Eye-tracking és nézési idős eljárások
PSZM17-KF-212:2

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Consulting hours: email reservation is necessary

Course time and place: Tuesday, 9:30-11:00 , Microsoft TEAMS (original location: IZU 315) - (maybe later in the eye-tracking lab on the 5th floor)

2020-21/ 1. Semester

Aim of the course:
The aim of the course is to highlight interesting paradigms in cognitive psychology that use eye tracking as a research tool. The focus will be on eye tracking methodology in memory research, but other areas will be also covered. In the first part of the course students will present relevant papers. Students will be asked to present a paper while another student will lead the short discussion of it with relevant questions and comments.
The last part of the course will be hands-on experience at using eye tracking in the research lab. This will contain an introduction to basic research tools and the workflow of how to conduct and analyze eye tracking data.

Grade: Paper presentation + class participation

1. **09.07 – Introduction to the course**
2. **09.14 – Eye tracking introduction I.**
3. **09.21 – Eye tracking introduction II.**
4. **09.28 – 1. Paper presentation session**
5. **10.05 – 2. Paper presentation session**
6. **10.12 – 3. Paper presentation session**
7. **10.26 – NO CLASS – AUTUMN HOLIDAY**
8. **11.02 – 4. Paper presentation session**
9. **11.09 – 5. Paper presentation session**
10. **11.16 – 6. Paper presentation session**
11. **11.23 – 7. Paper presentation session**
12. **11.30 – 8. Paper presentation session**
13. **12.07 – 9. Paper presentation session**

Research papers to choose from:

1. **Change detection (Scene memory paradigm):**

Ryan, J. D., Althoff, R. R., Whitlow, S., & Cohen, N. J. (2000). Amnesia Is a Deficit in Relational Memory. *Psychological Science*, *11*(6), 454–461.

Smith, C. N., & Squire, L. R. (2008). Experience-Dependent Eye Movements Reflect Hippocampus-Dependent (Aware) Memory. *Journal of Neuroscience*, *28*(48), 12825–12833. http://doi.org/10.1523/JNEUROSCI.4542-08.2008

2. **The relational eye movement effect (REME)**

Hannula, D. E. (2010). Worth a glance: using eye movements to investigate the cognitive neuroscience of memory. Frontiers in Human Neuroscience, https://doi.org/10.3389/fnhum.2010.00166

Hannula, D., Ryan, J., Tranel, D., & Cohen, N. (2007). Rapid onset relational memory effects are evident in eye movement behavior, but not in hippocampal amnesia. *Cognitive Neuroscience, Journal of*, *19*(10), 1690–1705.

3. **Recognition memory & pupillometry**

Kafkas, A., & Montaldi, D. (2012). Familiarity and recollection produce distinct eye movement, pupil and medial temporal lobe responses when memory strength is matched. Neuropsychologia, 50(13), 3080–3093. https://doi.org/10.1016/j.neuropsychologia.2012.08.001

Kafkas, A., & Montaldi, D. (2015). The pupillary response discriminates between subjective and objective familiarity and novelty: Pupil response to familiarity and novelty. Psychophysiology, 52(10), 1305–1316. https://doi.org/10.1111/psyp.12471

Montefinese, M., Vinson, D., & Ambrosini, E. (2018). Recognition memory and featural similarity between concepts: The pupil's point of view. Biological Psychology, 135, 159–169. https://doi.org/10.1016/j.biopsycho.2018.04.004

Otero, S. C., Weekes, B. S., & Hutton, S. B. (2011). Pupil size changes during recognition memory: Pupil size and recognition memory. Psychophysiology, 48(10), 1346–1353. https://doi.org/10.1111/j.1469-8986.2011.01217.x

4. **Free and cued recall & pupillometry**

Kucewicz, M. T., Dolezal, J., Kremen, V., Berry, B. M., Miller, L. R., Magee, A. L., Fabian, V., & Worrell, G. A. (2018). Pupil size reflects successful encoding and recall of memory in humans. *Scientific Reports,* 8(1), 4949. https://doi.org/10.1038/s41598-018-23197-6

Pajkossy, P., & Racsmány, M. (2019). How the size of the to-be-learned material influences the encoding and later retrieval of associative memories: A pupillometric assessment. *PLOS ONE*, 14(12), e0226684. https://doi.org/10.1371/journal.pone.0226684

Pajkossy, P., Szőllősi, Á., & Racsmány, M. (2019). Retrieval practice decreases processing load of recall: Evidence revealed by pupillometry. *International Journal of Psychophysiology*, 143, 88–95. https://doi.org/10.1016/j.ijpsycho.2019.07.002

Johansson, R., Pärnamets, P., Bjernestedt, A., & Johansson, M. (2018). Pupil dilation tracks the dynamics of mnemonic interference resolution. *Scientific Reports*, 8(1), 4826. https://doi.org/10.1038/s41598-018-23297-3

5. **Non-human primates**

Kano, F., & Call, J. (2014). Great Apes Generate Goal-Based Action Predictions An Eye-Tracking Study. *Psychological Science*, *25*(9), 1691–1698.

Kano, F., & Tomonaga, M. (2009). How chimpanzees look at pictures: a comparative eye-tracking study. *Proceedings of the Royal Society B: Biological Sciences*, *276*(1664), 1949–1955. http://doi.org/10.1098/rspb.2008.1811

Kano, F., & Tomonaga, M. (2013). Head-mounted eye tracking of a chimpanzee under naturalistic conditions. *PloS One*, *8*(3), e59785.

6. Infants, dogs

Kaldy, Z., & Blaser, E. (2020). Putting Effort Into Infant Cognition. Current Directions in Psychological Science, 29(2), 180–185. https://doi.org/10.1177/0963721420903015

Senju, A., & Csibra, G. (2008). Gaze Following in Human Infants Depends on Communicative Signals. *Current Biology*, *18*(9), 668–671. http://doi.org/10.1016/j.cub.2008.03.059

Téglás, E., Gergely, A., Kupán, K., Miklósi, Á., & Topál, J. (2012). Dogs' Gaze Following Is Tuned to Human Communicative Signals. *Current Biology*, *22*(3), 209–212. http://doi.org/10.1016/j.cub.2011.12.018

Cesana-Arlotti, N., Martín, A., Téglás, E., Vorobyova, L., Cetnarski, R., & Bonatti, L. L. (2018). Precursors of logical reasoning in preverbal human infants. *Science*, *359*(6381), 1263–1266. https://doi.org/10.1126/science.aao3539

7. Learning & eye-movements, blinks

Arató, J., Rothkopf, C. A., & Fiser, J. (2020). Learning in the eyes: Specific changes in gaze patterns track explicit and implicit visual learning [Preprint]. *Animal Behavior and Cognition*. https://doi.org/10.1101/2020.08.03.234039

Hoppe, D., Helfmann, S., & Rothkopf, C. A. (2018). Humans quickly learn to blink strategically in response to environmental task demands. *Proceedings of the National Academy of Sciences*, 115(9), 2246–2251. https://doi.org/10.1073/pnas.1714220115

Maus, G. W., Duyck, M., Lisi, M., Collins, T., Whitney, D., & Cavanagh, P. (2017). Target Displacements during Eye Blinks Trigger Automatic Recalibration of Gaze Direction. *Current Biology*, 27(3), 445–450. https://doi.org/10.1016/j.cub.2016.12.029

8. Pupillometry in basic cognitive processes / illusions

Mathôt, S. (2018). Pupillometry: Psychology, Physiology, and Function. *Journal of Cognition,* 1(1).

Laeng, B., & Endestad, T. (2012). Bright illusions reduce the eye's pupil. *Proceedings of the National Academy of Sciences*, *109*(6), 2162–2167.

Laeng, B., & Sulutvedt, U. (2014). The eye pupil adjusts to imaginary light. *Psychological Science*, *25*(1), 188–197.

Wu, E. X. W., Laeng, B., & Magnussen, S. (2012). Through the eyes of the own-race bias: Eye-tracking and pupillometry during face recognition. *Social Neuroscience*, *7*(2), 202–216. http://doi.org/10.1080/17470919.2011.596946