

**SEMINAR IN MEMORY AND COGNITION (HH/SC PSYC 4270 3.0 M)**

Term W 2020

Tuesdays, 11:30-14:30

VH 1158

Faculty of Health, York University

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**INSTRUCTOR:** R. Shayna Rosenbaum  
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**PREREQUISITES**

Students should be familiar with basic principles of brain function to fully appreciate the nature of cognitive models of memory.

**Course prerequisites are strictly enforced and include:**

- HH/PSYC 1010 6.00 (Introduction to Psychology), with a minimum grade of C.
- HH/PSYC 2021 3.00 (Statistical Methods I) or HH/PSYC 2020 6.00 (Statistical Methods I and II)
- HH/PSYC 2030 3.00 (Introduction to Research Methods) or substitutes
- HH/PSYC 2260 3.00 (Cognition) or HH/PSYC 3265 3.00 (Memory)
- Students must be in an Honours program in Psychology and have completed at least 84 credits (excluding (EDUC) education courses)

**Course Credit Exclusions:** Please refer to [York Courses Website](#) for a listing of any course credit exclusions.

**Course website:** [Moodle](#)

**COURSE DESCRIPTION**

This course will survey a variety of topics in the area of human memory and its relationship with other cognitive processes, such as perception, emotion, and executive function. Current theories and data on memory will be presented, focusing on the processes and systems involved at encoding, storage, and retrieval, as well as the errors of memory and the importance of memory in our everyday lives. Evidence derived from work with clinical populations with severe memory disturbances and healthy older individuals will be reviewed. Reference will also be made to research involving the use of animal models and the growing use of brain-imaging techniques to study the neural basis of memory. Students will have the opportunity to discuss and critique current research in memory, with particular attention to the ongoing debate regarding unitary versus multiple memory systems and the neural correlates of such systems.

## LEARNING OUTCOMES

Upon completion of this course, students should be able to:

1. Demonstrate in-depth knowledge of memory and cognition.
2. Critically evaluate, synthesize and resolve conflicting results of memory and cognition.
3. Articulate trends in the psychology of memory and cognition.
4. Locate research articles on memory and cognition and show critical thinking about research findings.
5. Express knowledge of memory and cognition in written form.
6. Engage in evidence-based dialogue with course director and peers.
7. Demonstrate an ability to work with others.

## EVALUATION

There is no examination in this course. Students will be assessed as follows:

1. Weekly Thought Papers: 30%

Students are required to submit 5 “thought papers” based on the week’s readings at the beginning of class (excluding the 1st and final classes). The purpose of the thought paper is to present your view of the readings in at least one of the following ways: describe the interesting or main questions and how well you believe they were addressed by one or more of the papers; evaluate the experimental design and/or the authors’ interpretation of the findings; discuss ideas for theory or experiments that the paper(s) inspired; describe how the papers complemented or contradicted each other. Importantly, the thought paper is NOT meant to summarize the readings but rather to serve as a stimulus for class discussion.

Thought papers should be 1 (minimum) to 2 (maximum) pages long (double-spaced, 12-point font, 1-inch margins all around), not including the title page and references (at least 1 reference must be included). 5 thought papers are required. A thought paper cannot be on the same topic of your class presentation (described next). Each paper will be graded on a 6-point scale (maximum grade = 30). **Late thought papers will not be accepted, so be sure to meet the deadline.**

2. Class Presentation: 20%

Each student will serve as a discussion leader and be responsible for presenting a seminar on one of the assigned topics. This will involve extracting the important issues of one or two of the readings, and posing discussion questions for class.

To lead the discussion, it will be necessary to elaborate on the Introduction of the paper and provide the theoretical context in which the main question or questions were asked in the paper. To do this well, you may need to read an additional article or two in order to be fully prepared to discuss the assigned paper. If you choose an empirical article, it will also be necessary to provide a concise description of the methods, the main findings, and interpretation of the findings. You should also share your take on the paper, and prepare a few questions to discuss. The questions can be points of confusion, issues for further consideration, follow-up research ideas, and so on. Sample questions are included with each topic, and you may use these as a guide for the questions that you pose for discussion. The presentation should take no more than 20-30 minutes.

### 3. Essay: 30%

At the end of the term, students will be required to submit a lengthier paper on one of the topics. In addition to the requirements for the thought paper, the essay should incorporate a creative or applied component. Some examples include: 1. Design of an original research proposal that would help advance our understanding of memory systems or processes; 2. Analysis of a literary work or movie that relates to a topic covered in the course; 3. Commentary on the content, retrieval process, or metacognitive aspects of a memory interview with a friend or relative. Papers should be **no longer than 8 pages, not including references** (12-point font, double-spaced, 1" margins). Before writing the paper, each student should discuss with me the topic chosen and the general approach the student wishes to take. The paper should be in APA format (see Publication Manual of the American Psychological Association, 6<sup>th</sup> Edition, Washington, DC: American Psychological Association). **There will be a penalty for late submissions of 10% per day. Due date: April 7, 2020**

### 4. Class Participation: 20%

Students are required to participate in class discussions by presenting the opinions, comments, or views they expressed in their thought papers and by offering answers to questions posed by others.

**Note: The last day to drop the course without receiving a grade on your transcript is March 13, 2020.**

## READINGS

There is no assigned text. Readings for each topic will consist of articles and/or book chapters selected by the instructor and will be available for download from the course website. The readings are intended to acquaint students with current issues and debate in the field of memory and serve to elaborate on topics discussed in class. Students will be expected to read the required readings for each topic *prior* to class and are also encouraged to sample any supplementary readings that are provided.

## ACADEMIC POLICIES

### Grading as per Senate Policy

The grading scheme for the course conforms to the 9-point grading system used in undergraduate programs at York (i.e., A+ = 9, A = 8, B+ = 7...C+ = 5, etc.). Assignments will bear either a letter grade designation or a corresponding number grade (e.g. A+ = 90 to 100, A = 80 to 90, B+ = 75 to 79, etc.) For a full description of York grading system see the York University Undergraduate Calendar - [Grading Scheme for 2019-20](#)

### Missed Classes, Presentations, or Assignment Deadlines

1. Students must email the instructor in advance of any missed class/presentation/deadline if at all possible; otherwise, within 24 hours following the missed class/presentation/deadline.

2. Appropriate documentation (See A, B below) verifying the circumstances for the missed class/presentation/deadline must be provided within 1 week (7 calendar days). Failure to provide appropriate documentation will result in: a grade of 0 for participation in a given class, thought papers, and presentations; a penalty of 10% per day for late essays.

A. Classes, presentations, and deadlines for thought papers and the essay missed due to medical reasons must be supported by an Attending Physician's Statement, which can be downloaded at the following link: <https://myacademicrecord.students.yorku.ca/pdf/attending-physicians-statement.pdf>

NOTE: The instructor and/or Psychology Undergraduate Office will verify the authenticity of medical notes. Falsification of any documentation relating to an absence or missed deadline is a serious academic offence (see "Academic Policies" below).

B. Classes, presentations, and deadlines missed for legitimate non-medical reasons must be supported by appropriate documentation (e.g., copy of a death certificate, automobile accident report, etc.). **Pre-booked travel is not a legitimate excuse.**

### Add/Drop Deadlines

For a list of all important dates please refer to: [Fall/Winter 2019-2020](#)

Important dates	Winter (W)
Last date to add a course <b>without</b> permission of instructor (also see Financial Deadlines)	Jan. 19
Last date to add a course <b>with permission</b> of instructor (also see Financial Deadlines)	Feb. 3
Last date to drop a course without receiving a grade (also see Financial Deadlines)	March 13
Course Withdrawal Period (withdraw from a course and receive a "W" on the transcript – see note below)	March 14 – April 5

*\*Note: You may withdraw from a course using the registration and enrolment system after the drop deadline until the last day of class for the term associated with the course. When you withdraw from a course, the course remains on your transcript without a grade and is notated as "W". The withdrawal will not affect your grade point average or count towards the credits required for your degree.*

### Electronic Device Policy

Absolutely no use of personal electronic devices (e.g., texting, email, social media) during class is permitted. Laptops may only be used for legitimate class related activities (e.g., taking notes, presenting). Violations of these rules will result in a loss of participation marks.

### Email Policy

All email correspondence to Dr. Rosenbaum must include the course code (PSYC 4270) in the subject-heading to prevent messages from being filtered as spam, and close with your full name and student number (e.g., "Jennifer Jones, 867530986"). A response from Dr. Rosenbaum can be expected within 48 hours, not including weekends. Please re-send your message if you do not receive a reply within this timeframe.

**Before contacting Dr. Rosenbaum, please reread the syllabus carefully to determine if it answers your question.**

**Attendance Policy**

Attendance is mandatory. To receive full participation marks, a student must:

1. Arrive on time and stay for the duration of the class.
2. Participate in class discussion.
3. Demonstrate knowledge of the assigned readings.

Please inform the instructor as soon as possible if there are extenuating circumstances that may interfere with the successful completion of the course requirements in order to make appropriate arrangements.

**Academic Integrity for Students**

York University takes academic integrity very seriously; please familiarize yourself with Information about the [Senate Policy on Academic Honesty](#).

**NOTE:** All students must review the Spark Academic Integrity modules:

(<https://spark.library.yorku.ca/academic-integrity-module-objectives/>). These modules explain principles of academic honesty. You must also complete the [Academic Honesty Quiz](#), repeating if necessary until a perfect score is achieved, and provide a copy of the results to the Course Instructor (see course Moodle site).

**Academic Accommodation for Students with Disabilities:**

While all individuals are expected to satisfy the requirements of their program of study and to aspire to do so at a level of excellence, the university recognizes that persons with disabilities may require reasonable accommodation to enable them to do so. The [York University Accessibility Hub](#) is your online stop for accessibility on campus. The [Accessibility Hub](#) provides tools, assistance and resources. Policy Statement

**Policy:** York University shall make reasonable and appropriate accommodations and adaptations in order to promote the ability of students with disabilities to fulfill the academic requirements of their programs. The nature and extent of accommodations shall be consistent with and supportive of the integrity of the curriculum and of the academic standards of programs or courses. Provided that students have given sufficient notice about their accommodation needs, instructors shall take reasonable steps to accommodate these needs in a manner consistent with the guidelines established hereunder.

For Further Information please refer to: [York University academic accommodation for students with disabilities policy](#)

**Course Materials Copyright Information**

These course materials are designed for use as part of the HH/PSYC 4270 3.0M course at York University and are the property of the instructor unless otherwise stated. Third party copyrighted materials (such as book chapters, journal articles, music, videos, etc.) have either been licensed for use in this course or fall under an exception or limitation in Canadian Copyright law.

Copying this material for distribution (e.g. uploading material to a commercial third-party website) may lead to a violation of Copyright law. [Intellectual Property Rights Statement](#)

**Additional Resources**

A number of valuable resources are available to students at York University. Importantly, this includes the Writing Center. Please visit the website: <https://writing-centre.writ.laps.yorku.ca/>

**SCHEDULE OF LECTURES AND READINGS**

The reading list will be modified throughout the term, and additional readings will be added on occasion. See course Moodle site for most up-to-date list of readings for each week.

Jan. 7	<p><b>Course Overview</b></p> <p>No Readings</p>
Jan. 14	<p><b>History and Methods in Memory and Cognitive Research</b></p> <p><u>History and Current Trends</u></p> <p>Bower, G.H. (2000). A brief history of memory research. In Tulving, E., &amp; Craik, F.I.M. (Eds.), <i>The Oxford Handbook of Memory</i>. New York: Oxford University Press.</p> <p>Queenan, B.N., Ryan, T.J., Gazzaniga, M.S., &amp; Gallistel, C.R. (2017). On the research of time past: the hunt for the substrate of memory. <i>Annals of the New York Academy of Sciences</i>, 1396(1). 108-125.</p> <p><u>Lesion Method</u></p> <p>Rosenbaum, R.S., Gilboa, A., &amp; Moscovitch, M. (2014). Case studies continue to illuminate the cognitive neuroscience of memory. <i>The Year in Cognitive Neuroscience, Annals of the New York Academy of Sciences</i>, 1316, 105-133.</p> <p><u>Neuroimaging</u></p> <p>Davis, T., &amp; Poldrack, R.A. (2013). Measuring neural representations with fMRI: practices and pitfalls. <i>Annals of the New York Academy of Sciences</i>, 1296, 108-134.</p> <p>Argyropoulos GP, Loane C, Roca-Fernandez A, Lage-Martinez C, Gurau O, Irani SR, Butler CR. (in press). Network-wide abnormalities explain memory variability in hippocampal amnesia. <i>Elife</i>.</p>
Jan. 21	<p><b>Object Recognition and Semantic Memory</b></p> <p><u>Object and Face Recognition</u></p> <p>Overview: Freiwald, W., Duchaine, B., &amp; Yovel, G. (2016). Face Processing Systems: From Neurons to Real-World Social Perception. <i>Annual Review of Neuroscience</i>, 39, 325-346.</p> <p>Liu TT, Freud E, Patterson C, Behrmann M. (2019). Perceptual Function and Category-Selective Neural Organization in Children with Resections of Visual Cortex. <i>Journal of Neuroscience</i>, 39(32), 6299-6314.</p> <p>Sunday MA, McGugin RW, Tamber-Rosenau BJ, Gauthier I. (2018). Visual imagery of faces and cars in face-selective visual areas. <i>PLoS One</i>, 13(9), e0205041.</p>

	<p><u>Semantic Memory</u></p> <p>Simmons, W.K., &amp; Martin, A. (2009). The anterior temporal lobes and the functional architecture of semantic memory. <i>Journal of the International Neuropsychological Society</i>, 15, 645-649.</p> <p>Chiou R, Lambon Ralph MA. (2019). Unveiling the dynamic interplay between the hub-and-spoke-components of the brain's semantic system and its impact on human behaviour. <i>Neuroimage</i>, 199, 114-126.</p> <p>Wurm MF, Caramazza A, Lingnau A. (2017). Action Categories in Lateral Occipitotemporal Cortex Are Organized Along Sociality and Transitivity. <i>Journal of Neuroscience</i>, 37(3), 562-575</p>
Jan. 28	<p><b>Implicit Memory</b></p> <p>Overview – Cognitive/Neuropsychology: Schacter, D.L. (1987). Implicit memory: History and current status. <i>Journal of Experimental Psychology: Learning, Memory, and Cognition</i>, 13, 501-518.</p> <p>Overview – Neuroimaging: Reber, P.J. (2013). The neural basis of implicit learning and memory: a review of neuropsychological and neuroimaging research. <i>Neuropsychologia</i>, 51, 2026-2042.</p> <p>Poppenk, J., McIntosh, A.R., &amp; Moscovitch, M. (2016). fMRI evidence of equivalent neural suppression by repetition and prior knowledge. <i>Neuropsychologia</i>, 90, 159-169.</p> <p>Gotts, S.J., Milleville, S.C., &amp; Martin, A. (2015). Object identification leads to a conceptual broadening of object representations in lateral prefrontal cortex. <i>Neuropsychologia</i>, 76, 62-78.</p> <p>Hannula, D.E., Baym, C.L., Warren, D.E., &amp; Cohen, N.J. (2012). The eyes know: eye movements as a veridical index of memory. <i>Psychological Science</i>, 23, 278-287.</p> <p>Batterink LJ, Paller KA, Reber PJ. (2019). Understanding the Neural Bases of Implicit and Statistical Learning. <i>Topics in Cognitive Science</i>, 11(3), 482-503.</p>
Feb. 4	<p><b>Retrieval and Distortion</b></p> <p><u>Retrieval</u></p> <p>Eldridge, L.L. et al. (2000). Remembering episodes: a selective role for the hippocampus during retrieval. <i>Nature Neuroscience</i>, 3, 1149-1152.</p> <p>Eichenbaum, H., Yonelinas, A. P., &amp; Ranganath, C. (2007). The medial temporal lobe and recognition memory. <i>Annual Review of Neuroscience</i>, 30, 123–152.</p>



	<p>Bowles, B., Crupi, C., Mirsattari, S.M., Pigott, S.E., Parrent, A.G., Pruessner, J.C., Yonelinas, A.P. &amp; Kohler, S. (2007). Impaired familiarity with preserved recollection after anterior temporal-lobe resection that spares the hippocampus. <i>Proceedings of the National Academy of Sciences, USA</i>, 16382-16387.</p> <p><u>Distortion</u></p> <p>Thakral, P.P., Madore, K.P., Devitt, A.L., &amp; Schacter, D.L. (2019). Adaptive constructive processes: An episodic specificity induction impacts false recall in the Deese-Roediger-McDermott paradigm. <i>Journal of Experimental Psychology: General</i>, 148(9), 1480-1493.</p> <p>Ghosh, V.E., Moscovitch, M., Melo Colella, B., &amp; Gilboa, A. (2014). Schema representation in patients with ventromedial PFC lesions. <i>Journal of Neuroscience</i>, 34, 12057-12070.</p>
Feb. 11	<p><b>Encoding and Perception</b></p> <p>Background: Craik, F.I. (2002). Levels of processing: past, present, and future? <i>Memory</i>, 10, 305-318.</p> <p>Background: Wagner, A. D. et al. (1998). Building memories: remembering and forgetting of verbal experiences as predicted by brain activity. <i>Science</i>, 281, 1188-1191.</p> <p>Brod, G., Lindenberger, U., Wagner, A.D., &amp; Shing, Y.L. (2016). Knowledge Acquisition during Exam Preparation Improves Memory and Modulates Memory Formation. <i>Journal of Neuroscience</i>, 36, 8103-8111.</p> <p>Behrmann, M., Lee, A.C., Geskin, J.Z., Graham, K.S., &amp; Barense, M.D. (2016). Temporal lobe contribution to perceptual function: A tale of three patient groups. <i>Neuropsychologia</i>, 90, 33-45.</p> <p>Baker, S., Vieweg, P., Gao, F., Gilboa, A., Wolbers, T., Black, S.E., &amp; Rosenbaum, R.S. (2016). The Human Dentate Gyrus Plays a Necessary Role in Discriminating New Memories. <i>Current Biology</i>, 26, 2629-2634.</p>
Feb. 18	<p><b>Reading Week</b></p>
Feb. 25	<p><b>Remote Memory, Consolidation, and Reconsolidation</b></p> <p>Overview: Moscovitch, M., Nadel, L., Winocur, G., Gilboa, A., &amp; Rosenbaum, R.S. (2006). The cognitive neuroscience of remote episodic, semantic, and spatial memory. <i>Current Opinion in Neurobiology</i>, 16, 179-190.</p> <p>Bonnici, H.M., Chadwick, M.J., &amp; Maguire, E.A. (2013). Representations of recent and remote autobiographical memories in hippocampal subfields. <i>Hippocampus</i>, 23, 849-854.</p> <p>Elward, R.L., &amp; Vargha-Khadem, F. (2018). Semantic memory in developmental amnesia. <i>Neuroscience Letters</i>, 680, 23-30.</p>

	<p>Snowden, J.S., Griffiths, H.L., &amp; Neary, D. (1996). Semantic-episodic memory interactions in semantic dementia: Implications for retrograde memory function. <i>Cognitive Neuropsychology</i>, 13, 1101-1137.</p> <p>Cellini N, Capuozzo A. (in press). Shaping memory consolidation via targeted memory reactivation during sleep. <i>Annals of the New York Academy of Sciences</i>.</p>
March 3	<p><b>Episodic Memory, Propection, and Time</b></p> <p>Overview: Schacter, D.L. (2019). Implicit Memory, Constructive Memory, and Imagining the Future: A Career Perspective. <i>Perspectives on Psychological Science</i>, 14(2), 256-272.</p> <p>Raby, C. R., Alexis, D. M., Dickinson, A. &amp; Clayton, N. S. (2007). Planning for the Future by Western Scrub-Jays. <i>Nature</i> 445, 919-921.</p> <p>Hassabis, D., Kumaran, D., Vann, S.D., &amp; Maguire, E.A. (2007). Patients with hippocampal amnesia cannot imagine new experiences. <i>Proceedings of the National Academy of Sciences</i>, 104, 1726-1731.</p> <p>Kwan, D., Craver, C.F., Green, L., Myerson, J., Gao, F., Black, S.E., &amp; Rosenbaum, R.S. (2015). Cueing the personal future to reduce discounting in intertemporal choice: Is episodic propection necessary? <i>Hippocampus</i>, 25, 432-443.</p> <p>De Brigard, F., Hanna, E., St Jacques, P.L., &amp; Schacter, D.L. (2019). How thinking about what could have been affects how we feel about what was. <i>Cognition and Emotion</i>, 33(4), 646-659.</p>
March 10	<p><b>Spatial Memory and Navigation</b></p> <p>Overview: Ekstrom, A., Spiers, H.J., Bohbot, V.D., &amp; Rosenbaum, R.S. (2018). <i>Human Spatial Navigation</i>. Princeton University Press.</p> <ul style="list-style-type: none"> <li>• Chapters 3 and 7</li> </ul> <p>Mullally, S.L., Intraub, H., Maguire, E.A. (2012). Attenuated boundary extension produces a paradoxical memory advantage in amnesic patients. <i>Curr. Biol.</i> 22:261–68</p> <p>Robin, J., Rivest, J., Rosenbaum, R.S., &amp; Moscovitch, M. (2019). Remote spatial and autobiographical memory in cases of episodic amnesia and topographical disorientation. <i>Cortex</i>, 119, 237-257.</p> <p>Marchette, S. A., Ryan, J. &amp; Epstein, R. A. Schematic representations of local environmental space guide goal-directed navigation. <i>Cognition</i> <b>158</b>, 68-80,</p> <p>Huffman, D.J., &amp; Ekstrom, A.D. (2019). A Modality-Independent Network Underlies the Retrieval of Large-Scale Spatial Environments in the Human Brain. <i>Neuron</i>, 104, 611-622.</p>

March 17	<p><b>Emotional Processing and Emotional Memory</b></p> <p>Overview: Adolphs, R. (2008). Fear, faces, and the human amygdala. <i>Current Opinion in Neurobiology</i>, 18, 166-172.</p> <p>Feinstein JS, Buzza C, Hurlemann R, Follmer RL, Dahdaleh NS, Coryell WH, Welsh MJ, Tranel D, Wemmie JA. (2013). Fear and panic in humans with bilateral amygdala damage. <i>Nature Neuroscience</i>, 16, 270-272.</p> <p>Kark SM, Slotnick SD, Kensinger EA. (in press). Forgotten but not gone: FMRI evidence of implicit memory for negative stimuli 24 hours after the initial study episode. <i>Neuropsychologia</i>.</p> <p>Tambini, A., Rimmele, U., Phelps, E.A., &amp; Davachi, L. (2017). Emotional brain states carry over and enhance future memory formation. <i>Nature Neuroscience</i>, 20(2):271-278.</p> <p>Payne, J.D., Stickgold, R., Swanberg, K., &amp; Kensinger, E.A. (2008). Sleep preferentially enhances memory for emotional components of scenes. <i>Psychological Science</i>, 19, 781-788.</p>
March 24	<p><b>Social Cognition</b></p> <p>Frith, C.D. &amp; Amodio, D.M. (2006). Meeting of Minds: The medial prefrontal cortex and social cognition. <i>Nature Reviews: Neuroscience</i>, 7, 268-277.</p> <p>Jenkins AC, Macrae CN, Mitchell JP. (2008). Repetition suppression of ventromedial prefrontal activity during judgments of self and others. <i>Proceedings of the National Academy of Sciences</i>, 105, 4507-4512.</p> <p>Deen, B., Koldewyn, K., Kanwisher, N., &amp; Saxe, R. (2015). Functional Organization of Social Perception and Cognition in the Superior Temporal Sulcus. <i>Cerebral Cortex</i>, 25, 4596-4609.</p> <p>Shenhav, A., &amp; Greene, J.D. (2014). Integrative moral judgment: dissociating the roles of the amygdala and ventromedial prefrontal cortex. <i>Journal of Neuroscience</i>, 34, 4741-4749.</p> <p>Craver, C.F., Keven, N., Kwan, D., Kurczek, J., Duff, M., &amp; Rosenbaum, R.S. (2016). Moral judgment in episodic amnesia. <i>Hippocampus</i>, 26, 975-979.</p>
March 31	<p><b>Memory and Aging</b></p> <p>Overview: Cabeza R, Albert M, Belleville S, Craik FIM, Duarte A, Grady CL, Lindenberger U, Nyberg L, Park DC, Reuter-Lorenz PA, Rugg MD, Steffener J, Rajah MN. (2018). Maintenance, reserve and compensation: the cognitive neuroscience of healthy ageing. <i>Nature Reviews Neuroscience</i>, 19(11), 701-710.</p> <p>Danckert SL, Craik FI. (2013). Does aging affect recall more than recognition memory? <i>Psychology and Aging</i>, 28, 902-909.</p>

Metcalf, J., Casal-Roscum, L., Radin, A., & Friedman, D. (2015). On teaching old dogs new tricks. *Psychological Science, 26*, 1833-1842.

Park, D.C., & Bischof, G.N. (2013). The aging mind: neuroplasticity in response to cognitive training. *Dialogues Clinical Neuroscience, 15*, 109-119.

Coughlan G, Coutrot A, Khondoker M, Minihane AM, Spiers H, Hornberger M. (2019). Toward personalized cognitive diagnostics of at-genetic-risk Alzheimer's disease. *Proceedings of the National Academy of Science USA, 116(19)*, 9285-9292.