OTRP online

Office of Teaching Resources in Psychology

COURSE SYLLABUS
PSYCHOLOGY 10
Analysis of Psychological Data

This course meets the Quantitative General Education Requirement for the the University of California, Merced.

INSTRUCTOR: Dr. William Shadish
INSTRUCTOR'S OFFICE: Classroom and Office Building (COB) Room 385
INSTRUCTOR'S PHONE: 209-724-4372
OFFICE HOURS: MW 1:30 to 3pm, and by appointment
INSTRUCTOR'S EMAIL: wshadish@ucmerced.edu

CLASSROOM: Classroom and Office Building, COB 102
CLASS DAY AND TIME: Monday-Wednesday 12-1:20
LAB DAY AND TIME: Lab is held on Friday of each week:

Sec 1	2-2:50	COB 127
Sec 2	1-1:50	COB 129
Sec 3	12-12:50	COB 288
Sec 4	11-11:50	COB 288
Sec 5	10-10:50	COB 276
Sec 6	9-9:50	COB 279
Sec 7	8-8:50	COB 276
Sec 8	3-3:50	COB 268

The teaching assistant will run most of the lab sections.

TEACHING ASSISTANTS: Corinne Townsend and David Marrer, M.A.
TA'S OFFICE: To Be Announced
TA'S OFFICE HOURS: To Be Announced
TA'S EMAIL: ctownsend@ucmerced.edu, dmarrer@ucmerced.edu

TUTOR: Sonia Bhasin

COURSE DESCRIPTION: Design and analysis of psychological research including experimental design, correlational research, and descriptive and inferential statistics. Students in the psychology emphasis must take this course before taking any upper division psychology courses.

PREREQUISITES:
1. Psychology 1.
2. Basic Mathematics Skills: Take the quiz on page 666 of the textbook. The quiz assesses your readiness to handle the material in this class.

TEXT AND SUPPLIES:
1. <u>Required Text</u>: Gravetter, F.J. & Wallnau, L.B. (2004). *Statistics for the Behavioral Sciences* (6th Edition). Belmont, CA: Wadsworth/Thompson Learning.
2. <u>Optional Text</u>: Gravetter, F.J. (2004). *Study Guide for Gravetter & Wallnau's Statistics for the Behavioral Sciences* (6th Edition). Belmont, CA: Wadsworth/Thompson Learning.
3. <u>Scantron Sheets</u>: Twenty (20) red scantron sheets (Form No. F-289-PAR-L), available for purchase at the bookstore, for use in tests and homeworks.
4. <u>Calculator</u>: You will need a calculator for both the homeworks and the exams.

COURSE OBJECTIVES:
By the end of the semester, students should be able to:
- Understand ordinary statistics that they encounter in the media
  - For example, what it means when a poll results say "58% +/- 2%"
- Apply and interpret descriptive statistics commonly used in psychological research
  - These are statistics that we use to describe our data, such as the mean or the standard deviation.
- Apply and interpret inferential statistics commonly used in psychological research
  - These are statistics that we use to make decisions about whether the results of our research are due to chance, or reflect some real (nonchance) effect.

CLASS ATTENDANCE AND PREPARING FOR CLASS: Class attendance is strongly recommended; very few students do well in this course without coming to class. It is crucial to stay current with the readings and the material. Learning statistics is like learning a language—if you get behind, it is very difficult to catch up.

GRADING POLICY
The grading scale will be as follows:
         A: 100% to 89.50%
         B: 89.49% to 79.50%
         C: 79.49% to 69.50%
         D: 69.49% to 59.50%
         F: 59.49% to 0%
Grades will be based on four exams (80% of your grade) and 15 homework assignments (20% of your grade).

EXAMINATIONS

The course will have four exams on the dates listed in the course schedule at the end of this syllabus, and the entire class time (80 minutes) will be devoted to the exam. The total number of points you accumulate on all four exams will count for 80% of your grade. All exam questions will be multiple choice or true/false, and will be drawn from the book and the lectures. Some

exam questions may be similar or identical to homework questions, but other exam questions will be new. Exams are **NOT** open-book, and you may **NOT** bring your notes, homeworks, or any other aids to the exams. You should bring a calculator, your student identification number, and a number 2 lead pencil to the exam.

Advice for Exams:
Here are some things you can do to prepare for exams:
1. Always guess, even if you don't know the answer. You will get some answers correct by chance.
2. Every chapter ends with a set of Problems. When studying for an exam, you should do as many of these as you can. The answers to the odd-numbered problems appear in the Appendix of your book so that you can check to see if you did them correctly.
3. You can buy the study guide that accompanies this text. Working through it will help you to do better on the tests.
4. ***Don't wait until the last minute to study***. Statistics is like learning another language; you have to study it every week, and if you don't you will fall behind and not be able to catch up.
5. When you have problems, come to see me during office hours, or send me an email, or phone me. I am happy to spend time with you. You can also email the TA or visit during office hours for the same help.

Missed Exams

If you cannot take an exam on the scheduled date because of an outside conflict, notify Professor Shadish *before* the exam. If the conflict is a valid excuse (e.g. death of a loved one, verifiable doctor's appointment), you may be allowed to take a makeup exam. If an unexpected emergency prevents you from notifying Professor Shadish before the exam, please communicate with him as soon as possible after the date of the exam. In such cases, some form of documentation verifying your inability to take the exam in class may need to be provided to arrange a make-up exam. Approval to take a makeup exam is not automatic in any of these cases, and you may receive no credit at all if your reason for missing the exam is not acceptable (e.g., you overslept, you felt sick but have no doctor's note).

Acceptable excuses must be in writing and should (1) identify the student and course, (2) give the date of the missed exam, and (3) provide a complete explanation of why the exam was missed. Supporting documentation *must* be provided (e.g., physician's letter, death notice listing you as a surviving relative); the instructor has sole discretion to decide if supporting documentation is acceptable. The original excuse or a copy should be given to the instructor. The excuse becomes part of the class record and will not be returned; xerox copies of the excuse are acceptable. A verbal excuse, either in person or on the telephone, is not acceptable.

HOMEWORK
Homework counts for 20% of your grade. The class includes 15 homework assignments, one each week, each with 35 multiple choice or true-false questions. Homework assignments
- Will be distributed at the end of class on Wednesdays
- Will be discussed in the Friday labs, and

- Will be due on the following Monday at the start of class (except for Week 6 because Monday is a holiday that week, so homeworks will be due on Wednesday at the start of class for that week only)

Here are the rules that will apply to the homeworks

- The homeworks are "open book". You should try to complete the homeworks before you attend the lab on Friday.
- The homeworks will be discussed at the Friday labs each week. At the labs, you will divide into small groups to work on the homeworks together. Again, you may use your book during the lab. **Attendance at the lab is required** even if you have already finished your homeworks. The reason is that small group collaborative learning has been shown to be highly effective in helping students to learn material, both for students who understand the material as they teach other students, and for students who do not know the answer as they learn it from their peers. If attendence at the labs drops off, I will stop distributing the homeworks on Wednesday and will only distribute them to those who come to the lab on Fridays.
- Put your answers to the homework assignment on a red scantron sheet, and turn in only the scantron sheet each week. Don't forget to fill out all the requested information on the scantron sheet, especially your name and student identification number. You may keep the original homework assignment to study from. However, you may not give the homework assignments to other students. Anyone found to have distributed a homework assignment to another student will be referred to the Student Affairs office for academic misconduct.
- Late homework assignments will be accepted; however, 10% (or one letter grade) will be deducted for each day (not per class) that passes after the due date that the assignment is not turned in. Homeworks not turned in by Friday of the week they were due will receive no points.
- If you wish to file an excuse for missing homework, we will follow the same procedures for the tests, requiring extensive documentation of serious reasons for missing the homework. If your excuse required you to turn the homework in late but still in the week it was due, then please turn your homework in as soon as you can, even if you intend to file an excuse later.

EXTRA CREDIT: EXAMPLES OF STATISTICAL APPLICATIONS.
You can earn up to four extra credit percentage points toward your final grade by finding examples of the use of statistics in published journal articles. Your examples **must** come from a published journal article reporting research. You may **not** download an example from the Internet, nor may you use research in a book, book chapter, dissertation, or any other source than a journal article. Appendix A tells you how to search for a journal article.

Examination	Turn in Example of the Following Statistic
Exam 1	Mean and standard deviation
Exam 2	A *t*-statistic or *z*-statistic[1]

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[1] Hint: Look for studies of treatment outcome (impact, effect) that have only two groups because they often compare groups to each other using a t-statistic. Also, look for tables that report t-statistics.

Exam 3	ANOVA (oneway, repeated measures, or factorial)[2]
Exam 4	Correlation

You may submit only **one** example for each test, for a total of four examples during the semester. To earn bonus points, turn in a typed description of the information conveyed by the statistic that was used in the article, and a copy of the article. The description should require only a few sentences. Sample descriptions are appended to this syllabus (Appendix B—you may not use the work in Appendix B for your extra credit). Your description must include an interpretation of the statistic that tells what the statistic means. Turn your description in to the teaching assistant on the date of the exam listed above. Each of these four descriptions can add 0, ½, or 1 percentage point to your course grade:

- 0 points: You turn in something that is not an example of the assigned statistic, or description of statistic is mostly or completely incorrect
- ½ point: You turn in an example of the statistic, but your description of the statistic is partially incorrect in an important way
- 1 point: You turn in an example of the statistic, and your description is mostly or completely correct, with only trivial errors at most.

Here is some advice on doing extra credit:

- You may have to examine 5-10 articles before you find the statistic you are looking for, so be persistent.
- It is my experience that t-statistics and z-statistics are particularly hard to find, so be prepared to look more extensively for these statistics.
- If you see the words "multivariate" or "MANOVA" associated with an F or t statistics (e.g., multivariate F-test), skip over it because it is not what we are studying.
- Closely follow the samples in Appendix B in order to get the highest grade.

POLICY ON ACADEMIC INTEGRITY:
The University of California has outlined a general code of student conduct that can be accessed at http://www.ucop.edu/ucophome/coordrev/ucpolicies/aos/uc100.html. Go to http://admissions.ucmerced.edu/docs/ucm_policies.pdf for the UC Merced code of academic conduct. Chapter 8 outlines policies on academic honesty. All academic work is expected to be in compliance with this code. In the present class, any form of cheating or plagiarism is a serious offense. Cheating includes any attempt to defraud, deceive, or mislead the instructor in arriving at an honest grade assessment. Plagiarism is a form of cheating that involves presenting, as one's own the ideas or work of another. All work that is directly copied from other sources (e.g., a book, the www) must be in quotation marks with full reference to the original source. Words that are paraphrased from the original into your own words does not have to be in quotation marks, but must include a reference to the original source. Violation of these policies may result in a grade of "F" in the assignment.

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[2] Hint: Look for studies of treatment outcome (impact, effect) that have more than two groups because they often compare groups to each other. Also, look for tables that report F-statistics because ANOVAs always use F-statistics).

SPECIAL NEEDS:
UCM provides individuals with disabilities reasonable accommodations to participate in educational programs, activities, and services. Students with disabilities requiring accommodations to participate in class activities or meet course requirements should contact the professor as early as possible, and also contact the UCM Disability Services Center located in Room 107 of the Kolligian Library (209-381-7862) to obtain their assistance and coordination in working with this course.

CLASSROOM CIVILITY
Each UCM student is encouraged to help create an environment during class that promotes learning, dignity, and mutual respect for everyone. Students who speak at inappropriate times, sleep in class, display inattention, take frequent breaks, interrupt the class by coming to class late, engage in loud or distracting behaviors, use cell phones or pagers in class, use inappropriate language, are verbally abusive, display defiance or disrespect to others, or behave aggressively toward others could be asked to leave the class and be subjected to disciplinary action.

Schedule of Classes

Week	Date	Topic	Reading
1	January 17	Introduction to the Class; Intro to Statistics Homework #1 Distributed	Chapter 1
	January 19	Lab HW #1 Discussed	
2	January 22	HW #1 Due at Start of Class Frequency Distributions	Chapter 2
	January 24	Central Tendency Homework #2 Distributed	Chapter 3
	January 26	Lab HW #2 Discussed	
3	January 29	HW #2 Due at Start of Class Variability	Chapter 4
	January 31	Variability Homework #3 Distributed	
	February 2	Lab HW #3 Discussed	
4	February 5	HW #3 Due at Start of Class z-Scores	Chapter 5
	February 7	z-Scores Homework #4 Distributed	
	February 9	Lab HW #4 Discussed	
5	February 12	HW #4 Due at Start of Class **FIRST EXAM**	
	February 14	Probability Homework #5 Distributed	Chapter 6
	February 16	Lab HW #5 Discussed	
6	February 19	President's Day Holiday: No Class	
	February 21	HW #5 Due at Start of Class Sampling Distributions Homework #6 Distributed	Chapter 7
	February 23	Lab HW #6 Discussed	
7	February 26	HW #6 Due at Start of Class Introduction to Hypothesis Testing	Chapter 8
	February 28	Introduction to Hypothesis Testing Homework #7 Distributed	
	March 2	Lab HW #7 Discussed	
8	March 5	HW #7 Due at Start of Class Introduction to the t-Statistic	Chapter 9
	March 7	Introduction to the t-Statistic Homework #8 Distributed	

	March 9	Lab HW #8 Discussed	
9	March 12	HW #8 Due at Start of Class t-test with Independent Samples	Chapter 10
	March 14	Hypothesis Tests with Related Samples Homework #9 Distributed	Chapter 11
	March 16	Lab HW #9 Discussed	
10	March 19	HW #9 Due at Start of Class **SECOND EXAM**	
	March 21	Estimation Homework #10 Distributed	Chapter 12
	March 23	Lab HW #10 Discussed	
11	March 26-30	Spring Break, No Class	
12	April 2	HW #10 Due at Start of Class Oneway Analysis of Variance	Chapter 13
	April 4	Oneway Analysis of Variance Homework #11 Distributed	
	April 6	Lab HW #11 Discussed	
13	April 9	HW #11 Due at Start of Class Repeated Measures Analysis of Variance	Chapter 14
	April 11	Repeated Measures Analysis of Variance Homework #12 Distributed	
	April 13	Lab HW #12 Discussed	
14	April 16	HW #12 Due at Start of Class Two Factor Analysis of Variance	Chapter 15
	April 18	Two Factor Analysis of Variance Homework #13 Distributed	
	April 20	Lab HW #13 Discussed	
15	April 23	HW #13 Due at Start of Class **THIRD EXAM**	
	April 25	Correlation and Regression Homework #14 Distributed	Chapter 16
	April 29	Lab HW #14 Discussed	
16	April 30	HW #14 Due at Start of Class Chi-Square	Chapter 17
	May 2	Chi-Square Homework #15 Distributed	
	May 4	Lab HW #15 Discussed	

17	May 7	HW #15 Due at Start of Class
		Review for Final Exam
	May 9	**FOURTH EXAM**

Appendix A: How to find published journal articles

1. Go to the UC Merced Home Page (www.ucmerced.edu)
2. Click on the link for the UC Merced Library Home page (or go directly to http://library.ucmerced.edu/)
3. Type PsycInfo into the Search Box and click on Search.
4. Click on the link that says:

Connect to
CSA access. Restricted to UC campuses 1806-

5. Click on the UC Merced Link (note at the top of the page you will see the requirement that you be working on a computer that is allowed to have access to the UC Merced library). You will see the following screen:

6. In the first line, change the word Keywords to Journal Name, and then type in the name of a journal that looks interesting to you from the list at the end of this appendix. For example, suppose you want to look at the Journal of Applied Psychology. Then the screen would look like this:

7. You will then see a screen listing the titles of articles in that journal. Pick a title that interests you and that has the Full-Text PDF icon. Click on the icon and you will see the article. Read the Results section of the article to see if it has one of the statistics you are looking for. If it does, and you decide to use it, copy the article to your computer and then print it out so you can turn it in with the assignment.

Appendix A, Continued: List of journals

American Journal of Psychiatry
Archives of General Psychiatry
Behavior Therapy
Behavior Modification
Clinical Psychology Review
Developmental Psychology
Health Psychology
Journal of Applied Psychology
Journal of Abnormal Psychology
Journal of Behavior Therapy and Experimental Psychiatry
Journal of Educational Psychology
Journal of Clinical and Experimental Neuropsychology
Journal of Clinical Child Psychology
Journal of Clinical Psychology
Journal of Consulting and Clinical Psychology
Journal of Counseling Psychology
Journal of Experimental Psychology: General
Journal of Family Psychology
Journal of Marital and Family Therapy
Journal of Nervous and Mental Diseases
Journal of Personality Assessment
Journal of Psychotherapy Integration
Journal of Studies on Alcohol
Professional Psychology: Research & Practice
Psychology and Aging
Psychology of Addictive Behaviors
Psychology, Public Policy, and Law
Rehabilitation Psychology
Psychotherapy

Appendix B: Examples of How to Write Extra Credit[3]

Example of Mean and Standard Deviation

Journal Article: Frazier, P.A., Mortensen, H., & Steward, J. (2005). Coping strategies as mediators of the relations among perceived control and distress in sexual assault survivors. *Journal of Counseling Psychology, 52*, 267-278

This article reports two studies. The first is a study of about 90 sexual assault survivors seen in emergency rooms in a Midwestern metropolitan area. Table 1 on page 269 of this article lists the means and standard deviations for seven measures taken at four different time points. On the measure called Distress at Time 1, the mean was 2.00 and the standard deviation was 0.74. The Distress scale consisted of 17 items, each scored on a 5-point scale (0 = *not at all* to 4 = *extremely*). A mean of 2.00 falls into the middle of that range, suggesting that the average distress levels of these sexual assault survivors was moderate. The standard deviation of 0.74 suggests that the average distance of participants' distance scores from the mean is slightly less than one point on the scale. This means that most of the participants' scores fell relatively close to the mean, with comparatively few scores at the extremes.

Example of t-statistic

Journal Article: Elliot, A.J., Shell, M.M., Henry, K.B., & Maier, M.A. (2005). Achievement goals, performance contingencies, and performance attainment: An experimental test. *Journal of Educational Psychology, 97*, 630-640.

This article reports results from three experiments. In experiment 1A, 101 German high school students were randomly assigned to three conditions (performance-approach vs. performance-avoidance vs. mastery), with task performance as the dependent measure. In the performance approach condition, students were told that some students do exceptionally well on the task. In the performance avoidance condition, students were told that some students do exceptionally poorly on the task. On page 633, the authors report the results of a between-subjects (independent groups) t-test, stating "that performance-avoidance goal participants (M = 5.82) performed worse than did performance-approach goal participants (M = 7.12), t(67) = 2.01, p < .05." This means that being told that some students do well improves the students' performance more than being told some students do poorly. The difference between the means of the two conditions is significantly different from zero (no difference), and the chances of observing a mean difference between conditions this large if there is no difference in the population is less than 5 in 100.

Example of analysis of variance

Journal Article: Petry, N.M., Alessi, S.M., Marx, J., Austin, M., & Tardif, M. (2005). Vouchers versus prizes: Contingency management treatment of substance abusers in

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[3] Note that the journal articles used in these four examples are available on UCMCROPS in the resources section of the course web site.

community settings. *Journal of Consulting and Clinical Psychology, 73*, 1005-1014.

This article reports a study of the effects of using either vouchers or prizes as contingency management interventions with substance abusers. 142 substance abusers were randomly assigned to three conditions: standard treatment (ST), ST with vouchers, or ST with prizes. Table 1 on page 1009 of the article reports the results of tests of the differences among the three groups on demographic and baseline characteristics. For the variable Age, the oneway analysis of variance yielded a significant difference among the three conditions. The F-statistic was 5.2 with 2 and 139 degrees of freedom [$F(2,139) = 5.2$, $p < .01$]. The probability level of $p < .01$ means that age differences between the three conditions are significantly larger than zero, and that differences as large as were observed in this study would be expected less than one in one hundred times if there were no differences in the population. On the same page, the authors say that patients in the standard treatment condition were older than patients in the other groups, although the authors did not report the statistics for this followup test.

Example of correlation coefficient

Journal Article: Frazier, P.A., Mortensen, H., & Steward, J. (2005). Coping strategies as mediators of the relations among perceived control and distress in sexual assault survivors. *Journal of Counseling Psychology, 52*, 267-278

This article reports two studies. The second is a study of women who were called in a random phone survey. Of those called, 106-127 reported having been sexually assaulted and also completed the measures in the study. Table 5 on page 274 reports correlations among six measures of control, coping, neuroticism and distress. The correlation between "Control over recovery process" and "Distress" was $r = -0.41$ ($p < .01$). The control measure used items rated on a scale from 1 (*strongly disagree*) to 5 (*strongly agree*), with 5 meaning the woman felt she had high control. The distress measure items were scored on a 5-point scale (0 = *not at all* to 4 = *extremely*), with 4 meaning the woman was extremely distressed. Therefore, the correlation means that women who agreed they had a high degree of control over the recovery process tended to have a lower level of distress. The probability level of $p < .01$ means that the correlation is significantly different from zero, and that the probability of observing a correlation of -.41 in this sample if the true population correlation is zero is less than one in one hundred.