroplasticity and Sleep lab at Queen's. One person will be the "sleeper", who will be connected to EEG, EOG, and EMG electrodes and is allowed to sleep in a private sleep room. The other two individuals will be the "sleep researchers", who stay in an adjacent room, where they will monitor brain, eye, and muscle activity and score the sleep stages of the sleeper throughout the night.

At the end of the night, the "researchers" provide you with a summary of the sleep profile of the sleep. Every student is responsible to graph out and submit a hypnogram (can be computer-generated or hand-drawn) of the sleep profile to your TA. In addition, you are required to submit a one-page analysis (12-point font, double spaced) of the hypnogram. The analysis should compare the overnight hypnogram to a "textbook" hypnogram that describes a typical night of normal, healthy sleep. The lecture notes and reading contain many examples of such a "standard hypnograms". You are responsible for finding one of these and using it as a standard to which you will compare the hypnogram that we will generate from the sleep experiment.

As a guide for your written analysis, use and answer the following questions:

1. Are there any clear differences/abnormalities between the standard healthy-sleep hypnogram and the one that we generated in the lab?
2. If yes, what are these differences?
3. How do these differences affect sleep quality? In other words, do they indicate improved or reduced sleep quality? Explain.
4. What might be one potential reason for why our overnight sleep differed from the standard healthy sleep hypnogram?

Please submit your hypnogram and the one-page written analysis as one Word document to your TA as an email attachment. The deadline for this submission is one week after the start of the overnight sleep session.*

Not relevant for the current year: [Groups of 3-4 students, together with one TA, will spent one night in the Sleep Laboratory at Queen's. The goal of the lab is to allow students to participate in a typical sleep experiment in real time. One student will be the "sleeper", who will be connected to EEG, EOG, and EMG electrodes and is allowed to sleep in a private sleep room. The other students and the TA will be in an adjacent room, where they will monitor brain, eye, and muscle activity and score the sleep stages of the sleeper throughout the night (hint: bring a supply of treats and goodies to keep your energy levels up; coffee and tea will be provided in the lab).

At the end of the night, your TA will provide you with a summary of the sleep profile of the sleep. Every group of students is responsible to graph out and submit a hypnogram (can be computer-generated or hand-drawn) of the sleep profile to your TA; the deadline for this submission is one week after the completion of your overnight session (for example: overnight sleep lab from Tuesday evening to Wednesday morning; the hypnogram is due on the following Wednesday by 23:59 hours). Only one hypnogram/group is required.]

Assessment:

a) attendance in the overnight live stream (50% of this lab)

c) evaluation of the hypnogram and written analysis (50%)*

***see Policy on deadlines and late submissions**

Lab #3: Sleep Myth Presentation

Goal: The goal of this lab is to critically examine a common assumption or belief ("myth") about sleep, factors that influence sleep, or the functions of sleep. The validity of the "myth" is critically assessed by identifying and presenting one or two empirical studies/research articles that test the hypothesis contained in the myth.

Background: There are numerous ideas and believes about sleep and its functions. We are familiar with many of them (e.g., "warm milk makes you sleepy"; "a power-nap improves performance at the workplace"; "screen time before bed interferes with sleep"; "we only need 2-3 hours of sleep").
Identify one sleep myth that is of interest to you (use books, movies, news outlets, your friends, other sources) for ideas. Be creative and try to find something a bit unusual if you can!

The Sleep Myth and Relevant Research: Formalize the myth that you will investigate in a brief statement (see examples above) and find at two (2) research articles that describe experiments to assess the hypothesis contained in the sleep myth. Submit the proposal of your sleep myth topic and citations to the article(s) to your TA by the stated deadline (posted in the Lab Schedule) ***see Policy on deadlines and late submissions**. Read the articles and familiarize yourself with the general background, specific methodology used in these studies, the results, and the implications and conclusions. Do the results of the study support or contradict the "sleep myth"? What conclusions can we draw from the study about the specific sleep myth, and perhaps sleep more generally?

The Presentation: Finally, you will present the myth and the relevant studies you have reviewed to the class as a narrated slideshow presentation (e.g., PowerPoint, Keynote). The presentation should

provide a clear statement of the sleep myth and a brief introduction/background of the myth. Then present the relevant studies, with an emphasis on the methodology and results. Finally, present your conclusions drawn from the studies; does the experimental evidence support or contradict the sleep myth. Are there any important implications and recommendations that you can make? Do not just repeated what the authors of your studies conclude and recommend; come up with some of your own ideas and conclusions!

The presentation/slide show should be no longer than 15 min.

Some things to consider for effective talks:

- longer is not always better: keep the talk short and concise
- more is not always better: cramming too much information into a talk will overwhelm and confuse your audience
- ask yourself: what information is important and necessary for my audience to understand the studies; leave out information that is not of primary importance
- how do I get my audience interested in my talk? how can I engage my audience?
- for slides, text is often less effective than graphs and images
- have fun with your talk; your audience will enjoy your talk a lot more if they feel that you enjoy giving it!

Submission Discussion: Please upload your slideshow to the Discussion Forum on the course onQ site by deadline stated (posted in the Lab Schedule).

Discussion Forum: You will also be assigned one presentation by another student to view and comment on. This will enhance the learning experience by facilitating active discussions of course material. For your reply post, use the 3C+Q format (further explained below). In your reply, think critically about your peers' presentation and consider how their ideas link to course content. Be sure to

consider the evidence available to support your (and your peers') points.

3C+Q format: Responses to other students should include **at least two** of the following: a **Compliment** (e.g., "I like how…"; "I like that…"), a **Comment** (e.g., "I agree that… because…"; "I disagree that… because…"), a **Connection** (e.g., "I also have read/seen/heard/thought that…"), and a **Question** (e.g., "I wonder why/how/who/what/when/where…").

The presenter, in turn, will respond to the reply and address their comments and answer the question that was posted.

Marking Breakdown:

Initial Proposal

- Proposal was complete and submitted in time /5

Slideshow Presentation

Presentation Style /5

- Was the presenter easy to understand, clear and engaging?

Content /15

- Background review/review of myth
- Review of studies chosen
  (explain the rationale, methods, results)
- Discuss results and what they mean for your myth, critical evaluation
  (demonstrate your own understanding of the literature)

Use of Audio/Video Materials /5

- Were presentation materials used effectively and clearly?

Integration/Critical Analysis /5

- Was the student able to demonstrate knowledge, understanding, and critical thinking related to the research area and specific studies discussed?

Discussion Forum

Comments and Questions Posted for other Presentation /5

- Does the reply post show keen interest and active engagement with the peers' initial presentation?

- Is the reply post written clearly, and includes meaningful commentary to contribute to peers' learning?

- Does the reply post include all components of the 3C+Q format?

LAB MARK /40