

# Psychology 2550 : The Psychology of Learning and Teaching

Spring 2014, Wednesdays 2-4pm, [Memorial Hall 303](#)

Samuel T. Moulton, *PhD*

Director of Research and Assessment for HILT  
Associate, Department of Psychology  
samuel\_moulton@harvard.\_\_\_\_  
Smith Center 765B  
(617) 496-7054

Erin Driver-Linn, *PhD*

Director of the Harvard Initiative for Learning and Teaching (HILT)  
Associate Provost for Institutional Research  
erin\_driver-linn@harvard.\_\_\_\_  
Smith Center 774  
(617) 384-9033

## Description

As the pedagogical paradigms and practices of higher education are innovated at Harvard and beyond, what claims or assumptions about cognitive and social psychology are being tested? How can concepts, principles, and evidence from the psychological sciences inform university-level learning and teaching, and how can applied educational research inform our basic understanding of mental and social processes? In this seminar, the varied phenomena of higher education today—from MOOCs and flipped classrooms to grading and procrastination—will be used as a proving ground for understanding and evaluating major ideas and evidence from psychology.

## Motivation

Improving education is one of our thorniest and most pressing social problems. Higher education is, as anyone reading the paper knows, under scrutiny right now—in a time of disruption, in crisis, with many calling for evidence of the value of college and graduate school. You should take this course if you are skeptical about the existing evidence we have for the pedagogical or curricular traditions you experience as students and instructors. You should take this course if you are curious about the psychological findings that actually can be applied to educational practice. You should take this course if you would like to contribute to the knowledge base at Harvard that can help to shape the way we study education and improve it here, and perhaps beyond.

# Overview of Educational Psychology

## Required readings

- Gehlbach, H. (2010). The social side of school: Why teachers need social psychology. *Educational Psychology Review*, 22, 349-362. <http://link.springer.com/content/pdf/10.1007%2Fs10648-010-9138-3.pdf>
- Mayer, R. E. (1992). Cognition and instruction: Their historic meeting within educational psychology. *Journal of Educational Psychology*, 84, 405. <http://ezp-prod1.hul.harvard.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=pdh&AN=1993-15331-001&site=ehost-live&scope=site>

## Optional readings

- Halpern, D. F., & Hakel, M. D. (2003). Applying the science of learning to the university and beyond: Teaching for long-term retention and transfer. *Change: The Magazine of Higher Learning*, 35, 36-41. <http://www.tandfonline.com.ezp-prod1.hul.harvard.edu/doi/pdf/10.1080/00091380309604109>
- King, G., Sen, M. (2012). How social science research can improve teaching. *PS: Political Science and Politics*, 25, 1-38. <http://dx.doi.org.ezp-prod1.hul.harvard.edu/10.1017/S1049096513000619>
- Roediger, H. L. (2013). Applying cognitive psychology to education: Translational educational science. *Psychological Science in the Public Interest*, 14, 1-3. <http://psi.sagepub.com/content/14/1/1.full.pdf>
- Shavelson, R. J., & Towne, L. (Eds.). (2002). *Scientific research in education*. National Academies Press. <http://www.nap.edu/catalog/10236.html>
- Thorndike, E. L. (1906). *The principles of teaching: Based on psychology*. AG Seiler. <http://nrs.harvard.edu/urn-3:HUL.FIG:001933284> [Chapter 1: "Introduction", Chapter 16: "The Scientific Study of Teaching"]
- Walton, G. M., & Dweck, C. S. (2009). Solving social problems like a psychologist. *Perspectives on Psychological Science*, 4, 101-102. <http://pps.sagepub.com.ezp-prod1.hul.harvard.edu/content/4/1/101.full.pdf>
- Wieman, C. (2007). Why not try a scientific approach to science education? *Change: The Magazine of Higher Learning*, 39, 9-15. <http://www.tandfonline.com.ezp-prod1.hul.harvard.edu/doi/pdf/10.3200/CHNG.39.5.9-15>

## Spacing and Testing

### Required readings

Cepeda, N. J., Vul, E., Rohrer, D., Wixted, J. T., & Pashler, H. (2008). Spacing effects in learning: A temporal ridge line of optimal retention. *Psychological Science, 19*, 1095-1102. <http://ezp-prod1.hul.harvard.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=a2h&AN=35604554&site=ehost-live&scope=site>

Roediger, H. L., & Karpicke, J. D. (2006). The power of testing memory: Basic research and implications for educational practice. *Perspectives on Psychological Science, 1*, 181-210. <http://pps.sagepub.com.ezp-prod1.hul.harvard.edu/content/1/3/181.full.pdf>

### Optional readings

Carpenter, S. K., Cepeda, N. J., Rohrer, D., Kang, S. H., & Pashler, H. (2012). Using spacing to enhance diverse forms of learning: Review of recent research and implications for instruction. *Educational Psychology Review, 24*, 369-378. <http://link.springer.com.ezp-prod1.hul.harvard.edu/article/10.1007/s10648-012-9205-z>

Dempster, F. N. (1988). The spacing effect: A case study in the failure to apply the results of psychological research. *American Psychologist, 43*, 627. <http://ezp-prod1.hul.harvard.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=pdh&AN=1989-03118-001&site=ehost-live&scope=site>

Karpicke, J. D., & Blunt, J. R. (2011). Retrieval practice produces more learning than elaborative studying with concept mapping. *Science, 331*, 772-775. <http://www.sciencemag.org.ezp-prod1.hul.harvard.edu/content/331/6018/772.full.pdf> (see also commentary and response)

Rawson, K. A., Dunlosky, J., & Sciarтели, S. M. (2013). The power of successive relearning: Improving performance on course exams and long-term retention. *Educational Psychology Review, 25*, 523-548. <http://link.springer.com.ezp-prod1.hul.harvard.edu/article/10.1007/s10648-013-9240-4>

### Optional multimedia

Roediger, H. (2012). HILT talk. <http://youtu.be/7me7PCROc7Y>

Rawson, K. (2013). HILT talk. <http://youtu.be/z0v-1WhMA0c>

# Motivation

## Required reading

Grant, H., & Dweck, C. S. (2003). Clarifying achievement goals and their impact. *Journal of Personality and Social Psychology*, 85, 541. <http://ezp-prod1.hul.harvard.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=pdh&AN=2003-07329-012&site=ehost-live&scope=site>

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, 55, 68. <http://ezp-prod1.hul.harvard.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=pdh&AN=2000-13324-007&site=ehost-live&scope=site>

## Optional reading

Ariely, D., Gneezy, U., Loewenstein, G., & Mazar, N. (2009). Large stakes and big mistakes. *The Review of Economic Studies*, 76, 451-469. <http://www.jstor.org.ezp-prod1.hul.harvard.edu/stable/40247610>

Harackiewicz, J. M., Barron, K. E., Tauer, J. M., & Elliot, A. J. (2002). Predicting success in college: A longitudinal study of achievement goals and ability measures as predictors of interest and performance from freshman year through graduation. *Journal of Educational Psychology*, 94, 562. <http://ezp-prod1.hul.harvard.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=pdh&AN=2002-18006-008&site=ehost-live&scope=site>

Hulleman, C. S., Godes, O., Hendricks, B. L., & Harackiewicz, J. M. (2010). Enhancing interest and performance with a utility value intervention. *Journal of Educational Psychology*, 102, 880. <http://ezp-prod1.hul.harvard.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=pdh&AN=2010-21220-001&site=ehost-live&scope=site>

Locke, E. A., & Latham, G. P. (2002). Building a practically useful theory of goal setting and task motivation: A 35-year odyssey. *American Psychologist*, 57, 705. <http://ezp-prod1.hul.harvard.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=pdh&AN=2002-15790-003&site=ehost-live&scope=site>

## Optional multimedia

Pink, D. The puzzle of motivation. *Ted talk*. <http://youtu.be/rrkrvAUbU9Y>

## Feedback

### Required reading:

Hattie, J., & Timperley, H. (2007). The power of feedback. *Review of educational research*, 77, 81-112. <http://www.jstor.org.ezp-prod1.hul.harvard.edu/stable/4624888>

### Optional reading:

Find your own article on the topic of feedback! To search literature, we highly recommend [this platform](#) (try sorting by # times cited, filtering by field, type of article, etc).

# Active Learning

## Required reading

Craik, F. I., & Lockhart, R. S. (1972). Levels of processing: A framework for memory research. *Journal of Verbal Learning and Verbal Behavior*, 11, 671-684. [http://dx.doi.org.ezp-prod1.hul.harvard.edu/10.1016/S0022-5371\(72\)80001-X](http://dx.doi.org.ezp-prod1.hul.harvard.edu/10.1016/S0022-5371(72)80001-X)

Deslauriers, L., Schelew, E., & Wieman, C. (2011). Improved learning in a large-enrollment physics class. *Science*, 332, 862-864. <http://www.sciencemag.org.ezp-prod1.hul.harvard.edu/content/332/6031/862.full> (be sure to read supplementary online material) + commentary/response <http://www.sciencemag.org.ezp-prod1.hul.harvard.edu/content/333/6047/1220.2.full.pdf>

## Optional reading

Haak, D. C., HilleRisLambers, J., Pitre, E., & Freeman, S. (2011). Increased structure and active learning reduce the achievement gap in introductory biology. *Science*, 332, 1213-1216. <http://www.sciencemag.org.ezp-prod1.hul.harvard.edu/content/332/6034/1213.full>

Mayer, R. E. (2004). Should there be a three-strikes rule against pure discovery learning?. *American Psychologist*, 59, 14. <http://ezp-prod1.hul.harvard.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=pdh&AN=2004-10043-002&site=ehost-live&scope=site>

Prince, M. (2004). Does active learning work? A review of the research. *Journal of Engineering Education*, 93, 223-231. <http://search.proquest.com.ezp-prod1.hul.harvard.edu/docview/217960253>

Smith, M. K., Wood, W. B., Adams, W. K., Wieman, C., Knight, J. K., Guild, N., & Su, T. T. (2009). Why peer discussion improves student performance on in-class concept questions. *Science*, 323, 122-124. <http://www.sciencemag.org.ezp-prod1.hul.harvard.edu/content/323/5910/122.full>

## Optional multimedia

Malan, D. The geek shall inherit the earth. *HGSE Master class*. <http://www.gse.harvard.edu/news-impact/2014/02/watch-the-master-class-live/>

# Expertise

## Required readings

Chi, M. T., Feltovich, P. J., & Glaser, R. (1981). Categorization and representation of physics problems by experts and novices. *Cognitive Science*, 5, 121-152. <http://www.sciencedirect.com.ezp-prod1.hul.harvard.edu/science/article/pii/S0364021381800298>

Feltovich, P. J., Prietula, M. J., & Ericsson, K. A. (2006). Studies of expertise from psychological perspectives. In K. A. Ericsson, N. Charness, P. Feltovich, and R. R. Hoffman, R. R. (Eds.). *Cambridge handbook of expertise and expert performance* (pp. 39-68). Cambridge, UK: Cambridge University Press. <http://scholar.google.com/scholar?hl=en&q=%22Studies+of+expertise+from+psychological+perspectives%22>

## Optional readings

Chase, W. G., & Simon, H. A. (1973). Perception in chess. *Cognitive Psychology*, 4, 55-81. [http://dx.doi.org.ezp-prod1.hul.harvard.edu/10.1016/0010-0285\(73\)90004-2](http://dx.doi.org.ezp-prod1.hul.harvard.edu/10.1016/0010-0285(73)90004-2)

Ericsson, K. A., & Charness, N. (1994). Expert performance: Its structure and acquisition. *American Psychologist*, 49, 725. <http://ezp-prod1.hul.harvard.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=pdh&AN=1994-43905-001&site=ehost-live&scope=site>

Redish, E. F., Saul, J. M., & Steinberg, R. N. (1998). Student expectations in introductory physics. *American Journal of Physics*, 66, 212-224. <http://dx.doi.org.ezp-prod1.hul.harvard.edu/10.1119/1.18847>

## Optional multimedia

Weiman, C. (2012). *HILT Symposium*. [http://youtu.be/HK\\_XgPV7uzo](http://youtu.be/HK_XgPV7uzo)

# Egocentrism

## Required readings (and multimedia)

Hinds, P.J. (1999). The curse of expertise: The effects of expertise and debiasing methods on prediction of novice performance. *Journal of Experimental Psychology: Applied*, 5(2), 205. <http://ezp-prod1.hul.harvard.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=pdh&AN=1999-03662-006&site=ehost-live&scope=site>

Gilbert, D. (2013). *HILT Conference*. <http://youtu.be/eME83oWFGZc>

Nickerson, R. S. (1999). How we know—and sometimes misjudge—what others know: Imputing one's own knowledge to others. *Psychological Bulletin*, 125, 737. <http://ezp-prod1.hul.harvard.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=pdh&AN=1999-01567-006&site=ehost-live&scope=site>

## Optional readings

Birch, S.A., & Bloom, P. (2004). Understanding children's and adults' limitations in mental state reasoning. *Trends in Cognitive Sciences*, 8, 255-260. <http://dx.doi.org.ezp-prod1.hul.harvard.edu/10.1016/j.tics.2004.04.011>

Fischhoff, B. (1975). Hindsight is not equal to foresight: The effect of outcome knowledge on judgment under uncertainty. *Journal of Experimental Psychology: Human Perception and Performance*, 1, 288. <http://ezp-prod1.hul.harvard.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=pdh&AN=1976-00159-001&site=ehost-live&scope=site>

Keysar, B., & Henly, A. S. (2002). Speakers' overestimation of their effectiveness. *Psychological Science*, 13, 207-212. <http://ezp-prod1.hul.harvard.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=a2h&AN=6642815&site=ehost-live&scope=site>

Reed, N., McLeod, P., & Dienes, Z. (2010). Implicit knowledge and motor skill: What people who know how to catch don't know. *Consciousness and Cognition*, 19, 63-76. <http://dx.doi.org.ezp-prod1.hul.harvard.edu/10.1016/j.concog.2009.07.006>

## Mind-wandering

### Required readings and multimedia

Mason, M. F., Norton, M. I., Van Horn, J. D., Wegner, D. M., Grafton, S. T., & Macrae, C. N. (2007). Wandering minds: the default network and stimulus-independent thought. *Science*, 315, 393-395. <http://www.sciencemag.org.ezp-prod1.hul.harvard.edu/content/315/5810/393.full.pdf>

Szpunar, K. K., Moulton, S. T., & Schacter, D. L. (2013). Mind wandering and education: from the classroom to online learning. *Frontiers in Psychology*, 4, 1-7. <http://journal.frontiersin.org/Journal/10.3389/fpsyg.2013.00495/abstract>

Mason, M. Mindwandering. *TEDxEast*. <http://youtu.be/Mf4kbi76yGk>

### Optional readings

*Frontiers in Psychology*. (2013). Towards a psychological and neuroscientific account of the wandering mind. [http://www.frontiersin.org/Perception\\_Science/researchtopics/Towards\\_a\\_psychological\\_and\\_neuroscientific\\_account\\_of\\_the\\_wandering\\_mind/1249](http://www.frontiersin.org/Perception_Science/researchtopics/Towards_a_psychological_and_neuroscientific_account_of_the_wandering_mind/1249). Ones to particularly consider: Smallwood & Andrew-Hanna, Klinger, Farley et al, Sousa et al, Oettingen & Schworer, McMillan et al, Callard et al

## Social Psychological Interventions

### Required readings

Miyake, A., Kost-Smith, L. E., Finkelstein, N. D., Pollock, S. J., Cohen, G. L., & Ito, T. A. (2010). Reducing the gender achievement gap in college science: A classroom study of values affirmation. *Science*, 330, 1234-1237. <http://www.sciencemag.org.ezp-prod1.hul.harvard.edu/content/330/6008/1234.full.pdf>

Ramirez, G., & Beilock, S. L. (2011). Writing about testing worries boosts exam performance in the classroom. *Science*, 331, 211-213. <http://www.sciencemag.org.ezp-prod1.hul.harvard.edu/content/331/6014/211.full.pdf>

Yeager, D. S., & Walton, G. M. (2011). Social-psychological interventions in education: They're not magic. *Review of Educational Research*, 81, 267-301. <http://rer.sagepub.com.ezp-prod1.hul.harvard.edu/content/81/2/267.full.pdf>

### Optional readings

Beilock, S. L., & Ramirez, G. (2011). On the interplay of emotion and cognitive control: Implications for enhancing academic achievement. *Psychology of Learning and Motivation: Advances in Research and Theory*, 55, 137-169. [https://hpl.uchicago.edu/sites/hpl.uchicago.edu/files/uploads/BeilockRamirez2011\\_CognitionEmotion\\_FinalCopy.pdf](https://hpl.uchicago.edu/sites/hpl.uchicago.edu/files/uploads/BeilockRamirez2011_CognitionEmotion_FinalCopy.pdf)

Cohen, G. L., & Sherman, D. K. (2014). The psychology of change: Self-affirmation and social psychological intervention. *Annual Review of Psychology*, 65, 333-371. <http://www.annualreviews.org.ezp-prod1.hul.harvard.edu/doi/pdf/10.1146/annurev-psych-010213-115137>

Creswell, J. D., Dutcher, J. M., Klein, W. M., Harris, P. R., & Levine, J. M. (2013). Self-affirmation improves problem-solving under stress. *PloS One*, 8(5), e62593. <http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0062593>

Shnabel, N., Purdie-Vaughns, V., Cook, J. E., Garcia, J., & Cohen, G. L. (2013). Demystifying values-affirmation interventions writing about social belonging is a key to buffering against identity threat. *Personality and Social Psychology Bulletin*, 39, 663-676. <http://psp.sagepub.com.ezp-prod1.hul.harvard.edu/content/39/5/663.full.pdf>

Walton, G. M. (2014). The new science of wise psychological interventions. *Current Directions in Psychological Science*, 23, 1, 73-82. <http://cdp.sagepub.com.ezp-prod1.hul.harvard.edu/content/23/1/73.full.pdf>

### Optional multimedia

Beilock, S. (2011). The science of "choking". <http://youtu.be/zcr4ZD-Vrsg>

# Multimedia Learning

## Required readings

- de Jong, T. (2010). Instruction based on computer simulations. In R. E. Mayer & P.A. Alexander (Eds.), *Handbook of research on learning and instruction* (pp. 446–466). Routledge Press. <http://scholar.google.com/scholar?q=de+Jong+%22Instruction+based+on+computer+simulations%22>
- Clark, R. E. (1994). Media will never influence learning. *Educational Technology Research and Development*, 42, 21-29. <http://www.jstor.org.ezp-prod1.hul.harvard.edu/stable/pdfplus/30218684.pdf>
- Mayer, R. E., & Moreno, R. (2003). Nine ways to reduce cognitive load in multimedia learning. *Educational Psychologist*, 38, 43-52. [http://www.tandfonline.com.ezp-prod1.hul.harvard.edu/doi/pdf/10.1207/S15326985EP3801\\_6](http://www.tandfonline.com.ezp-prod1.hul.harvard.edu/doi/pdf/10.1207/S15326985EP3801_6)

## Optional readings

- Dede, C. (2009). Immersive interfaces for engagement and learning. *Science*, 323, 66-69. <http://www.sciencemag.org.ezp-prod1.hul.harvard.edu/content/323/5910/66.full.pdf>
- Joyce, T. J., Crockett, S., Jaeger, D.A., Altindag, O., & O'Connell, S. D. (2014). Does classroom time matter? A randomized field experiment of hybrid and traditional lecture formats in economics (No. w20006). *National Bureau of Economic Research*. <http://www.nber.org/papers/w20006>
- Means, B., Toyama, Y., Murphy, R., Bakia, M., & Jones, K. (2010). Evaluation of evidence-based practices in online learning: A meta-analysis and review of online learning studies. <http://www2.ed.gov/rschstat/eval/tech/evidence-based-practices/finalreport.pdf>
- Merchant, Z., Goetz, E. T., Cifuentes, L., Keeney-Kennicutt, W., & Davis, T. J. (2014). Effectiveness of virtual reality-based instruction on students' learning outcomes in K-12 and higher education: A meta-analysis. *Computers & Education*, 70, 29–40. <http://dx.doi.org.ezp-prod1.hul.harvard.edu/10.1016/j.compedu.2013.07.033>