

NROD67

Psychobiology of Aging
Tentative Syllabus 2017

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Lecture: Wed 1-3 pm in AA 207

Office Hours: Tues 12 to 1:00

Fascinating psychological and biological questions cluster around the phenomenon of development and aging. Indeed, various lines of research are helping us to understand the aging process.

In this seminar course we will explore the neurobiological changes that occur during the process of aging and the relationship between these neurobiological changes and the cognitive changes that are experienced in the aged. We will examine both normal age-related changes and the cognitive changes that occur in age related disease states. Some of the questions we will discuss in this course include the following. Does every species age in the same way as the human? Is there a fundamental process of “aging” common to all organisms? How does the aging process deviate from the “normal” to cause aging-related disorders in long-lived species? Can one prevent and/or modify the aging process? What roles do nature and nurture play in this process? Can we learn something from various human lifestyles, diets, cultures, environments and even from other species in order to enhance healthy aging? Indeed, the quest to maintain a healthy, long life by mankind has been going on from time immemorial. Past and current research has focused on beginning to answer some of these questions. As we progress through this course we will observe that advances in aging research are contributed by worldwide researchers who cut across many disciplines.

Text: There is no text book for this course. Instead you will read various journal articles on topics related to aging.

Grading Scheme:

25% Leading In-Class Readings and Presentation

20% Class Participation, Discussion Board Postings, Pop Up Quizzes

2% Hypothesis for Research Proposal

8% Proposal Outline

20% Evaluating Research Proposals

5% Video Clip

20% Final Research Proposal

Leading In-Class Assigned Reading and Presentations

Articles for the week are posted through the library for our course. Each week a group of students will be responsible for presenting the articles to the class and facilitating discussion of these articles. Each group should work together to come up with a good way to highlight the important issues discussed in the articles and to engage the rest of the class in a thoughtful and critical discussion of those issues. You will be graded on your ability to summarize/highlight the important issues in the articles, your presentation skills, your understanding of the readings, and your ability to lead and engage your peers in a group discussion. Your grade will be based on the group performance and your individual contributions. Each group is required to submit a near complete ppt of their presentation to me no later than noon Tues for the next day class. Remember, students are expected to have read these readings in preparation for the class. You do not need to present on all of the information contained within the articles. You should discuss other empirical papers on your topic that complement the readings and our understanding of research in the field.

Participation:

You are expected to read assigned papers before each class, attend regularly and be engaged in our class discussion. All course readings can be obtained through the course reading tab in BB. In addition, students will be required to submit a weekly thought question/idea/issue based on the assigned readings to our BB discussion board. This question/idea/issue must be posted no later than noon of the Tues prior to our Wed lecture. You are not required to post an answer to the discussion board posting but may be called upon during the class to provide your answer.

Research Proposal:

There are several components of your research proposal that will be graded and these are described below. You may choose to work with a partner on your research proposal and you will each receive the same final grade for this submission. Please note, while you may work with a partner on the hypothesis, outline and final paper, all students must evaluate the proposals assigned to them independently. All proposals will address an aspect of sleep and aging. We will discuss the range of topics in class in depth.

Hypothesis for Research Proposal

The hypothesis (ie the proposed explanation for the phenomenon you are investigating) is not valued at a high proportion of your final grade but is due early in the term to ensure you are working towards the final product well in advance of the deadline. These should be clearly and concisely written and submitted to me electronically by the due date. Please mark Hypothesis and your name in the subject line.

Proposal Outline

You should bring a hard copy of your proposal outline to your individual meeting. You are expected to demonstrate that you have examined the literature, have an incomplete list of references to support the research done to date and an idea of how you will conduct this research.

Research Proposal:

The purpose of the proposal is to ensure that you have

- done sufficient preliminary reading/research in the area of your interest
- thought about the issues involved and are able to provide more than a broad description of the topic which you are planning to research.

The challenge in this assignment is to convince members of the scientific community and our class that you

- have identified a scientific problem
- have reviewed the theoretical background
- have a methodical approach to solve the problem
- have a realistic time frame and reasonable costs associated with the project.

The following sections should be included in this paper:

Project title

Summary statement of the research project:

This one paragraph summary should focus on the research topic, its new, current and relevant aspects. While this will appear at the start of your proposal, you should write this last.

Review of research literature

A short and precise overview about the current state of research that is immediately connected with your research project.

- Reference the most important contributions of other scientists.
- Discuss the theoretical scope or the framework of ideas that will be used to back the research.
- State clearly how your research will contribute to the existing research.

Objective of the research project

Give a concise and clear outline of the academic (you may also include non-academic, e.g. social) objectives that you want to achieve through your project. Be clear as to why the intended research is important.

Outline the project

This is the central part of your research outline.

- Detail your research procedure.
- Provide a timetable you will follow.
- Describe the intended methods of data gathering, include the controls you will include, the statistical methods to be used
- You are not expected to provide a budget

References

List all articles mentioned in your research

There will be no results or discussion section for this assignment

You are encouraged to be as concise as possible in this final proposal while adequately covering the topic. Your proposal should be double space with the only exception being that references may be single spaced. Late papers will be accepted but docked 10% per day unless a medical note is provided. A version of this proposal is due at the start of class on March 8, 2016. You will bring printed copies (number to be confirmed) which can be double spaced to class without your name on them. This copy of the paper will be peer reviewed and the author will receive the comments prior to the submission of the final proposal to me for evaluation through TURNITIN.

Evaluating Research Proposals

You will evaluate class research proposals and provide constructive feedback and suggestions to the author. You should expect to review 3 proposals for your peers. Only I will evaluate your feedback but the author will receive your comments. These are due On Mar 15. You should return 2 copies of each proposal evaluated. Only 1 copy should have your name on it. These evaluations should be a maximum of 2 pages.

Video Clip

You will prepare a short video clip highlighting your proposal, its importance and why you believe this work should be further investigated and “funded”. The video clip should not be longer than 5 minutes and may be captured on your cell phone or other video capturing device. The file should be submitted to me by email with your name and Video Clip in the subject line. The due date is Mar 1.

Final Proposal Submission

Your final proposal which will mark is due Mar 22 at the start of class. This proposal should be submitted to TURNITIN electronically. TURNITIN will time stamp your submissions so please to not submit late. Details on the Turnitin are as follows:

First, some background information on this program. Turnitin.com is a tool that assists in detecting textual similarities between compared works i.e.: it is an electronic resource that assists in the detection and deterrence of plagiarism. The terms that apply

to the University's use of the Turnitin.com service are described on the Turnitin.com web site.

“Normally, students will be required to submit their course essays to Turnitin.com for a review of textual similarity and detection of possible plagiarism. In doing so, students will allow their essays to be included as source documents in the Turnitin.com reference database, where they will be used solely for the purpose of detecting plagiarism. The terms that apply to the University's use of the Turnitin.com service are described on the Turnitin.com web site”

Students will submit their final paper to the turnitin.com site (www.turnitin.com). You will need the following information to submit your proposal.

Course: NROD67

Class ID: 14326060

Password: graduating

Missed Term Work due to Medical Illness or Emergency:

All students citing a documented reason for missed term work (this includes assignments and midterm exams) must bring their documentation to the Undergraduate Course Coordinator, Ainsley Lawson, **within three (3) business days** of the term test / assignment due date. All documentation must be accompanied by the departmental [Request for Missed Term Work form](http://uoft.me/PSY-MTW) (<http://uoft.me/PSY-MTW>).

In the case of missed term work due to illness, only an **original copy** of the [official UTSC Verification of Illness Form](http://uoft.me/PSY-MED) (<http://uoft.me/PSY-MED>) will be accepted. Forms are to be completed in full, clearly indicating the start date, anticipated end date, and severity of illness. The physician's registration number and business stamp are required.

In the case of other emergency, a record of visitation to a hospital emergency room or copy of a death certificate may be considered.

Forms should be dropped off in SW427C between 9 AM - 4 PM, Monday through Friday. Upon receipt of the documentation, you will receive an email response from the Course Instructor / Course Coordinator within three business days. The Course Instructor reserves the right to decide what accommodations (if any) will be made for the missed work.

Note that this policy applies only to missed term work (assignments and midterms). Missed final exams are dealt with by the Registrar's Office (<http://www.uts.utoronto.ca/registrar/missing-examination>).

Failure to adhere to any aspect of this policy may result in a denial of your request for accommodation.

Tentative Course Schedule

DATE	TOPIC	READINGS
Jan 4	Course Introduction	
Jan 11	Neurobiology of Healthy Aging	Geldmacher 2012 Kennard 2011 Imhof 2007 Boyle 2013
Jan 18	Models of Aging	Engle 2012 Alexander 2012 Roberson 2012 Roth 2004 Bizon 2012
Jan 25	Cognitive Training Hypothesis for Proposal Due	Sternberg 2013 Edwards 2009 Jiang 2016
Feb 1	Enrichment, Education and Lifestyle	Scharaga 2015 Santos 2015 Hanna-Pladdy 2012 Festini 2016
Feb 8	No class, work on proposal	
Feb 15	Vascular Cognitive Impairments Outlines Due Individual Meetings To Discuss Proposal Outlines Scheduled	Jellinger 2013 De la Torre 2004
Feb 22	Reading Week No classes	
Mar 1	Vascular Cognitive Impairments CONT Cortical Changes, Oxidative Stress/Chronic Stress Video clips Due	Hinman 2007 Richards 2009 Gems 2008 Christensen 2015
Mar 8	AD and MCI Proposal Due	Tampellini 2015 Granzotto 2014 Tampi 2015 Castanho 2014 Marchionni 2013
Mar 15	Nutrition Proposal Evaluations Due	Sinclair 2005 Huhn 2015 Kent 2014 Hsu 2014
Mar 22	Aerobic Exercise Final Proposal Due	Coubard 2011 Muscarello 2010 McGregor 2013
Mar 29	Non Aerobic Exercise	Pons van Dijk, 2013

Readings:

Alexander GE, Ryan L, Bowers D, Foster TC, Bizon JL, Gelmacher DS & Glisky EL. Characterizing cognitive aging in humans with links to animal models (2012). *Frontiers in Aging Neuroscience*. doi: 10.3389/fnagi.2012.00021

Bizon JL, Foster TC, Alexander, GE & Glisky EL (2012). Characterizing cognitive aging of working memory and executive function in animal models. doi: 10.3389/fnagi.2012.00019

Boyle PA, et al. (2013). Relation of neuropathology with cognitive decline among older persons without dementia. doi: 10.3389/fnagi.2013.00050

Castanho TC, et al. (2014). Telephone based screening tools for mild cognitive impairment and dementia imaging studies: a review of validated instruments. *Frontiers in Aging Neuroscience* doi: 10.3389/fnagi.2014.00016

Christensen A & Pike CJ. (2015). Menopause, obesity and inflammation: interactive risk factors for Alzheimer's disease. *Frontiers in Human Neuroscience* doi: 10.3389/fnagi.2015.00130

Coubard et al. (2011). Practice of contemporary dance improves cognitive flexibility in age. *Frontiers in Aging Neuroscience*. doi: 10.3389/fnagi.2011.00013

De la Torre JC (2004), Is Alzheimer's disease a neurodegenerative or a vascular disorder? Data, dogma, and dialectics. *Lancet Neurol*. 3(3): 184-190.

Edwards, JD. (2009). Cognitive enhancement for older adults. *Frontiers in Neuroscience* 3(1) 108-109.

Engle JR & Barnes CA (2012). Characterizing cognitive aging of associative memory in animal models. *Frontiers in Aging Neuroscience*. doi: 10.3389/fnagi.2012.00010

Festini SB. (2016). The Busier the Better: Greater Busyness Is Associated with Better Cognition. *Frontiers in Aging Neuroscience*. doi: 10.3389/fnagi.2016.00098

Geldmacher DS, Levin BE & Wright CB. (2012). Characterizing healthy samples for studies of human cognitive aging. *Frontiers in Neuroscience*

doi: 10.3389/fnagi.2012.00023

Gems K & Partridge L. (2008). Stress-response hormesis and aging: “that which does not kill us makes us stronger”. *Cell Metab* 7:200-203.

Granzotto A & Zatto P. (2014). Resveratrol and Alzheimer’s disease: message in a bottle on red wine and cognition. *Frontiers in Aging Neuroscience*.

doi:10.3389/fnagi.2014.00095

Hanna-Pladdy B & Gajewski B. (2012). Recent and past musical activity predicts cognitive aging variability: direct comparison with general lifestyles.

doi: 10.3389/fnhum.2012.00198

Hinman JD & Abraham CR. (2007). What’s behind the decline? The role of white matter in brain aging. *Neurochem Res* 32(12): 2023-2031.

Huhn S, Masouleh SK, Stumvoll M., Villringer A & Witte V. (2015). Components of a Mediterranean diet and their impact on cognitive functions in aging. *Frontiers in Aging Neuroscience*. doi: 10.3389/fnagi.2015.00132

Hsu TM & Kanoski SE. (2014). Blood-brain barrier disruption: mechanistic links between Western diet consumption and dementia. *Frontiers in Aging Neuroscience*. doi: 10.3389/fnagi.2014.00088

Imhof A et al. (2007). Morphological substrates of cognitive decline in nonagenarians and centenarians: a new paradigm? *J Neuroscience*. 257(1-2): 72-79.

Jellinger KA. (2013). Pathology and pathogenesis of vascular cognitive impairment—a critical update. doi: 10.3389/fnagi.2013.00017

Jiang L et al. (2016) Cortical Thickness Changes Correlate with Cognition Changes after Cognitive Training: Evidence from a Chinese Community Study. *Frontiers in Aging Neuroscience* doi: 10.3389/fnagi.2016.00118

Kennard & Woodruff-Pak. (2011). Age sensitivity of behavioral tests and brain substrates of normal aging in mice *Frontiers in Aging Neuroscience*. Vol 3 Article 9 doi: 10.3389/fnagi.2011.00009

Kent B. (2014). Synchronizing an aging brain: can entraining circadian clocks by food slow Alzheimer’s disease? *Frontiers in Aging Neuroscience*. doi: 10.3389/fnagi.2014.00234

Marchionni M et al. (2013). Inherited real risk of Alzheimer’s disease: bedside diagnosis and primary prevention. doi: 10.3389/fnagi.2013.00013

McGregor KM, et al. (2013). Effects of aerobic fitness on aging-related changes of interhemispheric inhibition and motor performance. doi: 10.3389/fnagi.2013.00066

Muscari A, et al. (2010). Chronic endurance exercise training prevents aging-related cognitive decline in healthy older adults: a randomized controlled trial
International Journal of Geriatric Psychiatry 25 (10), pg. 1055-1064

Pons van Dijk, et al. (2013). Taekwondo training improves balance in volunteers over 40. Frontiers in Aging Neuroscience doi: 10.3389/fnagi.2013.00010

Richards BA, et al. (2009). Patterns of cortical thinning in Alzheimer's disease and frontotemporal dementia. Neurobiology of Aging 30: 1626-1636.

Roberson, et al. (2012). Challenges and opportunities for characterizing cognitive aging across species. Frontiers of Neuroscience Aging.
doi: 10.3389/fnagi.2012.00006

Roth GS, et al. (2004). Aging in rhesus monkeys: relevance to human health interventions. Science 305: 1423-1426.

Santos NC, et al. (2014). Clinical, physical and lifestyle variables and relationship with cognition and mood in aging: across-sectional analysis of distinct educational groups. Frontiers in Aging Neuroscience doi: 10.3389/fnagi.2014.00021

Scharaga R, Holtzer R. (2015). Preliminary findings of the Brief Everyday Activities Measurement (BEAM) in older adults. The Journal of Nutrition Health and Aging 19:929-934

Sinclair DA, (2005). Toward a unified theory of caloric restriction and longevity regulation. Mech Ageing Dev 126:987-1002.

Sternberg DA, et al. (2013). The largest human cognitive performance dataset reveals insights into the effects of lifestyle factors and aging. Frontiers in Human Neuroscience doi: 10.3389/fnhum.2013.00292

Tampellini D. (2015). Synaptic activity and Alzheimer's disease: a critical update. Frontiers in Neuroscience doi.org/10.3389/fnins.2015.00423

Tampi RR, et al. (2015). Mild cognitive impairment: A comprehensive review. Healthy Aging Research 4:39

Wei G. et al. (2014). Tai Chi Chuan optimizes the functional organization of the intrinsic human brain architecture in older adults. Frontiers in Aging Neuroscience. doi: 10.3389/fnagi.2014.00074