
Sensation & Perception

Summer 2014 (Session III)

Course Specifics

What: Psychology 301 (01:830:301)

When: Monday – Thursday 12:10 – 2:00 PM

Where: ARC 105 on Busch Campus (<http://maps.rutgers.edu/location/allison-road-classroom-building>)

Website: <https://sakai.rutgers.edu/>

Textbook supplementary materials: <http://sites.sinauer.com/wolfe3e/>

Prerequisites: 01:830:101

Instructor Info

Instructor: Brian Keane, PhD (Research Associate, Rutgers Biomedical and Health Sciences, Rutgers University Center for Cognitive Science)

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Office Hours: Tuesdays 3-4 PM, after class, or by appointment

Course Introduction

Welcome! This course will give you a taste of the fascinating field of Sensation & Perception, which is the oldest scientific enterprise in psychology. S&P has captured the interests of philosophers and physicists for centuries and continues to dominate the attention of researchers in neighboring fields including biology, computer science, philosophy, and neuroscience. So what exactly is S&P? “Sensation” often refers to the processing of basic signals coming from the world (light, heat, pressure, sounds, smells, tastes) and “perception” refers to the interpretation attributed to these signals, but in reality the distinction between the two is not precise.

There are a few reasons why we should all care deeply about S&P. One reason is that our sense experiences dominate every waking moment of our lives, from the time we wake up to the time we go to bed. By understanding how our sense organs work, how they deliver information to the brain, and how that information is processed, we can have a better understanding of our own behavior and experience as well as that of the humans (and animals!) around us. Relatedly, the sense organs provide the primary link by which our minds connect to the world. A large portion of what we will ever know derives completely from at least one of our senses. If we want to understand the nature and extent of this knowledge, it behooves us to investigate the exquisite machinery that makes it all possible. Here’s a fact that will surprise you: *Most* of your brain is involved with perception. About 60% of your *entire cerebral cortex* is dedicated to perceptual information processing, 40% for vision alone!

Intellectual exhilaration aside, there are also practical reasons to study S&P. Analyzing perception allows us to imagine and to build artificial systems, such as virtual reality systems. Investigating the neural hardware of perception helps us to understand and treat injury and disorder. Perception issues arise in many facets of life, such as in the design of highways, motion pictures, and smartphones, to name only a few.

The course will emphasize *visual* perception, which is the most studied of the senses and arguably the most important. Vision is also the area in which I have done most of my research. To be balanced, we will also dedicate chunks of time toward other sense modalities including audition, olfaction, and gustation, depending partly on what you find to be most interesting.

Questions addressed include:

- How do our sensory organs (ears, eyes, etc.) work?
- How does energy (sound, light, etc.) get transformed into signals the brain can process?
- How does the brain transform signals corresponding to energy (number of photons entering the eye, wavelength of light, etc.) into perceptions (colors, names of objects and people, a song, etc.)?
- How do the physical properties of stimuli in the world (loudness of sound, brightness / color of light, etc.) relate to our *experiences*?
- Why does the brain process information in the way it does?

Goals:

- Acquire a basic understanding of the physics and biology of sensation;
- Gain familiarity with the rules by which sense impressions are organized into sophisticated representations of the objects and events around us;
- Gain familiarity with theories of *why* sensory organs are designed as they are and why perceptual experiences have the character that they have.

Course Readings & Exercises

The primary course readings derive from the textbook:

Wolfe, J. M., Kluender, K. R., & Levi, D. M. (2012). *Sensation & Perception (3rd edition)*. Sinauer.

- Available at Rutgers Bookstore (\$51 - \$139).
- Available from Amazon (\$116 new, \$81 used).

Occasionally, I will assign journal articles to read, so that you can gain a better idea of how perceptual science is practiced, debated, and expressed. The readings can be challenging at times, but do not get discouraged! Like anything that is worthwhile, the more that you put into it, the more you will get out.

Each chapter will have exercises (activities, essays, and study aids). In some cases, we will do one or more of the exercises together in class; in other cases, I will ask you to do them as homework. However, in all cases, I recommend that you go through the online material because it will definitely help you learn and remember the material from the book.

Grading and Course Work

1. 20% → *Pop quizzes on weekly readings*. There will be six (6) pop quizzes in which you will be asked straightforward, factual questions about the readings. For example, the question might be: What is spatial frequency? What sorts of stimuli are processed by the FFA? Quizzes will typically occur at the beginning of class, so please show up on time. The two lowest quiz scores will be dropped. Note that there will be no make-up quizzes under any circumstances.
2. 80% → *Midterms and final exam*. The final will be worth 40% of final grade and will be cumulative, with special emphasis given to material covered since the last midterm.

Other Matters

Attendance. It is in your best interest to attend all classes. There are several reasons for this. First, it is a psychological fact that the best way to learn material is through repeated exposure to it. Second, the lecture will let you know which of the reading material will most likely appear on the exams. Third, a percentage of the exam material will appear only in lecture. Finally, I hope to prove to you that Sensation & Perception is an intrinsically interesting subject and I hope that you will want to attend for that reason alone. I will however be taking attendance (partly so that I can get to know your names).

Participation. I will not enforce participation but I think you will enjoy the course more if you engage in discussion. Don't be afraid to speak up!

Make-up exams. No make-up midterm exams will be given. In the event that you miss a midterm exam, your grade on the cumulative final exam will be used to determine your most likely grade on the missed exam (see me for details). This grade, less 10% will be recorded as your grade on the missed examination(s). Make-up final exams will only be given in extremely special circumstances and—when granted—will be *very different* from the original exam, and may even be slightly harder. For this reason, I encourage you to really do your best to make all three exams.

Feedback. It is *important* to me that the course moves at the right pace and is pitched at the right level. I therefore welcome any input. Just in case you are shy, I will also give you the opportunity to give anonymous written feedback mid-way through the course.

Academic integrity. Get a lot of bang for your buck, and soak up the knowledge that is being offered to you. Doing your own work increases how much you take away from the course, makes you a better thinker, and prevents unnecessary risks to your academic record. Familiarize yourselves with the Rutgers policies here: <http://academicintegrity.rutgers.edu/academic-integrity-at-rutgers>. If you have *any* questions about this policy, please talk to me.

Breaks. Each lecture is somewhat long (1 hour and 50 minutes). I therefore will provide a 5 minute break about half way through each lecture so that you can go to the bathroom, get a drink, etc.

Phones/Portable Devices. During class, I ask that we all shut off our phones and other media (iPods, Kindles, etc.). Multitasking is well-known way to degrade task performance.

Incomplete Grades. In line with Rutgers policy, I will not be giving any Incompletes unless there is truly an extenuating circumstance (e.g., family emergency). Please do not assume that you have a grade of “Incomplete” unless we have discussed it and specified in writing how the course assignments will be completed.

Lecture Schedule

The following is a *tentative* course schedule and does not include journal article reading. The schedule may change at any time (depending on the interests/needs of students), so be sure to keep current with the syllabus and class announcements.

Week of	Day	Readings	Topic
7/7	MON	Chapter 1	Administrative / Chapter 1
7/8	TUE	Chapter 1	Introduction
7/9	WED	Chapter 2	First Steps in Vision
7/10	THU	Chapter 2	
7/14	MON	Chapter 3	Spatial Vision
7/15	TUE	Chapter 3	
7/16	WED	Chapter 4	Perceiving & Recognizing Objects
7/17	THU	Chapter 4	
7/21	MON	<u>Exam 1/Chapter 5</u>	Exam 1 (Chapters 1-4)
7/22	TUE	Chapter 5	Perception of Color
7/23	WED	Chapter 6	Space Perception & Binocular Vision
7/24	THU	Chapter 6	
7/28	MON	Chapter 7	Attention & Scene Perception
7/29	TUE	Chapter 7	
7/30	WED	Chapter 8	Motion Perception
7/31	THU	<u>Exam 2/Chapter 9</u>	Exam 2 (Chapters 5 – 8)
8/4	MON	Chapter 9	Hearing: Physiology & Psychoacoustics
8/5	TUE	Chapter 10	Hearing in the Environment
8/6	WED	Chapter 11	Music & Speech Perception
8/7	THU	Chapter 11 & catch-up	
8/11	MON	Chapter 14	Olfaction
8/12	TUE	Chapter 15	Taste
8/13	WED	Chapter 15 & review	
8/14	THU	<u>Final Exam</u>	Final Exam (cumulative)