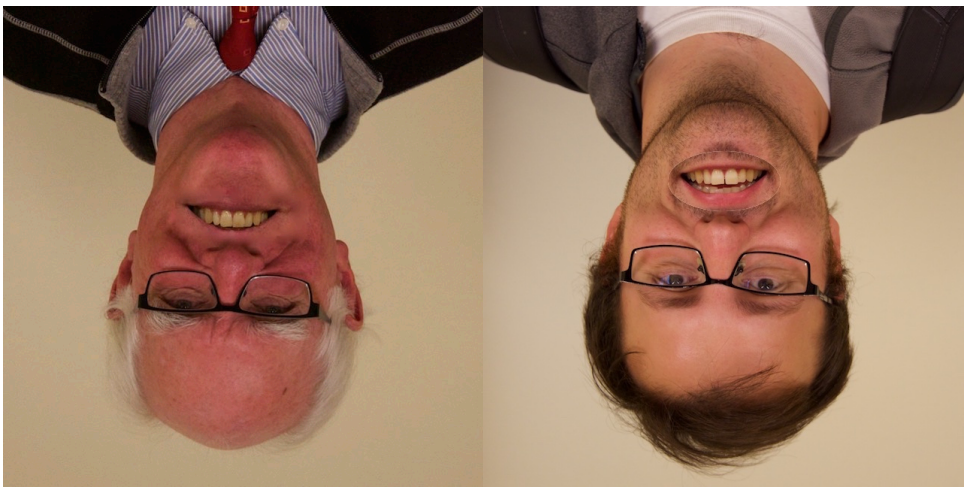
Psychology of Perception

Psychology 4165, Section 100

Fall 2016
Monday, Wednesday, Friday
11:00–11:50
Muenzinger E064

Lewis O. Harvey, Jr. – Instructor
Leif Oines–Teaching Assistant



Thatcher Illusion (Thompson, 1980)

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Syllabus Topics and Reading Assignments

Week 1	22 Aug	Introduction	Study Guide 1 (W 1)
Week 1	24 Aug	Psychophysics	(W 1)
Week 1	26 Aug	Psychophysics	Homework 1 (W 1)
Week 2	29 Aug	Vision	(W 2)
Week 2	31 Aug	Vision	(W 2)
Week 2	2 Sep	Vision	Homework 2 (W 2)
Week 3	5 Sep	**Labor Day**	Study Guide 2 (W 3)
Week 3	7 Sep	Spatial Vision	(W 3)
Week 3	9 Sep	Spatial Vision	Homework 3 (W 3)
Week 4	12 Sep	Object Perception	(W 4)
Week 4	14 Sep	Object Perception	(W 4)
Week 4	16 Sep	Object Perception	Homework 4 (W 4)
Week 5	19 Sep	Color Vision	(W 5)
Week 5	21 Sep	Color Vision	(W 5)
Week 5	23 Sep	Color Vision	Homework 5 (W 5)
Week 6	26 Sep	Space Perception	Study Guide 3 (W 6)
Week 6	28 Sep	Space Perception	(W 6)
Week 6	30 Sep	Space Perception	Homework 6 (W 6)
Week 7	3 Oct	Attention	(W 7)
Week 7	5 Oct	Attention	(W 7)
Week 7	7 Oct	Attention	(W 7)
Week 8	10 Oct	Exam 1	Mid-Term Exam
Week 8	12 Oct	Motion	(W 8)
Week 8	14 Oct	Motion	(W 8)
Week 9	17 Oct	Hearing	Study Guide 4 (W 9)
Week 9	19 Oct	Hearing	(W 9)
Week 9	21 Oct	Hearing	(W 9)
Week 10	24 Oct	Audition	(W 10)
Week 10	26 Oct	Audition	(W 10)
Week 10	28 Oct	Audition	Homework 7 (W 10)

Week 11	31 Oct	Music & Speech---------- ---------- (W 11)
Week 11	2 Nov	Music & Speech---------- ---------- (W 11)
Week 11	4 Nov	Music & Speech---------- Homework 8 ---------- (W 11)
Week 12	7 Nov	Vestibular ---------- Study Guide 5---------- (W 12)
Week 12	9 Nov	Vestibular ---------- ---------- (W 12)
Week 12	11 Nov	Vestibular ---------- ---------- (W 12)
Week 13	14 Nov	Touch ---------- ---------- (W 13)
Week 13	16 Nov	Touch---------- ---------- (W 13)
Week 13	18 Nov	Touch---------- ---------- (W 13)
Week 14	21 Nov	**Fall Break**
Week 14	23 Nov	**Fall Break**
Week 14	25 Nov	**Fall Break**
Week 15	28 Nov	Taste & Smell---------- ----------(W 14 & 15)
Week 15	30 Nov	Taste & Smell---------- ----------(W 14 & 15)
Week 15	2 Dec	Taste & Smell---------- ----------(W 14 & 15)
Week 16	5 Dec	Taste & Smell---------- ----------(W 14 & 15)
Week 16	7 Dec	Taste & Smell---------- ----------(W 14 & 15)
Week 16	9 Dec	Review

14 Dec **Final Exam, Wednesday Evening (19:30–22:00)**

- The "Homework x" notation on the syllabus indicates when homework assignments will be handed out. The homework will be due one week later

- The "Study Guide x" notation on the syllabus indicates when study guides will be handed out. The study guides are meant to focus your reading and notetaking in the lecture portion, as well as focus on the laboratory exercises. They are designed to prepare you for the midterm exam on Monday, 10 October 2016 and for the final exam on Wednesday, 14 December 2016.

Textbook for the Course

Wolfe, J. M., Kluender, K. R., Levi, D. M., Bartoshuk, L. M., Herz, R. S., Klatzky, R. L., . . . Merfeld, D. M. (2015). *Sensation and Perception*. Sunderland, Massachusetts: Sinauer Associates, Inc. (Required).

Note: The numbers in parentheses above refer to chapters in the Wolfe (W) text. Please read the indicated chapter before the class meeting.

The website for the course is available through DesireToLearn (D2L) using your CU Identikey and password or directly from this URL:

http://psych.colorado.edu/~lharvey/P4165/P4165_2016_3_Fall/Main_Page_2016_Fall_PSYC4165.html

All handouts and lab material are available from this web page. The outside reading and the lectures are available through D2L.

Office Hours

Name	Lewis O. Harvey, Jr.	Leif Oines
Office	MUEN D251b	MUEN D0040d
Hours	M&F: 09:00–10:00 T&R: 09:00–10:00 and by appointment	TBD in lab and by appointment
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Name	Vincent Mathias
Office	NA
Hours	in class, lab, and by appointment
Telephone	none
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Laboratory Schedule

Section L103: 12:30–15:20 Tuesday, Room MUEN D346
Section L104: 12:30–15:20 Thursday, Room MUEN D346

1.	23 & 25 Aug 2016	**"R" you ready?** Using R for data analysis
2.	30 Aug & 1 Sep 2016	**Lab 0:** Doing Computer-Controlled Experiments: **Oblique Effect**
3.	6 & 8 Sep 2016	**Lab 1:** Data Collection: **Face Recognition**
4.	13 & 15 Sep 2016	**Lab 1:** Data Analyses: **Face Recognition**
5.	20 & 22 Sep 2016	**Lab 2:** Data Collection: **Loudness Scaling** **Lab 1: Report Due** (30 points)
6.	27 & 29 Sep 2016	**Lab 2:** Data Analyses: **Loudness Scaling**
7.	4 & 6 Oct 2016	**Lab 3:** Create PsychoPy Experiment: **Stroop Effect** **Lab 2: Report Due** (40 points)
8.	11 & 13 Oct 2016	**Lab 3:** Group Data Analysis: **Stroop Effect** **Lab 4: Form Research Project Teams**
9.	18 & 20 Oct 2016	**Lab 4:** Work on Group Projects: Design Experiment **Lab 3 Report Due (50 points)**
10.	25 & 27 Oct 2016	**Lab 4:** Work on Group Projects: Data Collection
11.	1 & 3 Nov 2016	**Lab 4:** Work on Group Projects: Data Collection
12.	8 & 10 Nov 2016	**Lab 4:** Work on Group Projects: Data Collection
13.	15 & 17 Nov 2016	**Lab 4:** Work on Group Projects: Data Analysis
14.	22 & 24 Nov 2016	**Fall Break: No Classes**
15.	29 Nov & 1 Dec 2016	**Lab 4:** Work on Group Projects **Lab 4:** Work on Project Presentations
16.	6 Dec 2016, Tuesday 7 Dec 2016, Wednesday 9 Dec 2016, Friday	**Lab 4: All Group Project Presentations,** (10 points), MUEN D430, 12:30-15:20 **Lab 4: Group Project Posters due** (10 points) **Lab 4: Final Project Reports due** (40 + 20 points)

Original Articles

1.	23 Aug 2016	(Swets, 1961)
2.	30 Aug 2016	(Schiller, 2010)
3.	6 Sep 2016	(Schiller & Carvey, 2005)
4.	13 Sep 2016	(Owens, Antonoff, & Francis, 1994)
5.	20 Sep 2016	(Jacobs & Nathans, 2009)
6.	27 Feb 2016	(Kaufman & Rock, 1962)
7.	4 Oct 2016	(Most & Astur, 2007; Most, Scholl, Clifford, & Simons, 2005)
8.	11 Oct 2016	(Nuthmann, 2014; Psalta, Young, Thompson, & Andrews, 2014)
9.	18 Oct 2016	(Plomp, 1964)
10.	25 Oct 2016	(Plomp & Levelt, 1965)
11.	1 Nov 2016	(Poeppel, Emmorey, Hickok, & Pylkkänen, 2012)
12.	8 Nov 2016	(Held, 1965)
13.	15 Nov 2016	(Guterstam, Petkova, & Ehrsson, 2011; Slater, Spanlang, Sanchez-Vives, & Blanke, 2010)
14.	22 Nov 2016	**Fall Break – No Classes**
15.	29 Nov 2016	(Gelstein et al., 2011; Savic, Berglund, Gulyas, & Roland, 2001)
16.	6 Dec 2016	**Last Week of Class**

Copies of these papers are available to download for reading through D2L using your CU IdentiKey ID. See the reference section at the end of the syllabus for complete citation information.

Conditions Under Which the Course Operates

Lecture:

There will be two exams given during the semester: one mid-term and one final examination. Both are required. No make-up examinations will be given. You will receive a grade of zero for each exam not taken. There will be eight homework assignments. Each homework will be handed out on a Thursday (marked by bullets on the syllabus) and will be due the following Thursday. Hard copies of the homework should be handed in at lecture and an electronic copy uploaded to the Desire2Learn dropbox.

Original Articles Reading:

There are 19 original journal articles that are assigned as part of the course. These papers will form the basis of a 10 page paper about experimental design and drawing conclusions from data that you will write. This paper will be due on Friday 9 December 2016, and is worth 50 points.

Laboratory:

The laboratory is not optional in PSYC 4165. There are four graded assignments in the laboratory. The sum of the four grades will be your laboratory grade. All lab assignments must be written and printed with a computer word processor and all graphs must be prepared using computer graphics.

Grading:

Your final grade is computed from your exam scores, your laboratory grade, your homework grades, and the analytic paper grade. The total possible points in the course is 850:

200	First Examination (Mon, 10 Oct 2016, 11:00-11:50)
300	Final Examination (Wed, 14 Dec 2016, 19:30–22:00)
200	Laboratory Grade
80	Homework Grade
50	Analytic Paper Grade (Fri, 9 Dec 2016)
20	Participation

850	Total Possible Points

Your final letter grade in the course will be assigned in the following manner. First a "Reference Score" will be calculated by taking the mean of the top three students in the class. Your grade will be determined by how well you have done in comparison to this reference score:

	A >96.6%,	A- >93.3% of the reference score
B+ >90.0%,	B >86.6%,	B- >83.3% of the reference score
C+ >80.0%,	C >76.6%,	C- >73.3% of the reference score
D+ >70.0%,	D >66.6%,	D- >63.3% of the reference score
	F <63.3%	

It is therefore possible for the entire class to receive the grade of A. By the same token, it is also possible that very few people would receive an A, depending on the spread of grades across the class.

Comments About the Psychology Of Perception

Why Take This Course?

There are three reasons to take this course:

1. To gain an understanding of the capabilities and limitations of our perceptual experiences;

2. To sharpen your ability to critically evaluate the results of experiments in light of theories of perception;

3. To gain practical skills in the use of computers for designing experiments, for analyzing and graphing data, and for preparing written laboratory reports.

The study of perception is the oldest part of modern psychology. It developed from trying to answer two questions posed by philosophers: "How do we know what we know?" and "Why do things appear the way they appear?" Since most of what we know about the outside world comes to us through our sensory systems, our sensory capabilities were the first to be studied extensively. Perceptions are derived from neural and psychological mechanisms that operate on sensory information. We will study the limits of our sensory and perceptual abilities and learn how to characterize the unreliability that results from these limits.

Prerequisites:

A broad understanding of the basic concepts from a general psychology course is assumed. You will be using methods of inferential statistics, such as those taught in Psychology 3101, to evaluate the results of your experiments. A facile ability with these methods in particular and with mathematical concepts through algebra and trigonometry are required. A familiarity with calculus is helpful but is not necessary. Please work through the eight questions on the next two pages. If you find these questions very difficult and you don't even know how to find out how to answer them, you probably are not ready to take this course.

You will be expected to write in a clear and grammatically correct style in this class. If you believe you will require extra help with your writing, please visit The Writing Center located in Norlin E111. More information can be found at: http://www.colorado.edu/pwr/writingcenter.html.
You can also reach The Writing Center help desk by phone at (303) 735-6906.

You need to make a considerable commitment of time to do well in this class. For each credit hour of the course you should expect to spend 3 hours on class-related activities (studying, research, writing) per week. Since the class is a four-credit course, expect to spend 12 additional hours per week outside the class and laboratory.

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Skills Needed for Psychology of Perception

Question 1:
Rearrange the following linear equation to solve for *b*: $y = a + bx$

$b =$

Question 2:
Solve the following equation for *X*: $y = \log(x)$

$x =$

Question 3:
Compute the arithmetic mean and the standard deviation of this sample of numbers:
10.0, 9.0, 12.0, 11.0, 8.5, 13.0, 8.0, 10.0, 7.0, and 11.5:

$\mu =$

$\sigma =$

Question 4:
In an experiment you observe the number of times six different kinds of events occur. A theoretical model makes predictions about how often these events *should* occur. These data are presented in the table below. Compute the chi-square (χ^2) statistic to test if the observed data are significantly different from the predicted data. You may assume *n-1=5* degrees of freedom for the significance test.

	E1	E2	E3	E4	E5	E6
Observed Data	174.0	172.0	104.0	92.0	41.0	8.0
Predicted Data	175.5	167.8	106.5	90.4	44.3	6.5

$\chi^2 =$

Question 5:
In an experiment with two levels of an independent variable you observe the following values of the dependent variable for 10 subjects (five were tested under level 1 and five under level 2). Compute the mean of each column and calculate a t-test (or ANOVA if you wish) to test the hypothesis that there is not a meaningful difference between the means of groups:

Level 1		Level 2	
Subject	Dependent	Subject	Dependent
1	8.0	6	10.0
2	9.0	7	9.5
3	7.5	8	11.0
4	7.0	9	9.0
5	8.5	10	10.5
Mean		Mean	

$t(df) =$

$p =$

Question 6:
Convert the probability 0.8413447 to a quantile score based on the cumulative distribution function (CDF) of the unit normal Gaussian distribution (a quantile is a z-score). Such a transformation is achieved by the quantile function (`q <- qnorm(p)` in R, where p is the probability). What is the probability that a single sample drawn from a population having a Gaussian distribution with a mean of 0.0 and a standard deviation of 1.0 will have a value of 1.959964 or greater (use `pnorm(q)` in R)?

$q =$

$p =$

Question 7:
Using least-squares linear regression, compute the slope (a) and y-intercept (b) of the straight line, $y = a + bx$, that best fits this set of data. In R you can use `lm(y ~ 1 + x)`:

x	1.0	3.0	5.0	7.0	9.0
y	0.98	8.73	17.0	20.9	27.4

$a =$

$b =$

Question 8:
Plot the data in Question 7 on a graph using linear axes. The x-axis should have a range of 0.0 to 10.0 and the y-axis should range from 0.0 to 30. Use the plot() function in R.

Lewis O. Harvey, Jr.–Instructor
Leif Oines–Teaching Assistant

AGREEMENTS FOR PARTICIPATING IN THE COURSE

The purpose of these agreements is to create a condition that allows all people in the class to get maximum value from the course.

AGREEMENTS

1 You agree to be responsible for these agreements.

2 You agree to be on time to class and to your laboratory meetings.

3 You agree to complete the assigned reading and homework on time.

4 You agree to complete your laboratory assignments on time.

5 You agree to attend all class and laboratory meetings unless an emergency comes up.

6 You agree to understand the material.

7 You agree to ask questions when you don't understand the material.

8 You agree to communicate any complaints and criticisms you may have only to someone who can do something about the situation and you agree not to complain or to criticize to someone who cannot do something about the situation.

9 You agree to get value out of your participation in the course.

If you attend the next class meeting, you are accepting responsibility for the above agreements.

Statements Recommended by
Associate Vice Chancellor for Undergraduate Education

Accommodation for Disabilities

If you qualify for accommodations because of a disability, please submit to your professor a letter from Disability Services in a timely manner (for exam accommodations provide your letter at least one week prior to the exam) so that your needs can be addressed. Disability Services determines accommodations based on documented disabilities. Contact Disability Services at 303-492-8671 or by e-mail at dsinfo@colorado.edu. If you have a temporary medical condition or injury, see Temporary Injuries guidelines under the Quick Links at the Disability Services website and discuss your needs with your professor.

Religious Holidays

Campus policy regarding religious observances requires that faculty make every effort to deal reasonably and fairly with all students who, because of religious obligations, have conflicts with scheduled exams, assignments or required attendance. In this class, (*insert your procedures here*). See the campus policy regarding religious observances for full details.

Classroom Behavior

Students and faculty each have responsibility for maintaining an appropriate learning environment. Those who fail to adhere to such behavioral standards may be subject to discipline. Professional courtesy and sensitivity are especially important with respect to individuals and topics dealing with differences of race, color, culture, religion, creed, politics, veteran's status, sexual orientation, gender, gender identity and gender expression, age, disability, and nationalities. Class rosters are provided to the instructor with the student's legal name. I will gladly honor your request to address you by an alternate name or gender pronoun. Please advise me of this preference early in the semester so that I may make appropriate changes to my records. For more information, see the policies on classroom behavior and the student code.

Sexual Misconduct, Discrimination, Harassment and/or Related Retaliation

The University of Colorado Boulder (CU Boulder) is committed to maintaining a positive learning, working, and living environment. CU Boulder will not tolerate acts of sexual misconduct, discrimination, harassment or related retaliation against or by any employee or student. CU's Sexual Misconduct Policy prohibits sexual assault, sexual exploitation, sexual harassment, intimate partner abuse (dating or domestic violence), stalking or related retaliation. CU Boulder's Discrimination and Harassment Policy prohibits discrimination, harassment or related retaliation based on race, color, national origin, sex, pregnancy, age, disability, creed, religion, sexual orientation, gender identity, gender expression, veteran status, political affiliation or political philosophy. Individuals who believe they have been subject to misconduct under either policy should contact the Office of Institutional Equity and Compliance (OIEC) at 303-492-2127. Information about the OIEC, the above referenced policies, and the campus resources available to assist individuals regarding sexual misconduct, discrimination, harassment or related retaliation can be found at the OIEC website.

Honor Code

All students enrolled in a University of Colorado Boulder course are responsible for knowing and adhering to the academic integrity policy of the institution. Violations of the policy may include: plagiarism, cheating, fabrication, lying, bribery, threat, unauthorized access, clicker fraud, resubmission, and aiding academic dishonesty. All incidents of academic misconduct will be reported to the Honor Code Council (honor@colorado.edu; 303-735-2273). Students who are found responsible for violating the academic integrity policy will be subject to nonacademic sanctions from the Honor Code Council as well as academic sanctions from the faculty member. Additional information regarding the academic integrity policy can be found at honorcode.colorado.edu.

The following terms are clarified for the benefit of all members of the university community.

Cheating

Cheating is defined as using unauthorized materials or receiving unauthorized assistance during an examination or other academic exercise. Examples of cheating include: copying the work of another student during an examination or other academic exercise (includes computer programming), or permitting another student to copy one's work; taking an examination for another student or allowing another student to take one's examination; possessing unauthorized notes, study sheets, examinations, or other materials during an examination or other academic exercise; collaborating with another student during an academic exercise without the instructor's consent; and/or falsifying examination results.

Plagiarism

Plagiarism is defined as the use of another's ideas or words without appropriate acknowledgment. Examples of plagiarism include: failing to use quotation marks when directly quoting from a source; failing to document distinctive ideas from a source; fabricating or inventing sources; and copying information from computer-based sources, i.e., the Internet.

Unauthorized Possession or Disposition of Academic Materials

Unauthorized possession or disposition of academic materials may include: selling or purchasing examinations, papers, reports or other academic work; taking another student's academic work without permission; possessing examinations, papers, reports, or other assignments not released by an instructor; and/or submitting the same paper for multiple classes without advance instructor authorization and approval.

Reproduced from: http://www.colorado.edu/policies/academic-integrity-policy.

References

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