

PSYD50H3 S: Current Topics in Memory & Cognition

Winter 2016

Monday 19:00 – 21:00, BV 355

Course Instructor:	Danielle Douglas, M.A. d.douglas@mail.utoronto.ca*
Office Hours:	Monday 17:30 – 18:30; SW 413A Or by appointment, Monday and Friday only

*Please see e-mail policy below before sending an e-mail.

Course Description & Learning Objectives

With one singular exception, time's arrow is straight. Unidirectionality of time is one of nature's most fundamental laws. [...] The singular exception is provided by the human ability to remember past happenings. When one thinks today about what one did yesterday, time's arrow is bent into a loop. The rememberer has mentally traveled back into her past and thus violated the law of the irreversibility of the flow of time. Endel Tulving, 2002, *Episodic Memory: From Mind to Brain*.

The ability to mentally project oneself into past experiences is thought to be a uniquely human capacity, and presents one of the greatest mysteries of cognitive neuroscience. This course will focus on the learning opportunities presented by this fascinating “singular exception” and guide students through a critical analysis of the scientific literature pertaining to how episodic memory is supported by the brain. Weekly theoretical review papers will introduce students to current ideas on how the mind and brain support episodic memory, and student-lead presentations of research papers will tie theory to empirical findings. A capstone research proposal will present students with the opportunity to creatively apply concepts discussed in class and learned through self-directed readings.

This course will offer students a chance to develop their ability to critically assess cognitive neuroscience research of memory. Students will showcase their research skills in oral and written presentations and in-class discussions. Students will further demonstrate their ability to interact with their peers in a collegiate setting through contributions to in-class discussions and providing feedback on the work of their peers.

Evaluations of performance will center on five main learning objectives:

Learning Objectives

- 1 Understand, describe, summarize, and investigate** theories surrounding episodic memory.
- 2 Apply** concepts from readings to in-class discussions and presentations; **develop** informed opinions regarding interpretations of empirical research.
- 3 Discuss, examine, and question** support for and against hypotheses encountered in readings.
- 4 Integrate** information gleaned from a variety of sources into oral and written presentations.
- 5 Propose** an experiment that incorporates research presented in class and in self-guided readings.

Course Requirements & Assignments

Grading Breakdown

Oral Presentation	25%
Participation	30%
Research question & annotated bibliography	10%
Final research proposal	35%

Oral Presentation (25%): Each student will present one* of the research articles listed below for approximately 25-30* minutes. The presentation should provide **a theoretical introduction to the topic, a detailed critical account of the primary source research article, and a discussion of the theoretical implications.** The presentation should additionally incorporate and cite at least one other research article (not review article) into the theoretical discussion. By the end of the presentation, listeners should have a clear understanding of the topic as a whole, including pertinent theories and issues of debate in the field. Presentations should begin with enough background information to set-up the research question of interest, and end off with critical issues to be addressed by the class.

Oral presentations will be evaluated for clarity, logical flow, critical argument, accuracy, and engagement.

Powerpoint slides should be e-mailed to the course instructor on the day of the presentation, no later than 5pm. Please see e-mail policy below before sending an e-mail.

**This may change depending on the final number of presenters in the class.*

Participation (35%): Students are expected to actively participate in the discussion in every class. Active participation will be evaluated in three ways:

- 1. Discussion leader:** Each student will have one opportunity to lead the discussion of the research article following another student's oral presentation. The discussion leader will be responsible for stimulating discussion and fielding questions from the class.
- 2. Peer feedback:** All students will be expected to provide respectful feedback to presenters following each oral presentation. Time will be set-aside for students to fill out a peer evaluation form. Courteous, constructed comments are also expected, and should reflect the attention paid to the presentation.
- 3. Weekly discussion & preparation:** Students will write a very brief summary of the assigned theoretical and research papers every week. These should be as concise as possible, with a maximum of 5 sentences for each research article, and 10 sentences for the theoretical background paper. Students will additionally generate at least 2 questions or comments for each research article, comprising no more than three sentences each. At least 1 of these questions/comments should address possible future directions in the form of a research question, which should be clearly identified with the header "Research question". **Students will be expected to share their questions during the in-class discussions of research articles, this will also count towards participation marks.**

All questions/comments should demonstrate critical thinking and express the student's own original ideas about the research article. For example, one could address the perceived strengths and/or weaknesses of the paper, question the validity of the measures used or conclusions drawn, connect ideas from two different papers, or suggest an improvement to the study. Research questions should be logically justified (e.g. "The same experiment would be interesting in older adults" is not acceptable without giving reasoning, i.e. "because of the hippocampal atrophy that accompanies aging").

Assignments should be submitted via Blackboard before class at **7 pm**. No late assignments will be accepted. **Credit for the assignment is also dependent on the student's attendance in class that day;** the written questions are not a substitute for in-class participation. Assignments will be automatically given a grade of "complete" or "incomplete". However, I will dock participation marks if the summary or questions lack in detail or clarity. Due to time constraints, I will not provide detailed written feedback on weekly discussion questions. Students are not expected to complete this assignment for the week that they present, plus one other week -- attendance is still mandatory.

Research question & annotated bibliography (10%): The aim of this assignment is to prepare for the final research proposal assignment. It will comprise two sections

- 1. Research question:** In a single, concise paragraph (no more than ½ a page double-spaced), explain the gap in the current literature that you will address with your research proposal. This should conclude with a **statement of the research question** that will be addressed in the final paper.
- 2. Annotated bibliography:** On a separate page, provide a list of references in APA format listing at least 4 primary source research articles (not review papers). For each reference, provide a **concise summary of the referenced experiment** (2 - 4 sentences), along with a **statement of how this relates to your research question** (1-2 sentences). Resources and examples of annotated bibliographies will be posted to Blackboard later in the semester.

This assignment is due in hard copy at the beginning of class on February 22nd

Final research proposal (35%): The goal of this assignment is to propose a novel research project of the student's choosing within the realm of episodic memory. Non-human animal studies are acceptable, as long as they are explicitly related to their implications for human episodic memory. The paper should be no more than 15 pages double spaced, including a title page, abstract (250 words maximum), and reference section. All sections of the paper should be in APA format (see the writing and format section below). Figures (with appropriate legends) are encouraged. The body of the proposal itself will consist of two parts:

- 1. A literature review:** Provide a concise but adequately detailed review of the literature directly related to the research question that goes beyond information covered in class. This should cite at least 5 primary source research articles. This section should integrate the findings of relevant empirical research into a coherent argument for the importance of your proposed project. This section should conclude with a clearly stated research question and hypothesis.
- 2. A proposal for a novel experiment:** Detail your methods, expected results, and implications of expected results. Label each section clearly.

Methods – Outline the experimental approach to address the research question. State the experimental paradigm, technique, independent variable(s), dependent variable(s), and population. The statement should be concise with enough detail for the reader to understand how the research question will be addressed.

Predicted results – Describe the expected findings and explain the reasoning behind this expectation.

Interpretation of predicted results – Explain the direct interpretation of the results in relation to your hypothesis. Further explore the wider implications of these results to the literature and relevant theories, emphasizing why they are an important contribution to the field.

This assignment is due in hard copy at the beginning of class on March 21st. Except in the case of a documented emergency (see below), for every 24 hours that the paper is late, 10% will be docked off the final mark. The 24 hour period includes weekends.

On time	Full grade
24-48 h late	90% of original grade
48-72 h late	80% of original grade
72-96 h late	70% original grade, etc...

A topic for the proposal should be e-mailed directly to the course instructor (see e-mail policy below) no later than February 8th. This should be very brief – no more than 2-3 sentences.

Tentative Timetable

Class	Date	Topic
1	Jan 11	Introduction & background concepts <i>What is memory, and how can we study it?</i>
2	Jan 18	Dissociations of memory systems: Declarative and non-declarative memory <i>Are there multiple forms of human memory?</i>
3	Jan 25	Dissociations within declarative memory: Semantic memory and episodic memory <i>Are there multiple forms of declarative memory?</i>
4	Feb 1	Dissociations of episodic memory: Recollection and familiarity (Neuroimaging) <i>Are there multiple components of episodic memory?</i>
5	Feb 8	Dissociations of memory systems: Recollection and familiarity (Patients) <i>Are there multiple components of episodic memory?</i> E-mail me a topic for your final research proposal
	Feb 15	No Class – Reading week
6	Feb 22	Systems Consolidation <i>Where are memories stored over time?</i> Research question & annotated bibliography due
7	Feb 29	Synaptic (Re)consolidation <i>How stable are memories over time?</i>
8	Mar 7	Emotional memory <i>How is emotional content represented in episodic memory?</i>
9	Mar 14	Future imagining <i>How is episodic memory related to the ability to imagine the future?</i>
10	Mar 21	The representation of space in episodic memory <i>Does space play a special role in the episodic memory?</i> Final research proposal due
11	Mar 28	Episodic memory in non-human animals <i>Are non-human animals capable of creating episodic memories?</i>

Drop date (without academic penalty): Sunday, March 20th is the last day to drop course from academic record and GPA. After this deadline a mark is recorded for each course, whether course work is completed or not (a 0 is assigned for incomplete work), and calculated into the GPA.

Required Readings & Presentation Schedule

There is no textbook for this class. Instead, students are expected to have read the below papers before class for the week that they are assigned (weeks 2-11).

Wk 2, Jan 18	Dissociations of memory systems: Declarative and non-declarative memory
Background Article	Squire, L. R., & Zola-Morgan, A. J. O. (1991). Conscious and unconscious memory systems. <i>Cold Spring Harbor Perspectives in Biology</i> , 7(3), a021667. http://goo.gl/kP2iZS
Research Article 1	Bayley, P. J., Frascino, J. C., & Squire, L. R. (2005). Robust habit learning in the absence of awareness and independent of the medial temporal lobe. <i>Nature</i> 436(7050), 550–553. http://simplelink.library.utoronto.ca/url.cfm/492593
	Presenter: Thrilo Discussion Leader: Brian
Research Article 2	Gabrieli, J. D., Fleischman, D. A., Keane, M. M., Reminger, S. L., & Morrell, F. (1995). Double dissociation between memory systems underlying explicit and implicit memory in the human brain. <i>Psychological Science</i> , 6(2), 76-82. http://simplelink.library.utoronto.ca/url.cfm/492595

Wk 3, Jan 25	Dissociations within declarative memory: Semantic memory and episodic memory
Background Article	Tulving, E. (2002). Episodic memory: from mind to brain. Annual review of psychology, 53(1), 1-25. http://simplelink.library.utoronto.ca/url.cfm/492596
Research Article 1	Vargha-Khadem, F., Gadian, D. G., Watkins, K. E., Connelly, A., Van Paesschen, W., & Mishkin, M. (1997). Differential effects of early hippocampal pathology on episodic and semantic memory. Science, 277(5324), 376-380. http://goo.gl/0D14Lm
	Presenter: Velanie Discussion Leader: Roshana
Research Article 2	Levine, B., Turner, G. R., Tisserand, D., Hevenor, S. J., Graham, S. J., & McIntosh, A. R. (2004). The functional neuroanatomy of episodic and semantic autobiographical remembering: a prospective functional MRI study. Journal of Cognitive Neuroscience, 16(9), 1633-1646. http://goo.gl/9DBcJC

Wk 4, Feb 1	Dissociations of episodic memory: Recollection and familiarity (Neuroimaging)
Background Articles	1. Davachi, L. (2006). Item, context and relational episodic encoding in humans. Current opinion in neurobiology, 16(6), 693-700. http://simplelink.library.utoronto.ca/url.cfm/492598 2. Squire, L. R., Wixted, J. T., & Clark, R. E. (2007). Recognition memory and the medial temporal lobe: a new perspective. Nature Reviews Neuroscience, 8(11), 872-883. http://simplelink.library.utoronto.ca/url.cfm/492599
Research Article 1	Ranganath, C., Yonelinas, A. P., Cohen, M. X., Dy, C. J., Tom, S. M., & D'Esposito, M. (2004). Dissociable correlates of recollection and familiarity within the medial temporal lobes. Neuropsychologia, 42(1), 2-13. http://simplelink.library.utoronto.ca/url.cfm/492601
	Presenter: Audree Discussion Leader: Jin
Research Article 2	Eldridge, L. L., Knowlton, B. J., Furmanski, C. S., Bookheimer, S. Y., & Engel, S. A. (2000). Remembering episodes: a selective role for the hippocampus during retrieval. Nature Neuroscience, 3(11), 1149-1152. http://simplelink.library.utoronto.ca/url.cfm/492602

Wk 5, Feb 8	Dissociations of memory systems: Recollection and familiarity (Patients)
Background Article	<i>Same two background articles as last week – no summary of the background articles this week.</i>
Research Article 1	Yonelinas, A. P., Lazzara, M. M., Sauve, M., Widaman, K. F., & Knight, R. T. (2002). Effects of extensive temporal lobe damage or mild hypoxia on recollection and familiarity. Nature Neuroscience, 5(11), 1236-1241. http://simplelink.library.utoronto.ca/url.cfm/492603
	Presenter: Dora Discussion Leader: Philip
Research Article 2	Bowles, B., Crupi, C., Pigott, S., Parrent, A., Wiebe, S., Janzen, L., & Köhler, S. (2010). Double dissociation of selective recollection and familiarity impairments following two different surgical treatments for temporal-lobe epilepsy. Neuropsychologia, 48(9), 2640-2647. http://simplelink.library.utoronto.ca/url.cfm/492604

Wk 6, Feb 22	Systems Consolidation
Background Article	Moscovitch, M., Nadel, L., Winocur, G., Gilboa, A., & Rosenbaum, R. S. (2006). The cognitive neuroscience of remote episodic, semantic and spatial memory. Current Opinion in Neurobiology, 16(2), 179-190. http://simplelink.library.utoronto.ca/url.cfm/492605

Research Article 1	Rosenbaum, R. S., Moscovitch, M., Foster, J. K., Schnyer, D. M., Gao, F., Kovacevic, N., ... & Levine, B. (2008). Patterns of autobiographical memory loss in medial-temporal lobe amnesic patients. <i>Journal of Cognitive Neuroscience</i> , 20(8), 1490-1506. http://simplelink.library.utoronto.ca/url.cfm/492606
	Presenter: Jodi Discussion Leader: Audree
Research Article 2	Gilboa, A., Winocur, G., Grady, C. L., Hevenor, S. J., & Moscovitch, M. (2004). Remembering our past: functional neuroanatomy of recollection of recent and very remote personal events. <i>Cerebral Cortex</i> , 14(11), 1214-1225. http://simplelink.library.utoronto.ca/url.cfm/492607

Wk 7, Feb 29	Synaptic (Re)consolidation
Background Article	Nader, K., & Hardt, O. (2009). A single standard for memory: the case for reconsolidation. <i>Nature Reviews Neuroscience</i> , 10(3), 224-234. http://goo.gl/6VqSI2
Research Article 1	Hupbach, A., Hardt, O., Gomez, R., & Nadel, L. (2008). The dynamics of memory: context-dependent updating. <i>Learning & Memory (Cold Spring Harbor, N.Y.)</i> , 15(8), 574-579. http://goo.gl/5luzyy
	Presenter: Philip Discussion Leader: Velanie
Research Article 2	Kroes, M. C. W., Tendolkar, I., van Wingen, G. A., van Waarde, J. A., Strange, B. A., & Fernández, G. (2014). An electroconvulsive therapy procedure impairs reconsolidation of episodic memories in humans. <i>Nature Publishing Group</i> , 17(2), 204-206. http://simplelink.library.utoronto.ca/url.cfm/492609

Wk 8, Mar 7	Emotional memory
Background Article	LaBar, K. S., & Cabeza, R. (2006). Cognitive neuroscience of emotional memory. <i>Nature Reviews Neuroscience</i> , 7(1), 54-64. http://simplelink.library.utoronto.ca/url.cfm/492610
Research Article 1	Kensinger, E. A., & Schacter, D. L. (2006). Amygdala activity is associated with the successful encoding of item, but not source, information for positive and negative stimuli. <i>The Journal of Neuroscience</i> , 26(9), 2564-2570. http://simplelink.library.utoronto.ca/url.cfm/492611
	Presenter: Jordan Discussion Leader: Dora
Research Article 2	Adolphs, R., Tranel, D., & Buchanan, T. W. (2005). Amygdala damage impairs emotional memory for gist but not details of complex stimuli. <i>Nature neuroscience</i> , 8(4), 512-518. http://goo.gl/wEZZgo

Wk 9, Mar 14	Future imagining
Background Article	Schacter, D. L., Addis, D. R., & Buckner, R. L. (2007). Remembering the past to imagine the future: the prospective brain. <i>Nature Reviews Neuroscience</i> , 8(9), 657-661. http://simplelink.library.utoronto.ca/url.cfm/492613
Research Article 1	Hassabis, D., Kumaran, D., Vann, S. D., & Maguire, E. A. (2007). Patients with hippocampal amnesia cannot imagine new experiences. <i>Proceedings of the National Academy of Sciences</i> , 104(5), 1726-1731. http://simplelink.library.utoronto.ca/url.cfm/492614
	Presenter: Jin Discussion Leader: Jordan
Research Article 2	Addis, D. R., Wong, A. T., & Schacter, D. L. (2007). Remembering the past and imagining the future: common and distinct neural substrates during event construction and

elaboration. *Neuropsychologia*, 45(7), 1363–1377.
<http://simplelink.library.utoronto.ca/url.cfm/492615>

Presenter: Andrew

Discussion Leader: Jodi

Wk 10, Mar 21 The representation of space in episodic memory

Background Article Maguire, E. A., & Mullally, S. L. (2013). The hippocampus: a manifesto for change. *Journal of Experimental Psychology: General*, 142(4), 1180. <http://goo.gl/Ol6ccD>

Research Article 1 Mullally, S. L., Intraub, H., & Maguire, E. A. (2012). Attenuated Boundary Extension Produces a Paradoxical Memory Advantage in Amnesic Patients. *Current Biology*, 22(4), 261–268. <http://goo.gl/nZN5gA>

Presenter: Danielle

Discussion Leader: Danielle

Research Article 2 Bird, C. M., Capponi, C., King, J. A., Doeller, C. F., & Burgess, N. (2010). Establishing the boundaries: the hippocampal contribution to imagining scenes. *The Journal of Neuroscience*, 30(35), 11688-11695.

<http://simplelink.library.utoronto.ca/url.cfm/492616>

Wk 11, Mar 28 Episodic memory in non-human animals

Background Article Clayton, N. S., Bussey, T. J., & Dickinson, A. (2003). Can animals recall the past and plan for the future? *Nature Reviews Neuroscience*, 4(8), 685-691.
<http://simplelink.library.utoronto.ca/url.cfm/481856>

Research Article 1 Clayton, N. S., & Dickinson, A. (1998). Episodic-like memory during cache recovery by scrub jays. *Nature*, 395(6699), 272-274.
<http://simplelink.library.utoronto.ca/url.cfm/492617>

Presenter: Brian

Discussion Leader: Thrilo

Research Article 2 Raby, C. R., Alexis, D. M., Dickinson, A., & Clayton, N. S. (2007). Planning for the future by western scrub-jays. *Nature*, 445(7130), 919-921.

<http://simplelink.library.utoronto.ca/url.cfm/492618>

Presenter: Roshana

Discussion Leader: Andrew

Course Policies

Blackboard & Announcements: Students are wholly responsible to keeping up to date with announcements and assignments via the course website on Blackboard.

E-mail: All e-mails should have “PSYD50” in the subject line. Questions regarding course content should be asked during class or office hours whenever possible. If the question is extensive, please discuss it during office hours, or before, during, or after class. Please do not e-mail me to discuss ideas for presentations or final project topics; these will only be discussed during office hours or by appointment. E-mails will not be answered between 5pm Friday and 1 pm Monday.

Missed oral presentation/assignments: Students are expected to make every effort to attend class, especially on the day of their presentation. Because the presentation schedule will be decided in advance, there will be no opportunity for a make-up presentation unless another slot becomes available. If you are unable to attend class on the test day and you have a legitimate excuse, the remaining elements of your grade will be re-weighted. Similarly, class participation cannot be rescheduled, and thus the participation grade will be re-weighted to account for the illness.

Legitimate excuses include a documented family emergency, a conflict with a high priority academic activity that cannot be rescheduled, or a documented severe illness making it impossible to present or attend class. If you miss the test due to severe illness, you must complete the student medical certificate (http://www.utsc.utoronto.ca/~registrar/resources/pdf_general/UTSCmedicalcertificate.pdf). Medical documentation must show that the physician was consulted within 1 day of the missed term test. Contact me as soon as you are aware of the conflict.

I must receive all documentation within 7 days of the assignment (including weekends/holidays). Please deliver the form to the course instructor during office hours, or to Gloria Luza in room SW420B. Missed or unexcused assignments will be treated as zeroes.

Appropriate documentation is required in all emergency situations. Without proof of a legitimate emergency, no extensions or exemptions will be given.

Contesting a grade: All calculation errors will be recalculated immediately, upon notice. All other requests for a re-grade must be submitted **in writing** to the course instructor's e-mail address (see e-mail policy above) within two weeks of the day the grade is available. Only requests that include adequate written justification of an error in the original grading will be considered. *A re-grade request will result in the entire assignment being re-graded, **your grade may be raised, lowered, or it may stay the same.*** **Negotiations for extra marks once final grades are in will not be tolerated.**

Formatting and Writing Requirements

Clear communication of one's ideas is an essential skill in any workplace. Grammar, spelling, and style will all be considered when assigning grades to written works. For more information on campus writing centres and writing courses, please visit <http://www.utsc.utoronto.ca/twc/welcome>.

Formal written assignments (research question & research proposal) **MUST** follow APA style, both in formatting and in written style. Deviations from these guidelines on assignments will be penalized with docked marks.

An excellent set of guidelines to APA formatting, with illustrative examples:
<https://owl.english.purdue.edu/owl/resource/560/01/>

FAS Grading Guidelines (<http://www.writing.utoronto.ca/advice/general/grading-policy>):

A+ Outstanding performance, exceeding even the A described below.

A Exceptional performance: strong evidence of original thinking; good organization, capacity to analyze and synthesize; superior grasp of subject matter with sound critical evaluations; evidence of extensive knowledge base.

B Good performance: evidence of grasp of subject matter; some evidence of critical capacity and analytic ability; reasonable understanding of relevant issues; evidence of familiarity with the literature.

C Intellectually adequate performance: student who is profiting from her or his university experience; understanding of the subject matter and ability to develop solutions to simple problems in the material.

D Minimally acceptable performance: some evidence of familiarity with subject matter and some evidence that critical and analytic skills have been developed.

F Inadequate performance: little evidence of even superficial understanding of the subject matter; weakness in critical and analytic skills; with limited or irrelevant use of literature.

Academic Resources

Accessibility Needs: Students with diverse learning styles and needs are welcome in this course. In particular, if you have a disability/health consideration that may require accommodations, please feel free to approach me and/or Accessibility Services at (416) 978 8060; <http://www.accessibility.utoronto.ca>

Academic dishonesty and plagiarism: Academic integrity will be taken seriously in this course. In accordance with the University of Toronto's Code of Behaviour on Academic Matters (<http://sites.utoronto.ca/academicintegrity/resourcesforstudents.html>), the following are offences:

- To use someone else's ideas or words in one's own work without acknowledging in a citation that those ideas/words are not one's own.
- To include false, misleading or concocted citations in one's work.
- To obtain unauthorized assistance on any assignment or to provide unauthorized assistance to another student.
- To use or possess an unauthorized aid in any test or exam.
- To submit work for credit in more than one course without permission of the instructor.
- To falsify or alter any documentation required by the University (e.g., doctors' notes).

Assignments will be automatically given a grade of "complete" or "incomplete". However, I will dock participation marks if the summary or questions lack in detail or clarity. Due to time constraints, I will not provide detailed written feedback on weekly discussion questions. Students are not expected to complete this assignment for the week that they present, plus one other week -- attendance is still mandatory.