Individual Differences in Working Memory Seminar

Spring 2011
Time: Tuesday 12:00-2:50
Location: Straub 139

Instructor: Nash Unsworth
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COURSE DESCRIPTION

In this seminar, we will examine normal variation in working memory capacity (WMC) as measured by memory span tasks. We will focus on a small number of important topics. Some of the topics to be covered include: (a) measuring WMC and WMC's relation to higher-order cognition; (b) similarities and differences between WMC and short-term memory (STM); (c) the relationship between WMC and attention; and (d) the relationship between WMC and long-term memory (LTM).

We follow a seminar format, so we learn from each other. That means you need to come to class. You need to speak up, ask questions, provide answers or indicate confusion (no shame in that!). You also will lead a discussion of a topic or paper. You will also write a final paper which is a research proposal.

HOW TO USE THIS SYLLABUS

This syllabus contains most of the information that you need for understanding how the course is organized. I will not take up your time by going over all of the material in the syllabus in class. You should read the syllabus and make sure that you understand it. If you have a question, first check the material in the syllabus and if you still need information, by all means ask.

COMPONENTS OF THE COURSE GRADE

Discussion Lead: Students will be required to lead the discussion on papers throughout the semester. The discussion of each article will be led by one student. That student is responsible for a clear, concise (10-12 min) presentation of the article, including the critical questions asked, the methods, *the findings* and the conclusions. You will also tell us your take on the paper, and provide a few questions to discuss. To do this well, the leader may need to read an additional article or two. Doing a good job in leading a discussion requires that you (a) understand the paper and its issues and findings and (b) use your own words to describe the paper.

Final Paper: Each student will write a final paper of no more than 15 pages (1 inch margins, doubled spaced, 11-12 pt font, excluding references) on a topic of your choice closely related to individual differences in WMC due on May 31. The paper should culminate in a proposal for an experiment that could be conducted on this topic. As a model, I would recommend organization similar to the Introduction section in a Journal of Experimental Psychology article. Your experiment should be tractable and concrete. You do not need to include a complete Methods section. Primary source material for your paper must be peer review journals from some area of experimental psychology. There must be a minimum of 10 such references. Books, tech reports, and other sources are acceptable but are not a substitute for peer reviewed research and these do not count towards the minimum references required. Please be aware that it is inappropriate to cite papers that you have not actually read. If you wish to refer to sources that you have not directly accessed, you should refer to it "as cited in ...".

If you have never written a research paper of this type, I also strongly recommend speaking with me soon.

GRADING BREAKDOWN:

- 50% will be based on the final paper
- 25% leading discussion of papers
- 25% will be based on class participation

Total = 100%

A straight grading scale is the default (e.g., 90-100=A, 80-89=B, 70-79=C, 60-69=D, 59 or lower=F). However, I reserve the right to adjust the grades up depending on the distribution of scores (i.e., curve). Grades will never be adjusted downward. Those taking the class Pass/Fail must obtain a "C" to pass.

Criteria used in making grading decisions:

- I will usually round up, for example from 79.5% to 80%, but do not count on it (sometimes the tests may have been extra easy, for example—then the cutoffs will be firm).
- **As a general principle, I will never work harder for your grade than you do.** Students who have poor attendance should not expect me to "make up" points for them. Students who have done all that is in their power to do their best can be assured that will be carefully considered in making any borderline decision. I try to apply consistent standards and treat students fairly, as well as fulfill my responsibilities to UO in making difficult decisions about grades.

Grading problems: If you feel there has been an error in working out your grade please let me know as soon as possible. Work out your grade as described above and specify the reason for your concern when contacting me. I want you to get every point you have earned. If you are unhappy with your final grade but agree that it has been worked out correctly as described above, please don't ask for a better grade, or extra opportunities to make a better grade, as a "favor" at the end of the semester. The answer to such unfair requests must always be "no".

Schedule of Topics and Readings**

Tentative Date	Topic
Week 1	
3/29	Introduction to Class/Methods
Week 2	
4/5	Measuring and Explaining WMC Variation I
Week 3	
4/12	Measuring and Explaining WMC Variation II
Week 4	
4/19	WMC vs. STM I
Week 5	
4/26	WMC vs. STM II
Week 6	
5/3	WMC and Attention Control I
Week 7	
5/10	WMC and Attention Control II
Week 8	
5/17	WMC vs. LTM
Week 9	
5/24	WMC & Controlled Retrieval
Week 10	
5/31	WMC, personality, and anxiety

**** All readings, and assignments dates are tentative and subject to change. Any revisions to this syllabus will be announced during class time. It is your responsibility to make a note of any changes in this syllabus.**

Readings

Week 1

Underwood, B.J. (1975). Individual differences as a crucible in theory construction. *American Psychologist, 30,* 128-134.

Salthouse, T.A. (2000). Methodological assumptions in cognitive aging research. In Craik, F.I.M. & Salthouse, T.A. (Editors). Handbook of Aging and Cognition. (2nd Ed.) Hillsdale, N.J.: Lawrence Erlbaum Associates.

Conway, A. R. A., Jarrold, C., Kane, M. J., Miyake, A., & Towse, J. (2007). Variation in working memory: An introduction. In A. R. A. Conway, C. Jarrold, M. J. Kane, A. Miyake, & J. Towse (Eds.) *Variation in working memory* (pp. 3-17). Oxford, UK: Oxford University Press.

Week 2

Daneman, M. & Carpenter, P.A. (1980). Individual differences in working memory and reading. *Journal of Verbal Learning and Verbal Behavior, 19*, 450-466.

Turner, M.L. & Engle, R.W. (1989). Is working memory capacity task dependent? *Journal of memory and language, 28,* 127-154.

Unsworth, N., Redick, T.S., Heitz, R.P., Broadway, J., & Engle, R.W. (2009). Complex working memory span tasks and higher-order cognition: A latent variable analysis of the relationship between processing and storage. *Memory, 17,* 635-654.

Week 3

Lustig, C., May, C. P., & Hasher, L. (2001). Working memory span and the role of proactive interference. *Journal of Experimental Psychology: General, 130*, 199-207.

Heitz, R. P., Schrock, J. C., Payne, T. W., & Engle R. W. (2007). Effects of incentive on working memory capacity: Behavioral and pupillometric data. *Psychophysiology, 44*, 1 – 11.

Bailey, H., Dunlosky, J., & Kane, M.J. (2008). Why does working memory capacity predict complex cognition? Testing the strategy-affordance hypothesis. *Memory & Cognition, 36*, 1383-1390.

Barrouillet, P., Lépine, R., & Camos, V. (2008). Is the influence of working memory capacity on high-level cognition mediated by complexity or resource-dependent elementary processes? *Psychonomic Bulletin & Review, 15*, 528-534.

Week 4

Engle, Tuholski, Laughlin & Conway (1999). Working memory, short-term memory and general fluid intelligence: A latent variable approach. *Journal of Experimental Psychology: General*, 128, 309-331.

Conway, A. R. A., Cowan, N., Bunting, M. F., Therriault, D., & Minkoff, S. (2002). A latent variable analysis of working memory capacity, short term memory capacity, processing speed, and general fluid intelligence. *Intelligence, 30*, 163-183.

Kane, M. J., Hambrick, D. Z., Tuholski, S. W., Wilhelm, O., Payne, T. W., & Engle, R. W. (2004). The generality of working memory capacity: A latent-variable approach to verbal and visuospatial memory span and reasoning. *Journal of Experimental Psychology: General, 133*, 189-217.

Week 5

Colom, R., Rebollo, I., Abad, F. J., & Shih, P. C. (2006). Complex span tasks, simple span tasks, and cognitive abilities: A re-analysis of key studies. *Memory & Cognition, 34*, 158-171.

Colom, R., Shih, P.C., Flores-Mendoza, C., Quiroga, M.A. (2006). The real relationship between short-term memory and working memory. *Memory, 14*, 804-813.

Unsworth N., & Engle, R.W. (2007). On the division of short-term and working memory: An examination of simple and complex spans and their relation to higher-order abilities. *Psychological Bulletin, 133*, 1038-1066.

Week 6

Kane, Bleckley, Conway & Engle (2001). A controlled-attention view of working-memory capacity. *Journal of Experimental Psychology: General, 130*, 169-183.

Kane, M. J., & Engle, R. W. (2003). Working-memory capacity and the control of attention: The contributions of goal neglect, response competition, and task set to Stroop interference. *Journal of Experimental Psychology: General, 132*, 47-70.

Conway, A. R. A., Cowan, N., & Bunting, M. F. (2001). The cocktail party phenomenon revisited: The importance of working memory capacity. *Psychonomic Bulletin and Review, 8*, 331-335.

Week 7

Bleckley, M. K., Durso, F. T., Crutchfield, J. M., Engle, R. W., & Khana, M. M. (2003). Individual differences in working memory capacity predict visual attention allocation. *Psychonomic Bulletin and Review, 10*, 884-889.

Heitz, R. P., & Engle, R. W. (2007). Focusing the spotlight: Individual differences in visual attention control. *Journal of Experimental Psychology: General, 136*, 217-240.

Kane, M. J., Brown, L. E., McVay, J. C., Silvia, P. J., Myin-Germeys, I., & Kwapil, T. R. (2007). For whom the mind wanders, and when: An experience-sampling study of working memory and executive control in daily life. *Psychological Science, 18*, 614-621.

Unsworth, N., & Spillers, G.J. (2010). Working memory capacity: Attention, Memory, or Both? A direct test of the dual-component model. *Journal of Memory and Language, 62,* 392-406.

Week 8

Unsworth, N., & Engle, R.W. (2007). The nature of individual differences in working memory capacity: Active maintenance in primary memory and controlled search from secondary memory. *Psychological Review, 114,* 104-132.

Mogle, J.A., Lovett, B.J., Stawski, R.S., & Sliwinski, M.J. (2008). What's so special about working memory? An examination of the relationship among working memory, secondary memory, and fluid intelligence. *Psychological Science, 19,* 1071-1077.

Unsworth, N., Brewer, G.A., & Spillers, G.J. (2009). There's more to the working memory-fluid intelligence relationship than just secondary memory. *Psychonomic Bulletin & Review, 16,* 931-937.

Unsworth, N. (2010). On the division of working memory and long-term memory and their relation to intelligence: A latent variable analysis. *Acta Psychologica, 134,* 16-28.

Week 9

Conway, A.R.A. & Engle, R.W. (1994). Working memory and retrieval: A resource-dependent inhibition model. *Journal of Experimental Psychology: General, 123*, 354-373.

Rosen, V.J., & Engle, R.W. (1997). The role of working memory capacity in retrieval. *Journal of Experimental Psychology: General, 126*, 211-227.

Kane, M.J., & Engle, R.W. (2000). Working memory capacity, proactive interference, and divided attention: Limits on long-term memory retrieval. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 26,* 333-358.

Unsworth, N. (2007) Individual differences in working memory capacity and episodic retrieval: Examining the dynamics of delayed and continuous distractor free recall. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 33*, 1020-1034.

Week 10

Klein, K. & Boals, A. (2001). Expressive writing can increase working memory capacity. *Journal of Experimental Psychology: General*, 130, 520-533.

Schmader, T., & Johns, M. (2003). Converging evidence that stereotype threat reduces working memory capacity. *Journal of Personality and Social Psychology, 85,* 440–452.

Unsworth, N., Miller, J.D., Lakey, C.E., Young, D.L., Meeks, J.T., Campbell, W.K., & Goodie, A.S. (2009). Exploring the relations among executive functions, fluid intelligence, and personality. *Journal of Individual Differences, 30,* 194-200.

Beilock, S. L. & Carr, T. H. (2005). When high-powered people fail: Working memory and "choking under pressure" in math. *Psychological Science, 16*, 101-105.