

## PSY711/PSY712 - Introduction to Signal Detection Theory

Time: Tuesday, 2:30-5:30 pm, March 13 – April 17, 2018.

Location: PC 316

Instructor: Eugenie Roudaia

Office: PC-428/B (Psychology)      Office Hour: Fridays, 2–3 pm or by appointment

**Course Description:** Signal Detection Theory (SDT) is a theoretical framework for analyzing decision making in the presence of uncertainty. This course introduces the basic concepts of SDT and shows how this theory and its approaches are used in several different contexts.

### Recommended textbook:

MacMillan, N.A. and Creelman, C.D. (2005). *Detection Theory: A User's Guide, 2<sup>nd</sup> edition*. Lawrence Erlbaum Associates, London.

Supplementary textbook for further reading, see:

Wickens, T.D. (2001). *Elementary Signal Detection Theory*. Oxford University Press.

**Topic schedule:** The first three meetings will consist of lectures with some demonstration of calculations of detection theory measures in R. Students are expected to complete the assigned readings ahead of class. Assignments will be based on examples covered in class.

### Week 1: Basic signal detection and one-interval designs

Readings: MacMillan and Creelman, Chapters 1 and 2

Homework assignment #1 – due at the beginning of next class

### Week 2: Empirical ROCs, Threshold Models, Classification Experiments

Readings: MacMillan and Creelman: Chapters 3, 4, 5; and Geschneider, G.A. 1976. "Psychophysical Theory" in *Psychophysics: method and theory*, pp 39-83. 1976 Lawrence Erlbaum Associates.

Homework assignment #2 – due at the beginning of next class

### Week 3: Comparison and Classification Designs for Discrimination

Readings: MacMillan and Creelman, Chapters 7, 8, 9

Homework assignment #3 – due at the beginning of next class

Meetings on weeks 4, 5, and 6 will consist of discussion of journal articles in which signal detection theory is applied. A reference list of articles will be provided on the first day of class and the schedule of readings for each meeting will be determined in the first two weeks. Each student will be expected to facilitate a discussion on one article. All students are expected to read the articles and participate in the discussion.

**Assessment:**

Assignments: there will be 3 homework assignments worth 10% each. 30%  
Assignments will be posted on the day of class in weeks 1, 2, and 3 and will be due at the beginning of class one week later.

Oral presentation: each student will present and lead a discussion of one 30%  
of the reading articles. Evaluation will be based on the clarity of the presentation, the ability to summarise and critically evaluate the main points of the article and link with other topics discussed in class, and effectiveness of generating discussion. Students are welcome to meet with the instructor prior to their presentation to obtain feedback.

Class participation: students are required to attend all classes and to 10%  
participate in discussions. If there are extenuating circumstances that prevent you from attending class, you are required to notify the instructor as soon as possible.

Written paper: In this assignment, you are asked to find an article in your 30%  
research topic of interest that uses signal detection theory (or choose one of the readings covered in class that you did not present) and write a paper: a) summarise the questions addressed in the article, b) describe how signal detection theory was used in that context and critically evaluate that particular application of the theory and its interpretation. Finally, describe a related, open question that has not been addressed in that article and outline an experiment that can address that question using the signal detection theory framework. Word limit: 1000 words. Papers should be typed, use APA format, and submitted electronically to the instructor by email one week after last class.

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