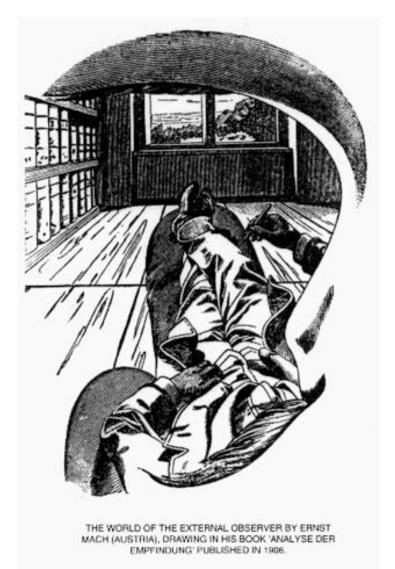# Psychology of Perception

Psychology 4165, Section 100

Fall 2004, Tuesday & Thursday, 9:30–10:45
Muenzinger D-156

Lewis O. Harvey, Jr. – Instructor

THE WORLD OF THE EXTERNAL OBSERVER BY ERNST
MACH (AUSTRIA), DRAWING IN HIS BOOK 'ANALYSE DER
EMPFINDUNG' PUBLISHED IN 1906.

Ernst Mach (1838–1916)

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Syllabus Topics and Reading Assignments

24 Aug	Introduction to the Course		26 Oct	3-D Perception	(SB 8)
26 Aug	Psychophysics	(SB 1)	28 Oct	3-D Perception	(SB 8)
31 Aug	Psychophysics	(SB Appendix)	2 Nov	Action and Motion	(SB 9)
2 Sep	Psychophysics •1	(SB Append)	4 Nov	Action and Motion	(SB 9)
7 Sep	The Human Eye	(SB 2)	9 Nov	Auditory System	(SB 10)
9 Sep	The Human Eye	(SB 2)	11 Nov	Auditory System •3	(SB 10)
14 Sep	The Eye & Seeing	(SB 3)	16 Nov	Hearing	(SB 11)
16 Sep	The Eye & Seeing	(SB 3)	18 Nov	Hearing	(SB 11)
21 Sep	Central Pathways	(SB 4)	23 Nov	Hearing •4	(SB 11)
23 Sep	Central Pathways	(SB 4)	25 Nov	**Thanksgiving Holiday**	(SB 11)
28 Sep	Spatial Vision	(SB 5)	30 Nov	Somatosensory	(SB 12)
30 Sep	**Fall Break**	(SB 5)	2 Dec	Taste & Smell	(SB 13)
5 Oct	Spatial Vision	(SB 5)	7 Dec	Taste & Smell	(SB 13)
7 Oct	**Midterm Exam**		9 Dec	Recapitulation	
12 Oct	Object Perception	(SB 6)	**13 Dec**	**Monday**	
14 Oct	Object Perception	(SB 6)		**Final Examination**	
				10:30–13:00	
19 Oct	Color Perception	(SB 7)			
21 Oct	Color Perception •2	(SB 7)	17 Dec	Commencement	

Textbooks for the Course

Sekuler, R. W., & Blake, R. (2002). Perception (4th ed.). New York: McGraw-Hill.
Martin, D. W. (2004). *Doing Psychology Experiments* (6th ed.). Pacific Grove, California:
Brooks/Cole Publishing.
Note: The numbers in parentheses above refer to chapters in the Sekuler and Blake (SB) and
in the Martin (M) texts. Please read the indicated chapter before the class.

Office Hours

Name	Lewis O. Harvey, Jr.	Erika M. Nyhus
Office	MUEN D251b	D260e
Hours	11:00–12:00 Mon & Tues	11:00–13:00 Wed
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Laboratory Schedule

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

1. 31 Aug & 2 Sep 2004   Begin Lab 1: **Weight Discrimination**
                                  (Martin Chapter 1, Chapter 12)

2. 7 & 9 September 2004   Work on Lab 1 (Martin Chapter 13)

3. 14 & 16 September 2004   Lab 1 Report Due (30 points)
                                  Begin Lab 2: **Face Recognition**
                                  (Martin Chapter 12)

4. 23 & 25 September 2004   Work on Lab 2

5. 28 & **30** September 2004   Work on Lab 2

6. 5 & 7 October 2004   Work on Lab 2
                                  Form Research Teams and start
                                  working on Group Projects

7. 12 & 14 October 2004   Lab 2 Due (40 points)
                                  Begin Lab 3: **Color Naming**

8. 19 & 21 October 2004   Work on Lab 3
                                  First draft of group proposal due
9. 26 Oct & 28 Oct 2004   Work on Group Projects (Lab 4)

10. 2 & 4 November 2004   Lab 3 due (50 points)
                                  Second draft of project due
                                  (Cover page, Introduction, References

11. 11 & 13 November 2004   Collect Data for Lab 4

12. 16 & 18 November 2004   Collect Data for Lab 4

13. 23 & **25** November 2004   Analyze Data for Lab 4

14. 20 Nov & 2 Dec 2004   Work on Presentation for Lab 4

15. Tuesday, 7 December 2004   Group Project **Presentations** (20 points)
                                  Group Project Report due (40 + 20 points)
                                  Each group turns in one paper with a Cover page,
                                  Introduction, Methods, Results and Reference
                                  section and each member of the group turns in their
                                  own discussion section. (80 points total: 40 points
                                  for group report, 20 points for individual discussion
                                  and 20 points for the group presentation).

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. Part of the semester grade will be based on homework assignments and class participation.

Laboratory:

The laboratory is not optional in Psychology 4165. There will be four assignments in 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, participation grade, and the laboratory grade. The total possible points in the course is 800:

```
200     First Examination  (7 October 2004)
300     Final Exam        (13 December 2004)
80      Homework grade
20      Class participation
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.

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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; and (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. All of our sensory systems operate under the same set of basic principles that we will study in depth:

1. **Selective Receptors**: Individual receptors respond to a restricted range of stimuli;
2. **Receptive Fields**: Individual sensory neurons respond selectively to a restricted range of stimuli that can be described by its receptive field;
3. **Distributed Response**: Each stimulus causes a pattern of activity across the neurons which respond to it;
4. **Neural Maps**: Neurons are arranged in the brain in an orderly way, forming maps based on their response properties;
5. **Columnar Organization**: Neurons that have similar response properties are organized in vertical columns of brain tissue;
6. **Parallel Pathways**: Different types of information flow from receptors to the brain in different parallel pathways;
7. **Relationship Between Physiology and Perception**: Perceptual experience is created by physiological activity—we will study this relationship in detail where possible;
8. **Cognitive Influences**: Perception is influenced by thoughts, feelings, motivations and memories.

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 know how to even find out how to answer them, you probably are not ready to take this course. The course requires 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.
A theoretical model makes a prediction 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 0.76 to a z-score based on the unit, normal Gaussian distribution. 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 1.96 or greater?

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 :

x	1.0	3.0	5.0	7.0	9.0
y	4.1	9.9	16.1	22.0	27.9

$a =$

$b =$

$R^2 =$

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 30.0.

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.