

EDUC₃₀: EDUCATIONAL PSYCHOLOGY

Fall Term, 2019
2A: Tuesday, Thursday @ 2:25-4:15
x-period: Wednesday @ 4:35-5:25
Kemeny 006

Professor: David J.M. Kraemer, PhD
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Office hours: Weds. @ 1:00-3:00 & appts.
Office: Raven House 210

COURSE DESCRIPTION

This course challenges students to think critically about the relationship between what we know about the mind from experimental research in the lab and how we teach students to learn in classrooms. We read empirical articles and reviews of research that highlight the major concepts and theories from Psychology and Neuroscience that have bearing on Education. Our focus is on the relationship between learning and such topics as working memory, reinforcement, semantic knowledge, experience and practice, and what role can neuroscience play in informing educational practice.

The main goals of this course are to:

- Become proficient at reading empirical research articles in education, experimental psychology, and cognitive neuroscience
- Become familiar with the major concepts and theoretical models from psychology and neuroscience that relate to education
- Become adept at evaluating the merit of claims from proposed educational interventions (and from the media) regarding neuroscience or psychology concepts

COURSE REQUIREMENTS

- All readings will be available on Canvas and you are required to read the assigned papers before class.
- In-class discussion of assigned readings is a critical component of this course and will be facilitated by bringing the printed articles to class for your reference.
- Developing the skills of critically reading empirical research articles and writing for a scientific audience are central to achieving the course goals.

GRADING OVERVIEW

30%	Midterm Exam
30%	Final Exam
15%	Research Paper
10%	Group Presentation
10%	Quizzes: 6 total
5%	Class Participation and Attendance

ASSIGNMENTS and ASSESSMENTS

Midterm examination (30%) – **THURSDAY, OCTOBER 17TH**

- Mix of short answer and fill-in-the-blank questions
- Covers all material presented so far (readings, slides, discussions, etc.)

Final examination (30%) – **SUNDAY, NOVEMBER 24TH @ 11:30am**

- Mix of short answer and fill-in-the-blank questions
- Covers all material (heavier emphasis on material since midterm)

In-class Quizzes (10%) – **Six quizzes throughout the term**

- Will consist of short answer and fill-in-the-blank questions
- These are intended to be low-stakes opportunities for you and I both to gauge your understanding of the material
- Each quiz will include a collaborative component that will count for half the grade

Research Paper (15%) – **DUE: FRIDAY, NOVEMBER 22ND**

- A well-researched, well-reasoned, ~8-10 page paper relating your chosen topic of interest to an educational intervention (see assignment posted on Canvas for more details).
- This is an individual assignment (not a group project), and will be graded as such – *you are expected to do your own research and convey your own assessment of the material*
- Paper must reference at least 7 scientific sources (peer-reviewed articles) not assigned in class
- Of critical importance: always cite your sources when you assert a fact

Group Presentation (10%)

- In the last few weeks of the term, groups will be formed to work on a collaborative presentation. Each group will present a summary of each group member's research paper, half as posters and half in PowerPoint form. Each group member will teach their co-members about their topic and then present together as a group.

Class Participation and Attendance (5%)

- Arrive on time for each class
- Prepare for all class discussions and be an active class member (e.g., read the assigned materials, stay awake during class, stay off internet, etc.)

GENERAL POLICIES

1. **Read all materials and prepare for class.** You are expected to read the materials posted on Canvas *before* each class. Be prepared to discuss that material *in class*. Everyone is expected to come to every class and to arrive on time. You are also expected to contribute to class discussion. You will learn the material better and others will learn from you. The success of this course depends on everyone coming to class prepared and ready to discuss the material. Both attendance (on-time) and preparation for class will determine a portion of your grade.
2. **Before you turn in your papers...** make sure that you use 12-point Times New Roman font, that you double-space the whole document, that your print margins are 1-inch on all sides (not the default in *Word*), that all your pages are numbered, and that your document is stapled together (if printed). For citations in all papers, you must use APA Style formatting (refer to the APA Style Manual or online guides, such as: <http://owl.english.purdue.edu/owl/resource/560/01/>)
3. **Tell me sooner rather than later.** If you know ahead of time that you will be missing a class, e.g., for sports, please let me know in advance in order to avoid losing participation credit. Some students may wish to take part in religious observances that occur during this academic term. If you have a religious observance that conflicts with your participation in the course, please meet with me before the end of the second week of the term to discuss accommodations.
4. **ASSUME THAT I WILL NOT ACCEPT LATE ASSIGNMENTS.**
5. **Cell phones are not to be used in class.** If an emergency arises that requires the use of a phone, please quietly excuse yourself from the room to respond.
6. **Accessibility Needs and Accommodations.** Students with learning, physical, or psychiatric disabilities enrolled in this course who may need disability-related classroom accommodations are encouraged to make an office appointment to see me early in the semester (i.e., within the first two weeks). If you have not done so already, students requiring disability-related accommodations should register with the Student Accessibility Services office (301 Collis Student Center).
Dartmouth's policies and resources: <http://www.dartmouth.edu/~accessibility>
Contact info: 646-9900, Student.Accessibility.Services@Dartmouth.edu
7. **Plagiarism is unacceptable.** All work submitted as your own must be written by you and not previously submitted for any other class. It is important to attribute material that is the work of others to the original source. If you are unsure how to properly cite a source, please consult with me prior to handing in an assignment (and see: <http://www.dartmouth.edu/~writing/sources/>). You should be familiar with Dartmouth's Honor Principle, which applies to all courses at Dartmouth (<http://www.dartmouth.edu/judicialaffairs/honor/index.html>). I do not expect any violations of this code, but if any concerns do arise I will forward all related materials to Dartmouth's Committee on Standards.
8. **Statement on Mental Health** (from the COSL): "The academic environment at Dartmouth is challenging, our terms are intensive, and classes are not the only demanding part of your life. There are a number of resources available to you on campus to support your wellness, including: your undergraduate dean (<http://www.dartmouth.edu/~upperde/>), Counseling and Human Development (<http://www.dartmouth.edu/~chd/>), and the Student Wellness Center (<http://www.dartmouth.edu/~healthed/>)."

SCHEDULE
***(READINGS MAY CHANGE SLIGHTLY FROM THIS LIST;
ASSIGNED READINGS ARE ALWAYS POSTED ON CANVAS)***

1. Tuesday, September 17

INTRODUCTION and COURSE OVERVIEW

ATTENTION AND EXECUTIVE FUNCTIONS

2. Thursday, September 19

MULTI-TASKING

Readings:

- Watson, J. M., & Strayer, D. L. (2010). Supertaskers: Profiles in extraordinary multitasking ability. *Psychonomic Bulletin & Review*, 17(4), 479-485.
- Mueller, P. A., & Oppenheimer, D. M. (2014). The pen is mightier than the keyboard advantages of longhand over laptop note taking. *Psychological science*, 25(6), 1159-1168.

APPLYING THEORIES AND EVIDENCE FROM EDUCATION, PSYCHOLOGY, AND NEUROSCIENCE

Readings:

- Excerpts from Chapters 1 & 2 in: *Ed Psych*, Snowman & McCown (eds.)
- Willingham, D. T., & Lloyd, J. W. (2007). How educational theories can use neuroscientific data. *Mind, Brain, and Education*, 1(3), 140-149.

3. Tuesday, September 24

ATTENTION and WORKING MEMORY

Readings:

- Moreno, R., & Mayer, R. E. (1999). Cognitive principles of multimedia learning: The role of modality and contiguity. *Journal of Educational Psychology*, 91(2), 358-368.
- Gathercole, S. E., & Alloway, T. P. (2008). Working memory and classroom learning. *Applied cognitive research in K-3 classrooms*, 17-40.
- Fan, J., McCandliss, B. D., Sommer, T., Raz, A., & Posner, M. I. (2002). Testing the Efficiency and Independence of Attentional Networks. *Journal of Cognitive Neuroscience*, 14(3), 340-347.

4. Thursday, September 26

COGNITIVE CONTROL and EXECUTIVE FUNCTIONS

Readings:

- St Clair-Thompson, H. L., & Gathercole, S. E. (2006). Executive functions and achievements in school: Shifting, updating, inhibition, and working memory. *The Quarterly Journal of Experimental Psychology*, 59(4), 745-759.
- Miyake, A., & Friedman, N. P. (2012). The Nature and Organization of Individual Differences in Executive Functions: Four General Conclusions. *Current Directions in Psychological Science*, 21(1), 8-14.
- Shaw, P., Greenstein, D., Lerch, J., Clasen, L., Lenroot, R., Gogtay, N., Evans, A., Rapoport, J. & Giedd, J. (2006). Intellectual ability and cortical development in children and adolescents. *Nature*, 440(30), 676-679.

5. Tuesday, October 1

SELF-REGULATION and GRIT

Readings:

- Mischel, W., Ayduk, O., Berman, M. G., Casey, B. J., Gotlib, I. H., Jonides, J., ... Shoda, Y. (2011). "Willpower" over the life span: decomposing self-regulation. *Social Cognitive and Affective Neuroscience*, 6(2), 252-256.
- Muraven, M., & Baumeister, R. F. (2000). Self-regulation and depletion of limited resources: Does self-control resemble a muscle? *Psychological Bulletin*, 126(2), 247-259.
- Duckworth, A. L., Peterson, C., Matthews, M. D., & Kelly, D. R. (2007). Grit: Perseverance and passion for long-term goals. *Journal of Personality and Social Psychology*, 92(6), 1087-1101.

Thursday, October 3

CLASS WILL NOT MEET TODAY

MOTIVATION AND REINFORCEMENT

6. Tuesday, October 8

LEARNING and REINFORCEMENT

Readings:

- Schultz, W. (2007). Behavioral dopamine signals. *Trends in Neuroscience*, 30, 203-210.
- Olson, M. & Fazio, R. (2001). Implicit attitude formation through classical conditioning. *Psychological Science*, 12, 413-417.
- McAllister, L., Stachowiak, J., Baer, D., & Conderman, L. (1969). The application of operant conditioning techniques in a secondary school classroom. *The Journal of Applied Behavioral Analysis*, 2(4), 277-285.

7. Thursday, October 10

MOTIVATION and PRAISE

- Mueller, C. M., & Dweck, C. S. (1998). Praise for intelligence can undermine children's motivation and performance. *Journal of Personality and Social Psychology*, 75(1), 33-52.
- Mangels, J. A., Butterfield, B., Lamb, J., Good, C., & Dweck, C. S. (2006). Why do beliefs about intelligence influence learning success? A social cognitive neuroscience model. *Social Cognitive and Affective Neuroscience*, 1(2), 75-86.

8. Tuesday, October 15

POSITIVE BEHAVIORAL INTERVENTIONS and SUPPORT

- Horner, R. H., Sugai, G., Smolkowski, K., Eber, L., Nakasato, J., Todd, A. W., & Esperanza, J. (2009). A Randomized, Wait-List Controlled Effectiveness Trial Assessing School-Wide Positive Behavior Support in Elementary Schools. *Journal of Positive Behavior Interventions*, 11(3), 133-144.
- Sugai, G., & Horner, R. R. (2006). A promising approach for expanding and sustaining school-wide positive behavior support. *School Psychology Review*, 35(2), 245.

9. Thursday, October 17

****MIDTERM EXAM****

INTELLIGENCE, MEMORY, AND ACADEMIC ACHIEVEMENT

10. Tuesday, October 22

INTELLIGENCE

Readings:

- Nisbett, R. E., Aronson, J., Blair, C., Dickens, W., Flynn, J., Halpern, D. F., & Turkheimer, E. (2012). Intelligence: New findings and theoretical developments. *American Psychologist*, 130-159.
- Gray JR, Chabris CF, Braver TS. (2003). Neural mechanisms of general fluid intelligence. *Nature Neuroscience*. 6(3), 316-22.
- Owen, A. M., Hampshire, A., Grahn, J. A., Stenton, R., Dajani, S., Burns, A. S., Howard, R. J., et al. (2010). Putting brain training to the test. *Nature*, 465(7299), 775-778.

11. Thursday, October 24

TESTING EFFECT and DISTRIBUTED RETRIEVAL

Readings:

- Rohrer, D. & Pashler, H. (2007). Increasing retention without increasing study time. *Current Directions in Psychological Science*, 16, 183-186.

- Roediger, H. L., & Karpicke, J. D. (2006). Test-Enhanced Learning: Taking Memory Tests Improves Long-Term Retention. *Psychological Science*, 17(3), 249–255.
- Kornell, N. & Son, L.K. (2009). Learners’ choices and beliefs about self-testing. *Memory*, 17(5), 493-501.
- Semb, G., Ellis, J., Araujo, J. (1993). Long-term memory for knowledge learned in school, *Journal of Educational Psychology*, 85(2), 305-316.

12. Tuesday, October 29

REMEMBERING and FORGETTING

Readings:

- Roediger, H. & McDermott, K. (2000). Tricks of memory. *Current Directions in Psychological Science*, 9(4), 123-127.
- Altmann, E. & Gray, W. (2002). Forgetting to remember: the functional relationship of decay and interference, *Psychological Science*, 13(1), 27-33.
- Brady, T. F., Konkle, T., Alvarez, G. A., & Oliva, A. (2008). Visual long-term memory has a massive storage capacity for object details. *Proceedings of the National Academy of Sciences*, 105(38), 14325–14329.

KNOWLEDGE AND HIGHER-ORDER COGNITION

13. Thursday, October 31

HOW EXPERIENCE LEADS TO EXPERTISE

Readings:

- Carey S. (2004). Bootstrapping and the origin of concepts. *Daedalus*, Winter, 59-68.
- Carpenter, T. P., Fennema, E., & Franke, M. L. (1996). Cognitively guided instruction: A knowledge base for reform in primary mathematics instruction. *The Elementary School Journal*, 3–20.
- Kalyuga, S., Ayres, P., Chandler, P., & Sweller, J. (2003). The Expertise Reversal Effect. *Educational Psychologist*, 38(1), 23–31.

14. Tuesday, November 5

ORGANIZATION OF KNOWLEDGE and SEMANTIC MEMORY

Readings:

- Smith, Glenberg, & Bjork. (1978). Environmental context and human memory. *Memory & Cognition*, 6(4) 342-353.
- Allport, D. A., & Funnell, E. (1981). Components of the Mental Lexicon. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 295(1077), 397–410.
- Thompson-Schill (2003). Neuroimaging studies of semantic memory: Inferring “how” from “where”. *Neuropsychologia*, 41, 280-292.

15. Thursday, November 7

ACTIVE LEARNING and ANALOGICAL REASONING

Readings:

- Gentner, D., Loewenstein, J. & Thompson, L. (2003). Learning and transfer: A general rule for analogical encoding. *Journal of Educational Psychology*, 95, 393-405.
- Green, A. E., Fugelsang, J. A., Kraemer, D. J. M., Shamosh, N. A., & Dunbar, K. N. (2006). Frontopolar cortex mediates abstract integration in analogy. *Brain research*, 1096(1), 125-137.

16. Tuesday, November 12

ORAL PRESENTATIONS – DAY 1

17. Thursday, November 14

ORAL PRESENTATIONS – DAY 2

18. Tuesday, November 19

POSTER PRESENTATIONS

Sunday, November 24 – FINAL EXAM @ 11:30am
