Stockholm University *2023*
Department of Psychology

TRENDS IN COGNITION PSMT45

Course Description

This is a master and postgraduate course on cognitive functions. The aim of the course is to present current trends and topics in cognitive psychology with the primary focus on human memory functions, thinking, decision making and related cognitive functions. The course will primarily cover emerging topics that are not always covered in introductory courses, but that have become important themes in cognitive psychology. The course will include reproducibility, music, autobiographical memory, cognition in non-human animals, decision-making, testing effects on memory, and cognitive training.

The course will be based on a series of seminars during which students read and discuss empirical and theoretical articles germane to understanding of the emerging and central issues in cognitive psychology. Activities related to the seminars are mandatory. A lecture will introduce each topic and provide a historical and theoretical background before the seminar. The lecture is accompanied by supplementary readings. The lectures and the supplementary readings provide an additional resource but are not required.

Course Objectives

After completing the course:

- Students should have increased understanding of outstanding topics of cognition and their methodological challenges.
- Students should be able to analyze and critically reflect on central trends of cognitive psychology.
- Students should acquire a deepened understanding of basic issues of cognitive psychology and their relation to multiple perspectives of cognitive sciences and complementary levels of explanation

Course Requirements

The course consists of lectures, seminars and exercises. To reach the course objectives, students need to attend and participate in all seminars as follows:

(a) *Contribution to seminars.* In addition to active participation, students are expected to generate outstanding question(s) prior to each seminar. The purpose of these questions and is to ensure that you have read the papers that have been assigned, and to help raise central issues for the discussion. You should submit (upload) you question(s) to the course web by noon the day before the seminar. You should also submit a separate PM in which you analyse and discuss your proposed question. Your proposal should reflect the general theme of each seminar, but you may also consider theoretical perspectives and empirical findings, which are not necessarily covered by the target articles. The document should be around 300-500 words and uploaded to the course web before each seminar.

(b) *Leading the discussion.* At each seminar, 1-2 students have the role of Discussants by organizing and leading the group discussion. Discussants will primarily summarize the key points to be extracted from the seminar topic and chair the session by presenting central issues raised the members of the group. Note that Discussants will lead the seminar, but everyone in the group is responsible for contributing to the seminar. Discussants do not

need to submit questions for their seminars.

Examination
The examination is based on each student's contribution during the seminar, including the written PM, with max 2 points/seminar (2 = good, 1 = pass, and 0 = fail/missed seminar. The max score for the whole course is 14 p as summarized below:

Seminars	7 x	2p (=max)	14
Final grade		A	≥13
		B	≥11
		C	≥ 9
		D	≥ 8
		E	≥ 7
		F	< 7

Readings
Readings and other course materials are based on empirical research articles and overviews, available at the course website.

T1: Cognitive Metascience

Target articles for seminar

Nosek, B. A., Ebersole, C. R., DeHaven, A. C., & Mellor, D. T. (2018). The preregistration revolution. *Proceedings of the National Academy of Sciences*, 201708274.

Hoogeveen, S., Sarafoglou, A., & Wagenmakers, E.-J. (2020). Laypeople can predict which social-science studies will be replicated successfully. *Advances in Methods and Practices in Psychological Science*, 267–285. https://doi.org/10.1177/2515245920919667

Ebersole, C. R., Axt, J. R., & Nosek, B. A. (2016). Scientists' reputations are based on getting it right, not being right. *PLoS Biology*, *14*(5), e1002460. https://doi.org/10.1371/journal.pbio.1002460

Supplementary reading (not mandatory)

Open Science Collaboration (2015). Estimating the reproducibility of psychological science. *Science, 349*(6251), aac4716. https://doi.org/10.1126/science.aac4716

Wagenmakers, E. J., Dutilh, G., & Sarafoglou, A. (2018). The creativity-verification cycle in psychological science: new methods to combat old ddols. *Perspectives on Psychological Science*, *13*(4), 418–427. https://doi.org/10.1177/1745691618771357

T2: Music and cognition

Target articles for seminar

Jakubowski, K., Finkel, S., Stewart, L., & Müllensiefen, D. (2017). Dissecting an earworm: Melodic features and song popularity predict involuntary musical imagery. *Psychology of Aesthetics, Creativity, and the Arts, 11*(2), 122–135. https://doi.org/10.1037/aca0000090

Martínez-Molina, N., Mas-Herrero, E., Rodríguez-Fornells, A., Zatorre, R.J., Marco-Pallarés, J. (2016). Neural correlates of specific musical anhedonia. *Proceedings of the National Academy of Sciences*, 113(46), E7337-E7345; DOI: 10.1073/pnas.1611211113

Bainbridge CM, Bertolo M, Youngers J, Atwood S, Yurdum L, Simson J, Lopez K, Xing F, Martin A, Mehr SA (2020). Infants relax in response to unfamiliar foreign lullabies. *Nature Human Behaviour*. Oct 19. doi: 10.1038/s41562-020-00963-z. Epub ahead of print.

Supplementary reading (not mandatory)

Savage PE, Loui P, Tarr B, Schachner A, Glowacki L, Mithen S, Fitch WT. (2020) Music as a coevolved system for social bonding. *Behavioral and Brain Sciences*. Aug 20:1-42. doi: 10.1017/S0140525X20000333. Epub ahead of print.

Thompson WF, Marin MM, Stewart L. Reduced sensitivity to emotional prosody in congenital amusia rekindles the musical protolanguage hypothesis. (2012) *Proceedings of the National Academy of Sciences*, Nov 13;109(46):19027-32. doi: 10.1073/pnas.1210344109.

T3: Cognitive Training

Target articles for seminar

Sala, G., & Gobet, F. (2019). Cognitive training does not enhance general cognition. *Trends in Cognitive Sciences, 23*(1), 9–20. https://doi.org/10.1016/j.tics.2018.10.004

Olofsson, J. K., Ekström, I., Lindström, J., Syrjänen, E., Stigsdotter-Neely, A., Nyberg, L., Jonsson, S., & Larsson, M. (2020). Smell-based memory training: evidence of olfactory learning and transfer to the visual domain. *Chemical Senses*, *45*(7), 593–600. https://doi.org/10.1093/chemse/bjaa049

Nilsson, J., Lebedev, A. V., Rydström, A., & Lövdén, M. (2017). Direct-current stimulation does little to improve the outcome of working memory training in older adults. *Psychological Science*, *28*(7), 907–920. https://doi.org/10.1177/0956797617698139

Supplementary reading (not mandatory)

Hertzog, C., Kramer, A. F., Wilson, R. S., & Lindenberger, U. (2008). Enrichment effects on adult cognitive development: can the functional capacity of older adults be preserved and enhanced?. *Psychological Science in the Public Interest*, *9*(1), 1–65. https://doi.org/10.1111/j.1539-6053.2009.01034.x

Simons, D. J., Boot, W. R., Charness, N., Gathercole, S. E., Chabris, C. F., Hambrick, D. Z., & Stine-Morrow, E. A. (2016). Do "brain-training" programs work?. *Psychological Science in the Public interest*, *17*(3), 103–186. https://doi.org/10.1177/1529100616661983

T4: Testing effects in memory

Target articles for seminar

Putnam, A. L., Nestojko, J. F., & Roediger, H. L. (2016). Improving student learning: Two strategies to make it stick. In J. C. Horvath, J. Lodge, & J. A. C. Hattie (Eds.), *From the laboratory to the classroom: Translating the science of learning for teachers.* (pp. 94-121). Oxford, U.K.: Routledge

Rowland C. A. (2014). The effect of testing versus restudy on retention: a meta-analytic review of the testing effect. *Psychological Bulletin*, *140*(6), 1432–1463. https://doi.org/10.1037/a0037559

Karlsson Wirebring, L., Wiklund-Hörnqvist, C., Eriksson, J., Andersson, M., Jonsson, B., & Nyberg, L. (2015). Lesser neural pattern similarity across repeated tests is associated with better long-term memory retention. *The Journal of Neuroscience*, *35*(26), 9595–9602. https://doi.org/10.1523/JNEUROSCI.3550-14.2015

Supplementary reading (not mandatory)

Roediger, H. L., 3rd, & Karpicke, J. D. (2006). The power of testing memory: basic research and implications for educational practice. *Perspectives on Psychological Science*, *1*(3), 181–210. https://doi.org/10.1111/j.1745-6916.2006.00012.x

Roediger, H. L., 3rd, & Butler, A. C. (2011). The critical role of retrieval practice in long-term retention. *Trends in Cognitive Sciences*, *15*(1), 20–27. https://doi.org/10.1016/j.tics.2010.09.003

T5: Autobiographical Memory

Target articles for seminar

Larsson M, Willander J, Karlsson K, Arshamian A. Olfactory LOVER: behavioral and neural correlates of autobiographical odor memory. *Frontiers in Psychology*. 2014; 5:312. doi: 10.3389/fpsyg.2014.00312.

Palombo DJ, Sheldon S, Levine B. (2018). Individual differences in autobiographical memory. *Trends in Cognitive Sciences*;22(7):583-597. doi: 10.1016/j.tics.2018.04.007. Epub 2018 May 25.

Patihis L, Frenda SJ, LePort AK, Petersen N, Nichols RM, Stark CE, McGaugh JL, Loftus EF. (2013) False memories in highly superior autobiographical memory individuals. *Proceedings of the National Academy of Sciences*,110(52):20947-52. doi: 10.1073/pnas.1314373110.

Supplementary reading (not mandatory)

Parker ES, Cahill L, McGaugh JL. A case of unusual autobiographical remembering. *Neurocase*. 2006(1):35-49. doi: 10.1080/13554790500473680.

Koppel J, Rubin DC. (2016). Recent advances in understanding the reminiscence bump: the importance of cues in guiding recall from autobiographical memory. *Current Directions in Psychological Science*, 25(2):135-149. doi: 10.1177/0963721416631955.

T6: Cognition in Non-Human Animals

Target articles for seminar

Kabadayi, C., & Osvath, M. (2017). Ravens parallel great apes in flexible planning for tool-use and bartering. *Science*, *357*(6347), 202–204. https://doi.org/10.1126/science.aam8138

Krupenye, C., Kano, F., Hirata, S., Call, J., & Tomasello, M. (2016). Great apes anticipate that other individuals will act according to false beliefs. *Science*, *354*(6308), 110–114. https://doi.org/10.1126/science.aaf8110

Alem, S., Perry, C. J., Zhu, X., Loukola, O. J., Ingraham, T., Søvik, E., & Chittka, L. (2016). Associative mechanisms allow for social learning and cultural transmission of string pulling in an insect. *PLoS Biology*, *14*(10), e1002564. https://doi.org/10.1371/journal.pbio.1002564

Supplementary reading (not mandatory)

Andrews, Kristin, "Animal Cognition", *The Stanford Encyclopedia of Philosophy* (Summer 2016 Edition), Edward N. Zalta (ed.), URL = <https://plato.stanford.edu/archives/sum2016/entries/cognition-animal/>.

T7: Spatial Cognition and Navigation

Target articles for seminar

Bierbrauer, A., Kunz, L., Gomes, C. A., Luhmann, M., Deuker, L., Getzmann, S., Wascher, E., Gajewski, P. D., Hengstler, J. G., Fernandez-Alvarez, M., Atienza, M., Cammisuli, D. M., Bonatti, F., Pruneti, C., Percesepe, A., Bellaali, Y., Hanseeuw, B., Strange, B. A., Cantero, J. L., & Axmacher, N. (2020). Unmasking selective path integration deficits in Alzheimer's disease risk carriers. *Science Advances*, *6*(35), eaba1394. https://doi.org/10.1126/sciadv.aba1394

Graves, K. N., Antony, J. W., & Turk-Browne, N. B. (2020). Finding the pattern: on-line extraction of spatial structure during virtual navigation. *Psychological Science*, *31*(9), 1183–1190. https://doi.org/10.1177/0956797620948828

Bao, X., Gjorgieva, E., & Shanahan, L. K., Howard, J. D., Kahnt, T., & Gottfried, J. A. (2019). Grid-like neural representations support olfactory navigation of a two-dimensional odor space. *Neuron*, *102*(5), 1066-1075. https://doi.org/10.1016/j.neuron.2019.03.034

Supplementary reading (not mandatory)

Moser, E. I., Kropff, E., & Moser, M. B. (2008). Place cells, grid cells, and the brain's spatial representation system. *Annual Review of Neuroscience, 31*, 69–89. https://doi.org/10.1146/annurev.neuro.31.061307.090723

Epstein, R. A., Patai, E. Z., Julian, J. B., & Spiers, H. J. (2017). The cognitive map in humans: spatial navigation and beyond. *Nature Neuroscience*, *20*(11), 1504–1513. https://doi.org/10.1038/nn.4656