

Syllabus for PSYCH-UA.60 (Spring 2017)
From illusions to inference: Adventures in human perception

This syllabus is subject to change. Changes will be announced in class and by email.

1. Course logistics

Instructor

Prof. Wei Ji Ma, weijima@nyu.edu, 212 992 6530, Meyer 754
Office hours: Fridays from 3 to 5 PM

Teaching assistants

Will be announced later
Meetings by appointment

Classes

Mon/Wed from 4 to 6 PM
Meyer Hall (4 Washington Place), Room 815

Questions

Wei Ji and the TAs will not answer content-related questions by email. Please ask your questions at an office hour or by appointment instead.

Clickers

- Clickers will be distributed in the second class. They will be used for quick polls during lecture as well as for taking attendance. You can keep the clickers for the duration of the course but have to return them during the last class.
- As soon as you can, register your clicker on NYU Classes. Instructions can be found on the course website on NYU Classes, under “Resources”. Or go to <http://www.nyu.edu/campusmedia/data/pdfs/Student%20Guide%20for%20Clicker%20Registration.pdf>
- Please don't forget to bring your clicker to class.
- If you lose your clicker or experience technical problems, go to Campus Media, basement of Silver Center, LL7A, to get a replacement.

Materials

- There is no textbook.
- Readings consist of the lecture notes, lecture slides, and the following additional readings, which will be posted on NYU Classes under Resources:
 - Two Federal Aviation Administration brochures on spatial disorientation

- Wansink, Painter, North (2005), *Bottomless bowls: why visual cues of size may influence intake*, *Obesity Research* 13 (1), 93-100
- Morrot, Brochet, Dubourdieu (2001), *The color of odors*, *Brain and Language* 79 (2), 309-20
- Ehrsson (2007), *The experimental induction of out-of-body experiences*, *Science* 317, 1048
- Chapter 25 from Kandel, Schwartz, Jessell, *Principles of Neural Science*.
- Audio + slide recordings of all lectures will be posted on NYU Classes.

2. Course objectives

Course description

Why do we see two lines of the same length as different? Why do healthy people hear spoken words in noise? Why do we eat more when we see there is more food left? Our sensory perception easily falls prey to illusions and biases. It is tempting to think of these as failures of our brain, but they are not! In fact, they reveal the difficult challenges that our brain faces when interpreting the world, and the clever (and sometimes not so clever) solutions that it comes up with.

We will use a wide variety of well-known and lesser-known illusions (visual, auditory, tactile, vestibular, and multisensory) to understand the central concept of inference in perception: the notion that the brain constantly forms hypotheses about the outside world and tries to figure out which of them is most probable. We will draw parallels with examples from online shopping to medical diagnosis to spam filtering to election forecasting to searching for crashed planes. There will be guest lectures by outside experts: last year, we had an artist talk about anamorphic illusions in art, a pilot about illusions in aviation, a wine expert about wine tasting illusions, and a neurologist about neurological disorders of perception.

Didactic philosophy

The goal of this course is to encourage curiosity and exploration about illusions and inference. Therefore, the assignments will focus on critical thinking and active learning, rather than on memorization. If you feel at any point that this can be improved, don't wait until the evaluations but please mention it. The quality of the course can greatly benefit from feedback, and changes can be made as we go.

3. Grading

The course grade will consist of:

- 50% homework
- 15% midterm
- 20% final
- 15% participation

Homework

- There will be 12 homework sets. The lowest **three** homework grades will not be counted.
- Homework is due before 4 pm on the day of class, through NYU Classes → Assignments. You can only submit your work as a single attachment.
- **Only typed work** is accepted, with one exception: drawings can be made by hand and either scanned/photographed and attached electronically, or handed in at the beginning of class (don't forget to write your name). **Do not** take a picture of handwriting. If you take a picture of a drawing, please make sure the quality is good.
- Late homework will not be accepted by the system and will count as 0.
- You are expected to work on these homework assignments independently. If you are stuck on a problem: Try your best first – this could mean struggling for hours, but that is often the best way to learn. If you are still stuck, the preferred method is to contact your TA or Wei Ji for help.
- If you ask a classmate for help **after trying hard yourself**, then you must indicate on your homework whom you worked with on what. You will not be penalized for learning with your peers. We ask that you say who you worked with for a few reasons: 1) Honesty. 2) We want to know what material is difficult so we can spend more time helping you learn. If you relied on a peer for a challenging question then we want to make sure that you understand the material before test time.
- Under no circumstances should you copy a classmate's answer, even if you modify it slightly. **Copying someone else's work is cheating, is easy to detect, and will yield a grade of 0.**
- If someone asks you for help on the homework: do not give them your answer – this is cheating and will yield a grade of 0. First, make sure that the person you are helping has tried their best on the homework. You will only hurt them come exam time if you just handed them the answers all semester. Second, explain how you got started and how you thought about the problem. If you can help someone learn that way, that is impressive.
- If you think your homework has been graded incorrectly, please first talk to your TA and if no resolution is reached, to Wei Ji.

Exams

- The midterm will be take-home, open-book, and consist of homework-type questions. You will be allowed to consult any notes, books, and online resources. Collaboration or assistance from others will not be allowed.

- The final will be in-class, open-book, and consist of homework-type questions. You will be allowed to consult any notes and books in paper form, but no other sources.
- There will be no make-up exams and no early exams.

Participation

- Attendance is mandatory. To request an excused absence, please email your TA and me in advance.
- Participation consists of answering questions, asking questions, and actively participating in discussions and in-class assignments.

Letter grades

- All numerical grades will be on a scale from 0 to 10.
- Your numerical score will be turned into a letter grade according to the following scale: 90-100 A; 87-89 A-; 84-86 B+; 80-83 B; 77-79 B-; 74-76 C+; 70-73 C; 67-69 C-; 64-66 D+; 60-63 D; 57-59 D-; 0-56 F.

4. Overview of classes

Day	What	HW due	Topic
Jan 23	Lecture 1		Introduction and overview
Jan 25	Recitation 1		
Jan 30	Lecture 2	1	Vision: depth, retina, prior, likelihood
Feb 1	Recitation 2		
Feb 6	Lecture 3	2	Vision: anamorphic illusions
Feb 8	Recitation 3		
Feb 13	Lecture 4	3	Vision: nuisance parameters
Feb 15	Recitation 4		
Feb 20	No class		
Feb 22	Lecture 5	4	Vision: illumination as a nuisance parameter
Feb 27	Recitation 5		
Mar 1	Lecture 6	5	Bayes' rule; inference without illusions
Mar 6	Recitation 6		
Mar 8	Lecture 7	6	Vision: Gestalt and forced perspective; causal inference
Mar 13	No class		
Mar 15	No class		
Mar 20	Recitation 7		
Mar 22	Lecture 8	Midterm	Vision: Foreground/background
Mar 27	Recitation 8		
Mar 29	Lecture 9	7	Vestibular illusions
Apr 3	Recitation 9		

Apr 5	Lecture 10	8	Auditory and auditory-visual illusions
Apr 10	Recitation 10		
Apr 12	Lecture 11	9	Auditory-visual illusions
Apr 17	Recitation 11		
Apr 19	Lecture 12	10	Other sensory modalities
Apr 24	Recitation 12		
Apr 26	Lecture 13	11	Illusions without inference
May 1	Recitation 13		
May 3	Lecture 14	12	Neurological disorders in perception
May 8	Recitation 14		
TBD	Final		