PSYC 5510-001 202310 Eye Movements In Perception, Language And Cognition

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Eye Movements in Perception, Language and Cognition Spring Semester 2021

Mondays and Wednesdays 12-1:30pm

Stephen A. Levin, Room 250

Summary

In this course, we examine how the recording of eye movements can provide a moment-by-moment record of perceptual, cognitive and linguistic processes. Three areas of research will be discussed:. Eye movements in (1) perception (scene perception and goal-directed tasks); (2) language processing (spoken language and reading); and (3) cognition (category learning and decision making). In all of these domains, eyetracking research has led to a better understanding of how attention and information selection supports real-time cognitive processes. Students will have access to eyetracking systems, giving them hands-on experience in designing, running, and analyzing eyetracking experiments. By the end of the semester, students will have collected pilot eyetracking data. Projects will be done individually or within small research teams.

Requirements

Requirements of course can be found **here (https://canvas.upenn.edu/courses/1696943/pages/requirements-for-course-grading)** .

Lab Resources

Useful information, like how to analyzing eyetracking data, can be found **here (https://canvas.upenn.edu/courses/1696943/pages/lab-resources)** .

Class Schedule and Links to Readings

SECTION 1: PRELIMINARIES

- **Wednesday, January 11: Introductions and Class Organization**
  - **Land M.F., Tatler B.W. (2009). Chapters 1, 2 and 3. *Looking and Acting: Vision and Eye Movements in Natural Behavior* (pp. 3-55). Oxford University Press. (https://canvas.upenn.edu/courses/1696943/files/117405915?wrap=1)** ↓ **(https://canvas.upenn.edu/courses/1696943/files/117405915/download?download_frd=1)**
  - Discussion of reading will be led by: *John Trueswell*
- **Monday, January 16: Introduction to Eye Movements**
  - **Pierce, J. E., Clementz, B. A., & McDowell, J. E. (2019). Saccades: fundamentals and neural mechanisms. In *Eye Movement Research* (pp. 11-71). Springer, Cham. (https://canvas.upenn.edu/courses/1696943/files/117392909?wrap=1)** ↓ **(https://canvas.upenn.edu/courses/1696943/files/117392909/download?download_frd=1)**
  - Discussion of reading will be led by:
- **Wednesday, January 18: How to use a Tobii Eyetracker (in lab)**
  - **Hutton, S. B. (2019). Eye tracking methodology. In *Eye Movement Research*(pp. 277-308). Springer, Cham. (https://canvas.upenn.edu/courses/1696943/files/117392912?wrap=1)** ↓ **(https://canvas.upenn.edu/courses/1696943/files/117392912/download?download_frd=1)**
  - Discussion will be led by: *John Trueswell*
  - *Assignment due in 1 week:* ***Create a "mini experiment" in Tobii Lab Pro and record eye movements (Due Jan 25)*** *(https://canvas.upenn.edu/courses/1696943/assignments/10757685?wrap=1)*

SECTION 2: PERCEPTION

- **Monday, January 23: Eye movements in perception**
  - **Schütz, A. C., Braun, D. I., & Gegenfurtner, K. R. (2011). Eye movements and perception: A selective review. *Journal of Vision, 11(5),* 9-9. (https://canvas.upenn.edu/courses/1696943/files/117392928?wrap=1)** ↓ **(https://canvas.upenn.edu/courses/1696943/files/117392928/download?download_frd=1)**
  - Discussion of reading will be led by: *John Trueswell*
- **Wednesday, January 25: Inspecting and Analyzing Gaze Data**
  - Be sure to complete mini experiment before class today.
  - Assignment due in 1 week: **Analyze example eyetracking data set I (Due Wednesday Feb 1) (https://canvas.upenn.edu/courses/1696943/assignments/10757690)**

- **Monday, January 30: Perception and Action**
  - [Borji, A., & Itti, L. (2014). Defending Yarbus: Eye movements reveal observers' task. *Journal of Vision, 14(3),* 29-29.](https://canvas.upenn.edu/courses/1696943/files/117071311?wrap=1) ↓ [(https://canvas.upenn.edu/courses/1696943/files/117071311/download?download_frd=1)](https://canvas.upenn.edu/courses/1696943/files/117071311/download?download_frd=1)
  - Discussion of reading will be led by:
- **Wednesday, February 1: Object Files, Multiple Object Tracking, FiNST**
  - [Zelinsky, G. J., & Neider, M. B. (2008). An eye movement analysis of multiple object tracking in a realistic environment. *Visual Cognition, 16(5),* 553-566.](https://canvas.upenn.edu/courses/1696943/files/117392935?wrap=1) ↓ [(https://canvas.upenn.edu/courses/1696943/files/117392935/download?download_frd=1)](https://canvas.upenn.edu/courses/1696943/files/117392935/download?download_frd=1)
  - Discussion of reading will be led by:
  - Analyze Eyetracking Data I is due today.
- **Monday, February 6: Quantity Perception (and Ensembles)**
  - [Odic, D., & Halberda, J. (2015). Eye movements reveal distinct encoding patterns for number and cumulative surface area in random dot arrays. *Journal of Vision, 15(15).*](https://canvas.upenn.edu/courses/1696943/files/117392979?wrap=1) ↓ [(https://canvas.upenn.edu/courses/1696943/files/117392979/download?download_frd=1)](https://canvas.upenn.edu/courses/1696943/files/117392979/download?download_frd=1)
  - Discussion of reading will be led by:

SECTION 3: LANGUAGE

- **Wednesday, February 8: The Visual World Paradigm (Word Recognition)**
  - Readings:
    - [Tanenhaus, M.K. & Trueswell, J.C. (2006). Eye movements and spoken language comprehension. In M.J. Traxler and M.A. Gernsbacher (ed.) *Handbook of Psycholinguistics, 2nd Edition.* Elsevier Press.](https://canvas.upenn.edu/courses/1696943/files/117405956?wrap=1) ↓ [(https://canvas.upenn.edu/courses/1696943/files/117405956/download?download_frd=1)](https://canvas.upenn.edu/courses/1696943/files/117405956/download?download_frd=1)
    - [Allopenna, P. D., Magnuson, J. S., & Tanenhaus, M. K. (1998). Tracking the time course of spoken word recognition using eye movements: Evidence for continuous mapping models. *Journal of Memory and Language,* 38(4), 419-439.](https://canvas.upenn.edu/courses/1696943/files/117071293?wrap=1) ↓ [(https://canvas.upenn.edu/courses/1696943/files/117071293/download?download_frd=1)](https://canvas.upenn.edu/courses/1696943/files/117071293/download?download_frd=1)
  - Discussion of readings will be led by: *John Trueswell*
  - *Assignment due in 1 week:* [*Analyze example eyetracking data set II (Due Feb 15)* *(https://canvas.upenn.edu/courses/1696943/assignments/10757777?wrap=1)*](https://canvas.upenn.edu/courses/1696943/assignments/10757777?wrap=1)
- **Monday, February 13: The Visual World Paradigm (Sentence Processing)**
  - [Spivey, M. J., Tanenhaus, M. K., Eberhard, K. M., & Sedivy, J. C. (2002). Eye movements and spoken language comprehension: Effects of visual context on syntactic ambiguity resolution. *Cognitive Psychology, 45(4), 447-481.*](https://canvas.upenn.edu/courses/1696943/)

[(https://canvas.upenn.edu/courses/1696943/files/117392994?wrap=1)](https://canvas.upenn.edu/courses/1696943/files/117392994?wrap=1) ↓ [(https://canvas.upenn.edu/courses/1696943/files/117392994/download?download_frd=1)](https://canvas.upenn.edu/courses/1696943/files/117392994/download?download_frd=1)

- ○ Discussion of reading will be led by:
- **Wednesday, February 15: Analyzing Visual World Paradigm Data**
  - ○ **Ito, A., & Knoeferle, P. (2022). Analysing data from the psycholinguistic visual-world paradigm: Comparison of different analysis methods.** *Behavior Research Methods,* **1-33. [(https://canvas.upenn.edu/courses/1696943/files/117392996?wrap=1)](https://canvas.upenn.edu/courses/1696943/files/117392996?wrap=1)** ↓ **[(https://canvas.upenn.edu/courses/1696943/files/117392996/download?download_frd=1)](https://canvas.upenn.edu/courses/1696943/files/117392996/download?download_frd=1)**
  - ○ Be sure to complete Analyzing Eyetracking Data II assignment before class today.
- **Monday, February 20: Incremental Interpretation of Scalar Adjectives**
  - ○ **Sedivy, J. C., Tanenhaus, M. K., Chambers, C. G., & Carlson, G. N. (1999). Achieving incremental semantic interpretation through contextual representation.** *Cognition, 71(2),* **109-147. [(https://canvas.upenn.edu/courses/1696943/files/117393001?wrap=1)](https://canvas.upenn.edu/courses/1696943/files/117393001?wrap=1)** ↓ **[(https://canvas.upenn.edu/courses/1696943/files/117393001/download?download_frd=1)](https://canvas.upenn.edu/courses/1696943/files/117393001/download?download_frd=1)**
  - ○ Discussion of reading will be led by:
- **Wednesday, February 22: Scalar Implicatures during listening**
  - ○ **Huang, Y. T., & Snedeker, J. (2018). Some inferences still take time: Prosody, predictability, and the speed of scalar implicatures.** *Cognitive Psychology, 102,* **105-126. [(https://canvas.upenn.edu/courses/1696943/files/117393007?wrap=1)](https://canvas.upenn.edu/courses/1696943/files/117393007?wrap=1)** ↓ **[(https://canvas.upenn.edu/courses/1696943/files/117393007/download?download_frd=1)](https://canvas.upenn.edu/courses/1696943/files/117393007/download?download_frd=1)**
  - ○ Discussion of reading will be led by:
  - ○ Assignment due in 1 week: **Brief Research Proposal (Due March 1) [(https://canvas.upenn.edu/courses/1696943/assignments/10757778?wrap=1)](https://canvas.upenn.edu/courses/1696943/assignments/10757778?wrap=1)**
- **Monday, February 27: Language and Thought**
  - ○ **Papafragou, A., Hulbert, J., & Trueswell, J. (2008). Does language guide event perception? Evidence from eye movements.** *Cognition, 108(1),* **155-184. [(https://canvas.upenn.edu/courses/1696943/files/117071286?wrap=1)](https://canvas.upenn.edu/courses/1696943/files/117071286?wrap=1)** ↓ **[(https://canvas.upenn.edu/courses/1696943/files/117071286/download?download_frd=1)](https://canvas.upenn.edu/courses/1696943/files/117071286/download?download_frd=1)**
  - ○ Discussion of reading will be led by:
- **Wednesday, March 1: Eye Movements during Reading**
  - ○ **Hyönä, J., & Kaakinen, J. K. (2019). Eye movements during reading. In** *Eye Movement Research* **(pp. 239-274). Springer, Cham. [(https://canvas.upenn.edu/courses/1696943/files/117393067?wrap=1)](https://canvas.upenn.edu/courses/1696943/files/117393067?wrap=1)** ↓ **[(https://canvas.upenn.edu/courses/1696943/files/117393067/download?download_frd=1)](https://canvas.upenn.edu/courses/1696943/files/117393067/download?download_frd=1)**
  - ○ Discussion of reading will be led by: *John Trueswell*
  - ○ *Assignment due today: Brief written research proposal*

- **Monday, March 6: Research Proposal Presentations**
- **Wednesday, March 8: Research Proposal Presentations**

- **Monday, March 6: Spring Break**
- **Wednesday, March 8: Spring Break**

- **Monday, March 13: Eye Movements during Ambiguity**
  - [Grant, M., Sloggett, S., & Dillon, B. (2020). Processing ambiguities in attachment and pronominal reference.](https://canvas.upenn.edu/courses/1696943/files/117393640?wrap=1) *Glossa: A Journal of General Linguistics,* 5(1). (https://canvas.upenn.edu/courses/1696943/files/117393640?wrap=1) ↓ (https://canvas.upenn.edu/courses/1696943/files/117393640/download?download_frd=1)
  - Discussion of reading will be led by:
- **Wednesday, March 15: Doing a Reading Study with a Tobii**
  - Playing with eyetrackers (in lab)
  - Led by: *John Trueswell*
- **Monday, March 20: Scalar Implicatures during reading**
  - [Panizza, D., Chierchia, G., & Clifton Jr, C. (2009). On the role of entailment patterns and scalar implicatures in the processing of numerals.](https://canvas.upenn.edu/courses/1696943/files/117393646?wrap=1) *Journal of Memory and Language, 61(4),* 503-518. (https://canvas.upenn.edu/courses/1696943/files/117393646?wrap=1) ↓ (https://canvas.upenn.edu/courses/1696943/files/117393646/download?download_frd=1)
  - Discussion of reading will be led by:

SECTION 4: COGNITION

- **Wednesday, March 22: Eye movements during Memory Encoding and Retrieval**
  - [Damiano, C., & Walther, D. B. (2019). Distinct roles of eye movements during memory encoding and retrieval.](https://canvas.upenn.edu/courses/1696943/files/117393650?wrap=1) *Cognition, 184,* 119-129. (https://canvas.upenn.edu/courses/1696943/files/117393650?wrap=1) ↓ (https://canvas.upenn.edu/courses/1696943/files/117393650/download?download_frd=1)
  - Discussion of reading will be led by:
- **Monday, March 27: Category Learning**
  - [Weichart, E. R., Galdo, M., Sloutsky, V. M., & Turner, B. M. (2022). As within, so without, as above, so below: Common mechanisms can support between-and within-trial category learning dynamics.](https://canvas.upenn.edu/courses/1696943/files/117393657?wrap=1) *Psychological Review, 129(5),* (https://canvas.upenn.edu/courses/1696943/files/117393657?wrap=1) ↓ (https://canvas.upenn.edu/courses/1696943/files/117393657/download?download_frd=1)
  - Discussion of reading will be led by:
- **Wednesday, March 29: Cross-situational word learning**
  - [Trueswell, J. C., Medina, T. N., Hafri, A., & Gleitman, L. R. (2013). Propose but verify: Fast mapping meets cross-situational word learning.](https://canvas.upenn.edu/courses/1696943/files/117071299?wrap=1) *Cognitive Psychology, 66(1),* 126-156. (https://canvas.upenn.edu/courses/1696943/files/117071299?wrap=1) ↓ (https://canvas.upenn.edu/courses/1696943/files/117071299/download?download_frd=1)
  - Discussion of reading will be led by:
- **Monday, April 3: Decision Making**
  - [Orquin, J. L., & Loose, S. M. (2013). Attention and choice: A review on eye movements in decision making.](#) *Acta Psychologica, 144(1),* 190-206.

[(https://canvas.upenn.edu/courses/1696943/files/117071285?wrap=1)](https://canvas.upenn.edu/courses/1696943/files/117071285?wrap=1) ⤓
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- Discussion of reading will be led by:

- **Wednesday, April 5: Students work on their projects (no class)**
- **Monday, April 10: Students work on their projects (no class)**
- **Wednesday, April 12: Students work on their projects (no class)**

SECTION 5: STUDENT PRESENTATIONS OF FINAL PROJECTS

- **Monday, April 17: Final Presentations**
- **Wednesday, April 19: Final Presentations**
- **Monday, April 24: Final Presentations**
- **Wednesday, April 26: Final Presentations**
- **Friday, April 28, no class but paper due: [Final Research Paper (Due Friday April 28)](https://canvas.upenn.edu/courses/1696943/assignments/10757781?wrap=1)**
  [(https://canvas.upenn.edu/courses/1696943/assignments/10757781?wrap=1)](https://canvas.upenn.edu/courses/1696943/assignments/10757781?wrap=1)

Course Summary:

Date	Details	Due

📝 **Analyze example eyetracking data set I (Due Wednesday Feb 1)** [(https://canvas.upenn.edu/courses/1696943/assignments/10757690)](https://canvas.upenn.edu/courses/1696943/assignments/10757690)

📝 **Analyze example eyetracking data set II (Due Feb 15)** [(https://canvas.upenn.edu/courses/1696943/assignments/10757777)](https://canvas.upenn.edu/courses/1696943/assignments/10757777)

📝 **Create a "mini experiment" in Tobii Lab Pro and record your eye movements (Due Jan 25)** [(https://canvas.upenn.edu/courses/1696943/assignments/10757685)](https://canvas.upenn.edu/courses/1696943/assignments/10757685)

📝 **Give final presentation on experiment and preliminary findings (April, 17, 19, 24, or 26)** [(https://canvas.upenn.edu/courses/1696943/assignments/10758561)](https://canvas.upenn.edu/courses/1696943/assignments/10758561)

📝 **Give presentation of proposed experiment (March 6 or 8)** [(https://canvas.upenn.edu/courses/1696943/assignments/10758558)](https://canvas.upenn.edu/courses/1696943/assignments/10758558)

📝 **Implement you eyetracking experiment** [(https://canvas.upenn.edu/courses/1696943/assignments/10758567)](https://canvas.upenn.edu/courses/1696943/assignments/10758567)

📝 **Lead discussion of reading** [(https://canvas.upenn.edu/courses/1696943/assignments/10758553)](https://canvas.upenn.edu/courses/1696943/assignments/10758553)

📝 **Write a final research paper (Due Friday April 28)** [(https://canvas.upenn.edu/courses/1696943/assignments/10757781)](https://canvas.upenn.edu/courses/1696943/assignments/10757781)

📝 **Write brief research proposal (Due March 1)** [(https://canvas.upenn.edu/courses/1696943/assignments/10757778)](https://canvas.upenn.edu/courses/1696943/assignments/10757778)