

## **Psychological Statistics**

*Psych 301*

Summer Term, 2009

Section 001: 10:00-11:50am, MWThF, 341 MARB

### ***Instructor***

Sam Hardy  
Department of Psychology  
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Office Hours: Thursday, 12:00-1:00pm

### ***Teaching Assistants***

David Rackham, undergraduate TA  
Role: Conduct Lab  
Office Location: Psych Central 1150 SWKT  
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Office Hours: Tuesday, 9:00-10:00am

Austin Beck, undergraduate TA  
Role: Teaching Materials  
Office Location: Psych Central 1150 SWKT  
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Office Hours: Tuesday, 1:00-2:00pm

Scott Fischbuch, undergraduate TA  
Role: Grading and Exam Prep  
Office Location: Psych Central 1150 SWKT  
Email: freschfisch@hotmail.com  
Office Hours: Wednesday, 1:00-2:00pm

### **Consultations**

- For most questions regarding assignments and grading, please first contact Scott. For stats questions, ask any of us.
- If you need to contact me, it is best that you contact me before or after class, or come to my office during my office hours.
- The next best way to contact me is via email. I will try to respond fairly promptly.
- PLEASE AVOID POP-IN VISITS to my office (unscheduled visits not during my office hours) if at all possible, especially if the door is closed, as that generally means I am busy working on research.

## **Required Materials**

- *Statistics for Psychology* (5<sup>th</sup> Edition; Aron, Aron, & Coups)
- *Lecture notes* – will be posted prior to class on Blackboard in the Course Materials area.
- *Calculator* – You will also need a calculator. Any calculator will do, but something like a scientific calculator that allows you to see the functions as you enter them will work best. These, such as the TI-30 series, can be found for around \$15.

## **Other Helpful Resources (Optional)**

- *The Internet* – Google any stats terms to get more information. Here are several good examples of stats sites:
  - <http://davidmlane.com/hyperstat/index.html>
  - <http://onlinestatbook.com/rvls.html>
  - <http://www.seeingstatistics.com/>
  - <http://www.statsoft.com/textbook/stathome.html>

## **Course Description**

The purpose of this course is to help you learn the basic statistical techniques psychological researchers most commonly use to discover how and why people think, feel, and behave the way they do. I hope that you will not only gain a conceptual understanding of how the various statistics work and what they do, but that you will be able to use those statistics to analyze psychological data, and then be able to make sense of the results. Additionally, I hope that you will be able to better critically evaluate research journal articles, news reports, advertisements, and claims made by your Uncle Ned and Aunt Myrtle about psychological phenomena. Lastly, this course should provide you with knowledge and skills that will be valuable to you regardless of where life takes you.

Many of you probably have some anxiety about taking a statistics class – I felt that way when taking my first statistics class. It may help to know that statistics is not simply math – it is more like applied logic. It is a way of scientifically testing questions and hypotheses. So, it is more about concepts than numbers – although it certainly involves numbers (sorry).

## **Course Learning Objectives**

1. Understand key concepts involved in psychological statistics.
2. Understand basic statistical techniques (conceptually and formulaically).
3. Be able to correctly apply statistical techniques to psychological data.
4. Be able to correctly interpret results of analyses of psychological data.
5. Be able to clearly convey orally and in writing the details of statistical analyses and results.
6. Be able to critically evaluate scientific research and real-world examples such as those one might encounter from the media or at a family gathering.

## Course Design

### ***Learning Opportunities***

This is a 4-credit course which means it includes a lecture portion and a lab portion. During the lecture portion (Monday and Wednesday) I will help you understand the concepts and logic of psychological statistics, and walk you through examples. The lab portion will occur Friday during class and will be facilitated by the TAs. The purpose of lab is to provide opportunities for you to more extensively and independently practice what you have learned from your readings and the lectures. It is also a time to help clarify anything that still remains unclear from lecture. Time may also be allotted during labs for working on and discussing homework assignments. In addition to lectures and labs, you will be given assigned textbook readings for each day of class.

### ***Assessments***

Your achievement of the course objectives will be assessed via homework exercises, quizzes, and exams.

***Homework exercises.*** A set of homework exercises will be assigned for each chapter. These homework problems will come from the problem sets at the back of each chapter. To know which questions to answer, please go to the “Assignments” page on Blackboard. You will find for each chapter a list of the required homework problems, as well as the due date. These are primarily calculation problems. The answers to each question are in the back of the book. To get credit for completing the questions, for each question you need to show all your work. Even in cases where there is no work to be shown, please write out a one or two sentence justification for the given answer.

***Quizzes.*** The quizzes will be administered in the lab sections. You will have a short quiz at the beginning of each lab section, and these will primarily be conceptual questions. These will be graded during lab, and used for discussion. The questions will come from the Key Concepts on the last slide of each lecture handout.

***Exams.*** You will have three exams throughout the semester that will cover the assigned readings and the material discussed in lecture. These exams will not necessarily be cumulative, but much of the material learned later in the semester will build on the concepts learned earlier. The final exam in particular will entail knowledge of material learned throughout the entire course. The exam reviews (one during class with me, and at least one provided by the TAs) will help you focus your study efforts. You will not be allowed to use your book or work with other students on the exams.

***Extra Credit.*** There are three ways you can receive extra credit, for a total of 9 possible extra credit points. You are allowed three extra credit items throughout the semester, and for each item you will receive 3 extra points.

1. You may earn extra credit points by bringing “Show and Tell” items to your lab session (not the lecture session). A “Show and Tell” item consists of anything you find in a magazine, journal article, book, newspaper, TV commercial, or other media outlet that pertains to psychological statistics. For you to get credit, you must follow four criteria: (1) You must present your item to the class in about 2 minutes or less; (2) You must present some actual numbers relevant to the statistics discussed in the course; (3) You must identify the statistical tests that

were used, might have been used (if you don't know for sure), or should have been used; (4) You must provide me with a write-up (one page, double-spaced) of your presentation.

2. You can participate in psychology research studies going on in the department. To get credit, you must submit a write-up (one page, double-spaced) that includes the title of the study and name of the researcher, what measures and tasks the study involved, and a discussion of what statistics you think the researchers will employ to analyze the data.
3. You can attend a research talk. The talk does not have to be sponsored by the psychology department, but, should involve presentation of scientific research, including reports of statistical analyses. To get credit, you must submit a write-up (one page, double-spaced) that includes the title of the talk, the speaker, and some discussion of the statistical analyses the researcher reported.

### **Grading**

Your course grade will be based on the homework assignments, quizzes, and the three lecture exams. Attendance and participation in class will be noted (in my head) and will be used in the assignment of course grades, particularly in cases of "borderline" grades. Assignment of letter grades will be determined "roughly" according to the following (percentages are the percent of points achieved out of the total points possible):

A	93-100%
A-	90-92%
B+	87-89%
B	83-86%
B-	80-82%
C+	77-79%
C	73-76%
C-	70-72%
D+	67-69%
D	63-66%
D-	60-62%
F	below 60%

Below is a potential breakdown of the course point system:

Source of Points	How Many	# Points Each	Total Points
Quizzes	10	4	40
Homework	12	5	60
Lecture Exams	3	100	300
Total Course Points:			400

## **Policies**

**Late work.** All assignments are due in class on the due date. I will still accept work after the due date, but will deduct points based on the amount of time since the due date. I will deduct 5% for anything turned in on the due date but after class, and then an additional 10% for each day late after that. If you cannot make it to class on the due date, you can turn your assignments in early (to the box outside my door), or email them to Ann. DO NOT EMAIL ME to tell me you will not make it; rather, email her, and attach the assignment (scan it if you need to).

**Make-up exams.** Generally speaking there will be no make-up exams. However, if you have a really good excuse for not being able to make an exam, please contact me as soon as possible and we will schedule you to take the exam early. Also, in the rare event that an extenuating circumstance occurs immediately before the exam (e.g., a bad accident, severe health complications, or childbirth) and you are unable to attend the exam, please let me know as soon as possible, and provide some evidence of the event (hopefully a newborn child).

**Attendance.** Attendance is required. I will not formally take attendance, but, attendance and participation will be taken into account when assigning grades, and can make a difference in borderline cases. Further, given the difficulty – or at least the newness – of much of the material covered in this course, it is in your best interest to attend all lecture and lab sessions. In fact, if you anticipate that you will end up regularly missing class (due to work schedule, family issues, etc.), it is in your best interest to drop the class now and take it at a time when you are able to attend faithfully. DO NOT EMAIL ME to tell me you will miss class. Rather, contact another student in class to get class notes, or come to one of our office hours. Also, see above for what to do about assignments.

## **Tips on How to Succeed in This Class**

1. Read the assigned textbook pages. Best to read them before class, and then go back through them after class as you are working on homework. Often you will find that it will make much more sense after lecture.
2. Do the homework. Since you are graded based on completion (completion meaning you write out answers to each question), these are basically free points. Also, the homework will help you learn the concepts and prepare for exams.
3. Attend class. It is really, really, really hard to learn statistics from a book and lecture handouts. It is much easier to learn statistics in a classroom setting where you are free to ask questions, where you get a chance to discuss the concepts with other students, and where you get multiple explanations from the instructor.
4. Attend lab. First of all, you need to attend lab to take the quizzes. But, lab is also a time to reinforce your learning of the concepts. Students find it very valuable, even though it might seem redundant. You can make the best of lab by going with questions (such as questions from the homework).
5. Attend the exam reviews. This is another time to reinforce concepts, and a chance to get more specifics on what you will need to know for the exam.

## **Expected Learning Outcomes of Psychology BS Program**

- (1) Be able to demonstrate that they understand and can apply basic research methods in psychology, including research design, data analysis, and interpretation of results in light of previous findings.
- (2) Be able to use computers and other research-related technology to competently collect, access, and manage information, communication, and other purposes.
- (3) Be able to express realistic ideas about how to implement their psychological understanding, skills, and values in occupational and family-related pursuits in a variety of settings.
- (4) Be able to critically reflect on the content of psychology as well as on disciplinary values in light of their knowledge of and commitment to the restored gospel of Jesus Christ and to sustain personal values that are true to the gospel while maintaining their serious study of psychology.

## **University Policies & Procedures**

### ***Honor Code Standards***

In keeping with the principles of the BYU Honor Code, students are expected to be honest in all of their academic work. Academic honesty means, most fundamentally, that any work you present as your own must in fact be your own work and not that of another. Violations of this principle may result in a failing grade in the course and additional disciplinary action by the university.

Students are also expected to adhere to the Dress and Grooming Standards. Adherence demonstrates respect for yourself and others and ensures an effective learning and working environment. It is the university's expectation, and my own expectation in class, that each student will abide by all Honor Code standards. Please call the Honor Code Office at 422-2847 if you have questions about those standards.

### ***Statement on Learning Objectives***

Each program at BYU has developed a set of expected student learning outcomes. These will help you understand the objectives of the curriculum in the program, including this class. To learn the expected student outcomes for the programs in this department and college go to <http://learningoutcomes.byu.edu> and click on the College of Family, Home and Social Sciences and then this department. We welcome feedback on the expected student learning outcomes. Any comments or suggestions you have can be sent to [FHSS@byu.edu](mailto:FHSS@byu.edu).

### ***Statement on Academic Honesty***

While all students sign the honor code, there are still specific skills most students need to master over time in order to correctly cite sources, especially in this new age of the internet; as well as deal with the stress and strain of college life without resorting to cheating. Please know that as your professor I will notice instances of cheating on exams or plagiarizing on papers. See <http://www.byu.edu/honorcode> for specific examples of intentional, inadvertent plagiarism, and fabrication, falsification.

### ***Statement on Discrimination***

Title IX of the Education Amendments of 1972 prohibits sex discrimination against any participant in an educational program or activity that receives federal funds. The act is intended to eliminate sex discrimination in education. Title IX covers discrimination in programs, admissions, activities, and student-to-student sexual harassment. BYU's policy against sexual harassment extends not only to employees of the university but to students as well. If you encounter unlawful sexual harassment or gender based discrimination, please talk to your professor; contact the Equal Employment Office at 378-5895 or 367-5689 (24-hours); or contact the Honor Code Office at 378-2847.

### ***Students with Disabilities***

Brigham Young University is committed to providing a working and learning atmosphere which reasonably accommodates qualified persons with disabilities. If you have any disability which may impair your ability to complete this course successfully, please contact the Services for Students with Disabilities Office (378-2767). Reasonable academic accommodations are reviewed for all students who have qualified documented disabilities. Services are coordinated with the student and instructor by the SSD office. If you need assistance or if you feel you have been unlawfully discriminated against on the basis of disability, you may seek resolution through established grievance policy and procedures. You should contact the Equal Employment Office at 422-5895, D-282 ASB.

## Tentative Course Outline

<b>Date</b>	<b>Topic/Activity</b>	<b>Reading (page #)</b>
Jun 22 (Mon)	Introduction to the Course; Stats & Methods	Syllabus; Ch 1 (1-3)
Jun 24 (Wed)	Measurement; Displaying Data; Percentiles;	Ch 1 (3-6, 7-23)
Jun 25 (Thur)	Central Tendencies; Variability	Ch 2 (33-57)
Jun 29 (Mon)	Inferential Statistics: z-Scores; Normal Curve; Probability	Ch 3 (67-106)
Jul 1 (Wed)	Hypothesis Testing Part I: Introduction to Hypothesis Testing	Ch 4 (107-128)
Jul 2 (Thur)	Hypothesis Testing Part II: Hypothesis Testing with Means	Ch 5 (137-155)
Jul 6 (Mon)	Hypothesis Testing Part III: Decision Errors	Ch 6 (175-179)
Jul 8 (Wed)	Hypothesis Testing Part IV: Effect Sizes and Power	Ch 6 (179-211)
Jul 9 (Thur)	Catch-Up and Exam Review	
	<b>FIRST MIDTERM EXAM (July 8-11, late day 11<sup>th</sup>)</b>	<b>Chapters 1-6</b>
Jul 13 (Mon)	<i>t</i> -Tests Part I: Introduction to <i>t</i> -Tests	Ch 7 (222-235)
Jul 15 (Wed)	<i>t</i> -Tests Part II: <i>t</i> -Tests for Dependent Means	Ch 7 (236-253)
Jul 16 (Thur)	<i>t</i> -Tests Part III: <i>t</i> -Tests for Independent Means	Ch 8 (270-285)
Jul 20 (Mon)	<i>t</i> -Tests Part IV: <i>t</i> -Tests for Independent Means continued	Ch 8 (286-293)
Jul 22 (Wed)	ANOVA Part I: Introduction to ANOVA	Ch 9 (310-318)
Jul 23 (Thur)	ANOVA Part II: Calculating <i>F</i>	Ch 9 (319-333)
Jul 27 (Mon)	ANOVA Part IV: Beyond <i>F</i> ; Catch-Up and Exam Review	Ch 9 (334-351)
	<b>SECOND MIDTERM EXAM (July 27-30, late day 30<sup>th</sup>)</b>	<b>Chapters 7-9</b>
Jul 29 (Wed)	Correlation Part I: Introduction to Correlation	Ch 11 (432-451)
Jul 30 (Thur)	Correlation Part II: Hypothesis Testing with Correlations	Ch 11 (452-469)
Aug 3 (Mon)	Regression Part I: Introduction to Regression	Ch 12 (487-502)
Aug 5 (Wed)	Regression Part II: Regression continued; Multiple Regression	Ch 12 (503-517)
Aug 6 (Thur)	Chi-Square	Ch 13 (536-554, 558-560)
Aug 10 (Mon)	Catch-Up and Exam Review	
	<b>FINAL EXAM in testing center Aug 12-13</b>	<b>Chapters 11-13 (and some comprehensive)</b>