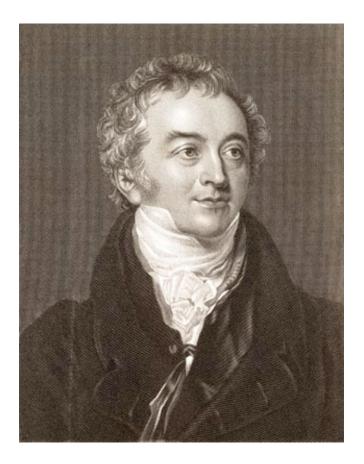# Psychology of Perception

Psychology 4165, Section 100

Fall 2007, Tuesday and Thursday, 9:30–10:45
Muenzinger D-156

Lewis O. Harvey, Jr. – Instructor

Thomas Young (1773–1829)

Psychology of Perception
Psychology 4165-100
Fall 2007

Lewis O. Harvey, Jr.–Instructor
Brad Aisa–Assistant
MUEN D156, 09:30–10:45 TR

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Syllabus Topics and Reading Assignments

28 Aug	Psychophysics	(W 1)	30 Oct	Hearing	(W 10)
30 Aug	Psychophysics •	(W 1)	1 Nov	Hearing •	(W 10)
4 Sept	First Steps in Vision	(W 2)	6 Nov	Music Perception	(W 11
6 Sept	First Steps in Vision •	(W 2)	8 Nov	Music Perception •	(W 11
11 Sept	Spatial Vision	(W 3)	13 Nov	Speech Perception	(W 11)
13 Sept	Spatial Vision •	(W 3)	15 Nov	Speech Perception •	(W 11)
18 Sept	Object Perception	(W 4)	20 Nov	**Thanksgiving Break**	
20 Sept	Object Perception	(W 4)	22 Nov	**Thanksgiving Break**	
25 Sept	Color Vision	(W 5)	27 Nov	Somatosensory	(W 12)
27 Sept	Color Vision •	(W 5)	29 Nov	Somatosensory	(W 12)
2 Oct	Space Perception	(W 6)	4 Dec	Taste & Smell	(W 13)
4 Oct	Space Perception •	(W 6)	6 Dec	Taste & Smell •	(W 13)
9 Oct	Motion Perception	(W 7)	11 Dec	Taste & Smell	(W 14)
11 Oct	Motion Perception	(W 7)	12 Dec	Taste & Smell	(W 14)
16 Oct	**First Examination**		17 Dec	**Final Exam (16:30–19:00)**	
18 Oct	Attention	(W 8)			
23 Oct	Auditory System	(W 9)			
25 Oct	Auditory System •	(W 9)			

Required Textbooks for the Course

Wolfe, J. M., Kluender, K. R., Levi, D. M., Bartoshuk, L. M., Herz, R. S., Klatzky, R. L., et al. (2006). *Sensation and Perception*. Sunderland, Massachusetts: Sinauer Associates.

Martin, D. W. (2007). *Doing Psychology Experiments* (7th ed.). Pacific Grove, California: Brooks/Cole Publishing.

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

Office Hours

Name	Lewis O. Harvey, Jr.	Brad Aisa
Office	MUEN D244F	MUEN D260d
Hours	11:00–12:00 Mon, Tue, Wed and by appointment	10:00–11:00 Monday 11:00–12:00 Tuesday and by appointment
Telephone	303-492-4498	720-233-0225
email	Lewis.Harvey@colorado.edu	baisa@colorado.edu
web	psych.colorado.edu/~lharvey/	

Laboratory Schedule

Section L101:   12:30–15:20 Tuesday,   Room MUEN D-156 (Brad)
Section L102:   12:30–15:20 Thursday,   Room MUEN D-156 (Brad)

1.	28 & 30 Aug 2007	**No Laboratory Meetings**
2.	4 & 6 Sept 2007	Lab 1 data collection: **Noisy Representations** (Read Martin Chapter 1, Chapter 12)
3.	11 & 13 Sept 2007	Lab 1 data analyses (Read Martin Chapter 13)
4.	18 & 20 Sept 2007	Lab 2 data collection: **Signal Detection** **Lab 1 Report Due** (30 points)
5.	25 & 27 Sept 2007	Lab 2 data analyses
6.	2 & 4 Oct 2007	Lab 3 data collection: **Color Naming** **Lab 2 Due** (40 points) Form Research Project Teams (Read Martin Chapters 6 & 7)
7.	9 & 11 Oct 2007	Lab 3 data analysis First draft of project proposal due (Cover Page, Introduction, References)
8.	16 & 18 Oct 2007	**Lab 3 Due (50 points)** Work on Group Projects
9.	23 & 25 Oct 2007	Work on Group Projects Second draft of project proposal due (Cover Page, Introduction, Methods, Expected Results, References)
10.	30 Oct & 1 Nov 2007	Work on Group Projects Data Collection
11.	6 & 8 Nov 2007	Work on Group Projects Data Collection
12.	13 & 15 Nov 2007	Work on Group Projects Data Analysis
13.	20 & 22 Nov 2007	**Fall Break and Thanksgiving Break**
14.	27 & 29 Nov 2007	Work on Group Projects Work on Project Presentations
15.	4 Dec 2006 6 Dec 2006	**Group Project Presentations & Posters Due** (20 points) **Group Project Report due** (60 points)
16.	11 & 13 Dec 2006	**No Laboratory Meetings**

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 10 computational homework assignments. Each homework will be handed out on a Thursday (marked by bullets on the syllabus) and will be due the following week.

Laboratory:

The laboratory is not optional in PSYC 4165. There are four assignments in the laboratory. These assignments will be graded and 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 with a graphics or spread sheet program.

Grading:

Your final grade is computed from your exam scores, homework grades, and the laboratory grade. The total possible points in the course is 800:

200	First Examination (16 October 2007)
300	Final Exam (17 December 2007)
100	Homework grade
200	Laboratory Grade

800	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 five percent of 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.

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 need to make a considerable commitment of time. For each credit hour you should expect to spend 3 hours of 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.

Skills Needed for Psychology of Perception

Question 1:
Rearrange the following linear equation to solve for *b*: $Y = a + b \cdot X$

$b =$

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
($n = 6$). 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* degrees of freedom.

	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

$\chi^2 =$

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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 a significant difference between the means:

Level 1

Subject	Dependent
1	8.0
2	9.0
3	7.5
4	7.0
5	8.5
Mean	

Level 2

Subject	Dependent
6	10.0
7	9.5
8	11.0
9	9.0
10	10.5
Mean	

$t(df) =$

$p =$

Question 6:
Convert the probability 0.8413447 to a z-score based on the unit, normal Gaussian distribution. Such a transformation uses the quantile function (qnorm() in R). 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 (pnorm() in R)?

Question 7:
Using least-squares linear regression, compute the slope (b) and y-intercept (a) of the straight line, $y = a + b \cdot x$, that best fits the following set of data. Use lm(y ~ 1 + x) in R:

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

$a =$

$b =$

$R^2 =$

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.

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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.

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Academic Integrity Policy

A university's intellectual reputation depends on maintaining the highest standards of intellectual honesty. Commitment to those standards is a responsibility of every student, faculty, and staff member on the University of Colorado at Boulder campus.

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Honor Code

A student-run Honor Code was instituted on the Boulder Campus in 2002. The intent of the Honor Code is to establish a community of trust where students do not plagiarize, cheat, or obtain unauthorized academic materials. An honor code council collaborates with the colleges and schools in addressing allegations and instances of academic dishonesty and in assisting to educate all members of the university community on academic integrity issues.

Breaches of academic honesty include cheating, plagiarism, and the unauthorized possession of examinations, papers, computer programs, as well as other class materials specifically released by the faculty.

A student accused of academic dishonesty will either accept the accusation made by a faculty member or request a hearing before a student panel, who will make a decision on the accusation of academic dishonesty. In addition to academic sanctions imposed by the faculty, students found guilty of academic dishonesty also face consequences from the honor code council ranging from attending a mandatory class in ethics to expulsion from the campus. More information about CU-Boulder's Honor Code may be found at www.colorado.edu/academics/honorcode/Home.html.

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/acadinteg.html

Check out http://www.marymount.edu/academic/sehs/ps/plagiarism_glines/index.html for explicit examples.

Statements Recommended by
Associate Vice Chancellor for Undergraduate Education, Michael Grant

1. *Recommended syllabus statement on disabilities*: If you qualify for accommodations because of a disability, please submit a letter to me from Disability Services in a timely manner so that your needs may be addressed. Disability Services determines accommodations based on documented disabilities. Contact: 303-492-8671, Willard 322, or
http://www.Colorado.EDU/disabilityservices/

2. *Recommended syllabus statement on religious observances*: Campus policy regarding religious observances requires that faculty make every effort to reasonably and fairly deal with all students who, because of religious obligations, have conflicts with scheduled exams, assignments or required attendance. Please speak with me if you have a conflict. See policy details at

http://www.colorado.edu/policies/fac_relig.html/

3. *Recommended syllabus statement on classroom behavior*: Students and faculty each have responsibility for maintaining an appropriate learning environment. Students who fail to adhere to behavioral standards may be subject to discipline. Faculty have the professional responsibility to treat students with understanding, dignity and respect, to guide classroom discussion and to set reasonable limits on the manner in which students express opinions. See policies at

http://www.colorado.edu/policies/classbehavior.html/ and at
http://www.colorado.edu/studentaffairs/judicialaffairs/code.html#student_code/

4. *Recommended syllabus statement on the Honor Code*: All students of the University of Colorado at Boulder are responsible for knowing and adhering to the academic integrity policy of this institution. Violations of this policy may include: cheating, plagiarism, aid of academic dishonesty, fabrication, lying, bribery, and threatening behavior. All incidents of academic misconduct shall be reported to the Honor Code Council (honor@colorado.edu; 303-725-2273). Students who are found to be in violation of the academic integrity policy will be subject to both academic sanctions from the faculty member and non-academic sanctions (including but not limited to university probation, suspension, or expulsion). Additional information on the Honor Code can be found at

http://www.colorado.edu/policies/honor.html/ and at
http://www.colorado.edu/academics/honorcode/