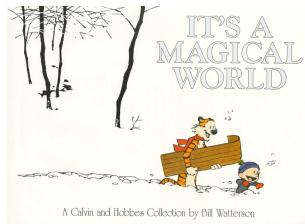


Psychology 302
Statistics
(June 2012)



That's the problem with science. You've got a bunch of empiricists trying to describe things of unimaginable wonder. – Calvin (Bill Watterson)

♪ Note: This syllabus is subject to small changes once the semester begins. These will include corrections and slight refinements in the assignment(s) – nothing huge.

DESCRIPTION OF COURSE FROM THE UNDERGRADUATE CATALOGUE:

Psychological Statistics: Descriptive and Inferential

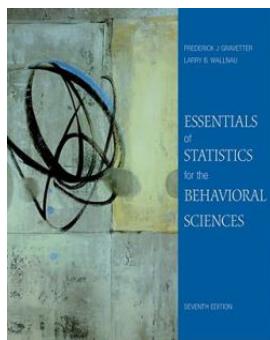
Hours: 4 Lecture Lab/Clock Hours (3 lecture, 2 lab)

The logic and methods of descriptive and inferential statistics and their relation to experimental design in psychology are studied.

♪ Note: The clumsy passive voice construction in the course description is of course regrettable, but not fatal. Though my personal preference is experimental research, the course will also touch on (merely) correlational approaches and other techniques that may be used in a variety of research contexts, including experimental ones. More problematic, the very general description of course content opens the gates to many a pedagogical vicissitude, some of which can be of limited value.

TEXTBOOK:

Gravetter, F. J., & Wallnau, L. B. (2010). *Essentials of statistics for the behavioral sciences* (7th ed.). Belmont, CA: Wadsworth. [ISBN 13: 978-0-495-81220-3. This is a paperback.]



OUR CONTRACTUAL AGREEMENT:

Through the university I am offering this course to you (and a grade in it) in exchange for your doing the work specified in this syllabus, and otherwise complying with university regulations and requirements. If you choose to continue your enrollment in the course (whether you attend or not), I will assume that this agreement is consummated. You and I will thus be responsible for the content of this syllabus and complying with its specifics. Each of us is further acknowledging that we will abide by and accept the outcomes generated in this course through the appropriate application of the guidelines of its syllabus.

GENERAL COGNITIVE OBJECTIVES OF THE COURSE:

My principal goal is that when you finish the course you will, first, know what descriptive and inferential statistics are good for, and in a rudimentary sense how to use them. Second, I want you to *see* the relationship between a sample statistic and a sampling distribution, in general, and for the several inferential statistics we will be learning about. Next, I want you to have some operational understanding of the procedures we will be learning, as well as the relative value provided by computer algorithms for carrying them out (e.g., SPSS). I also want you to be able to distinguish, conceptually and practically, parametric and nonparametric statistical procedures, and to understand, use, and to be able to articulate the way we draw inferences (probabilistically) about the world using statistical procedures. Finally, I want you to have a good feeling about what you have experienced and what *you* know about and can do with statistics based on your experiences in this course. (This last is an example of a legitimate affective objective, one that is all too often lacking in a statistics course. I will, no doubt, mess up on it occasionally, but I will at least be ever mindful of it, and try to succeed in it.)

Here is my statement of general objectives for this course from the last time I had the privilege of teaching it (5 years ago):

Students completing the course should be able to have working computational mastery of the most basic descriptive and inferential statistical procedures commonly used in psychology. They should also be able to articulate the relationship between descriptive and inferential statistics, as well the relationship between a computed sample statistic and the theoretical distribution that the statistic is assumed to be drawn from, using examples from the procedures learned in the course. Finally, the student should be able to discriminate the research situations in which it is appropriate to use one statistical procedure or another.

You will note that it is much the same as the new one (though I didn't consult it – or even find it – until after had written the current version). I also omitted the last objective in the new offering, but, since it may well be the most important one, we will also include it this time as well. It implies the ability to understand (and write) hypotheses that can be tested by (anticipated) specific statistical procedures.

NOTES TOWARD A “PHILOSOPHY” OF TEACHING APPLIED STATISTICS:

Assumption 1. Most undergraduates are not majoring in psychology in order to “grow up” and carry out original empirical research that can be understood through inferential statistics – at least not for a living.

Assumption 2. Many undergraduate psychology majors do not love mathematics, and are frankly glad to have done with it as soon as possible.

Assumption 3. Mathematics is a ruthlessly cumulative discipline, and many undergraduate (and graduate) majors in psychology have gaping holes in their pre-existing knowledge.

Assumption 4. The rate at which each student may progress through a specific mathematical curriculum, given the degree of incompleteness of his or her mathematical skills and knowledge, cannot be fixed or known in advance.

Corollary: It is extremely improbable that a group of 20 or more psychology undergraduates at a regional public university in the United States will be able to proceed through a specified mathematical (or even quasi-mathematical) curriculum in statistics at the same rate.

Assumption 5. Many undergraduate psychology majors experience negative affect when presented with mathematical (or quasi-mathematical) concepts which they are unprepared to assimilate into a preexisting structure of mathematical knowledge.

Assumption 6. Where adequate admissions procedures are in place, undergraduate students have the cognitive skills to learn the basic concepts of an undergraduate applied statistics course in psychology.

Postulate 1. Either on the basis of poor preparation or cognitively paralyzing negative affect (or of course both) many students choose not to commit to the commonly accepted role of the serious student when dealing with a specified mathematical or quasi-mathematical curriculum in statistics.

Postulate 2. Affective domain goals are crucial in teaching a specified mathematical or quasi-mathematical curriculum in statistics.

Postulate 3. Flexibility in pacing will facilitate learning in a specified mathematical or quasi-mathematical curriculum in statistics.

Assumption 7. It is more effective to learn well a smaller percentage of a curriculum (in anything), than to have gone over (“covered”) the entire curriculum while learning well a significantly smaller portion of it (further assuming that all of it is more or less equally worthwhile, hierarchically organized).

Postulate 4. Appropriate application of postulates 2 and 3 will produce adequate learning of statistical concepts, sufficient to the needs of both “most students” and those for whom more comprehensive learning in the area will be necessary.

(You do the math.)

BROAD OUTLINE OF TOPICAL CONTENT:

[Deferred until my copy of the text arrives – it's been on order for about 2 months!]

COURSE ASSIGNMENTS AND REQUIREMENTS:

Examinations. We will have six cumulative examinations, which may include computational work and written interpretations of computations (which Computations may be provided by the instructor or worked out as part of the exam by the student), multiple choice questions, fill-in-the-blanks, or matching. Class and laboratory experiences, as well as aquainting yourselves with the assigned textual readings, should prepare you adequately for the exams without the need for a “study guide.” Some portions of each exam may be administered on eCollege, but computational and some other components will happen in class. (Indeed, it may prove convenient to give the entire exam in class. We'll see.) Except for the final examination, classtime given over to exams will not exceed 75 minutes. Since I want our exams to be measures of power and not speed, this convention means that the in-class examinations

will entail your showing mastery of a relatively small number of skills (while having prepared for more than I will ask).

Homework. There will be ten written homework assignments. You must download and print the assignments from eCollege (on the site for the lab), and you must turn them in to your lab instructor on the dates included on this syllabus (with possible modifications. Depending on the class's progression). Correct, on-time completion of these assignments earns points toward your final grade (a maximum of 10 points per assignment). These assignments represent realistic examples and simulations of social science research problems, while at the same time they are meaningfully accessible to undergraduate students who are just beginning the process. Questions relating to the substantive content of the assignments may also appear on the examinations. We will grade late papers, but penalty points will be assessed (2 points for the first day the paper is late, and 1 point for each day afterward). You should be sure to turn in answers (of course), as well as the work that shows how you arrived at the answers. Be sure to respond to the verbal questions and inquiries. How you make meaning of a result is as important as the result itself (indeed, it is the *sine qua non* of statistical inference). Write in clear, complete sentences, using a word processor. Our colleague Dr. Benton Pierce recommends, and we agree, that numerical portions of homework papers be completed on gridded graph paper (let's go with quadrille-ruled graph paper – mandatory). The lines help keep columns of numbers lined up neatly so that we can read your work.



Lab Sessions. As a part of this course, you have registered (and are paying for) scheduled lab/tutorial sessions, which meet for 1-2 hours once a week at a specifically scheduled time. These labs provide an opportunity for smaller groups of students to meet together and discuss difficult topics, to work with the Hurlburt CD-Rom, AND work on the homework assignments or other class problems. These meetings are instructional periods with planned activities, making it difficult for you to assume that you will get your homework and other

study activities done during this time. The lab instructor is Dawn Weatherford, who will record your attendance and use this and other information to determine your grade in lab. If you do not believe you have a need for a lab during a particular week, please contact Ms. Weatherford in advance to order to determine whether you will receive attendance credit for a given week. Ms. Weatherford is one of our very top doctoral students, and she will also be totally in charge of the content and organization of the lab. She will also grade your homework, which represents 10% of your course grade. She has taught the lecture component of this course in the past, and she knows her stuff. Trust her to help you more than you might have reason to anticipate.

In order to assign you a grade in this course I will give you six cumulative examinations based on the chapters we cover, class presentations, and powerpoints. You will also complete 10 homework assignments, worth 20 points apiece

Graded Course Component	Due Date	Point Value
a. First cumulative examination	Week 3	100
b. Second cumulative examination	No Earlier Than Week 5	100
c. Third cumulative examination	No Earlier Than Week 8	100
d. Fourth cumulative examination	No Earlier Than Week 10	100
e. Fifth cumulative examination	No Earlier Than Week 12	100
f. Sixth cumulative examination	No Earlier Than Week 15-16	100
g. Nine statistical homework assignments distributed through eCollege and turned in at the beginning of your laboratory on a more or less weekly basis (the schedule will be regulated through the	As assigned by your laboratory instructor	180

lab instructor). These will also be posted on eCollege for the week they are due, at least one week in advance, and are worth 20 points each		
h. Final homework assignment (hypothesis generation) placed by the student in the eCollege dropboxes of <i>both</i> the laboratory instructor and me (the teacher of record for the course).	The first Tuesday of week 15-16	20
Total Class Points		800

I will base the grade I give you on the chart below and an assumed maximum number of points of 800.

In order to earn a/an	You must earn
A	720 points
B	640 points
C	560 points
D	400 points

Missing the final for a legitimate reason will net you an incomplete for the course (if you have a passing grade in the course). The incomplete must be removed by the end of the long semester following this one (lest the university convert it automatically to a grade of "F"). You, or someone with your power of attorney, must negotiate the terms of a contract for removing such an incomplete *before* final grades are due for the semester. Since you could miss the final due to a serious accident or illness, one which may incapacitate you, you may wish to arrange for a limited power of attorney now.

If you miss either only one of the other examinations with an excused absence, and take the final, I will prorate your score for the missing exam, such that your grade on the missed test will be the mean (average) of the other seven that you take. If you miss more than one examination, with or without excused absences, I will drop you from the class roll.

BONUS POINTS:

Up to 40 points may be earned through either participation in approved research projects (Appendix 1), or through completion of a brief literature review in selected areas of research (Appendix 2). I will make every attempt to ensure that these two options represent equal effort and time commitment on your part, so that you will not feel coerced into participating in any research project. It is my ethical obligation to do so.

ATTENDANCE:

All other things being equal, you will perform better in this course if you come to class regularly. We are all adults and I understand that you may have many priorities, planned and unplanned, which exceed those of this course. Go, therefore, when you must, but note: Things happen in college classrooms which are crucial to becoming educated and for which it is difficult (perhaps impossible) to test. Sometimes these things are serendipitous and represent the most significant of our learnings; and of course in some class periods they may not happen at all. They usually are unpredictable and rely on spontaneous exchanges involving students and the professor. They may occur before the instructor arrives, or at a break. They are worth the wait and the intervening tedium. When you are absent – even if someone takes notes for you – you will miss them. To ensure that this vital part of your education is there for you, I will enforce the university's absence policy in the following way:

If you have excessive absences (either excused or unexcused), it will be hard for you to avoid getting a grade of "F" in this class. I will check the roll, and I will *perhaps* let you know if I believe your absences are excessive. Still, it is ultimately your call, and if you get an "F" it will be based on your grades. You may avoid this fate (i.e., getting an "F") by officially dropping the course. For purposes of this policy, an absence occurs if you miss 10 or more minutes of a single class period, from the scheduled beginning (or my arrival, whichever is later) to the scheduled end of the period (or my dismissing you, whichever comes earlier). Missed time includes tardiness, leaving early, and leaving the room for phone calls, potty breaks, or whatever, for over 10 minutes in a class period. Absences become excessive as a direct function of how much actual class you are missing, and if you are flagrantly absent on most occasions, I *may* drop you officially from the roster. As noted elsewhere, some work in this course may be made up if you miss it due to an excused absence. University policy permits the instructor of a class to define valid excuses for an absence. I include, in general, the following things as valid reasons for missing a class:

- (1) participation in an authorized and documented university activity;
- (2) illness of the student or a first-degree relative who cannot be provided *necessary* care without the student's missing class;
- (3) documented alien abduction of the student or parts of the student (over 18 hours in duration; or over 1 hour if alien-induced pregnancy is documented);
- (4) death in a student's immediate family; and
- (5) fulfilling one's legal responsibilities (jury duty, court hearings) as a citizen.

Such excuses must be documented to my satisfaction, including support for the notion that you had no choices (e.g., alternative university activities, legal continuance, alien impregnation, etc.). As noted above, I will *perhaps* counsel you in some form as your absences accumulate to near critical levels. Notwithstanding, I do not guarantee that I will do this on a consistent basis. I am more likely to do so if I see you in person on occasion, e.g., you come to class occasionally or you come by the office (real or virtual) for a chat.

CONDUCT

Faculty members are required to include in their course syllabi the following statement: "All students enrolled at the University shall follow the tenets of common decency and acceptable behavior conducive to a positive learning environment." (See Student's Guide Handbook, Policies and Procedures, Conduct)

Admission and attendance in a college or university form an honor and a privilege. Where tuition and other expenses are subsidized, either by private or public funds, the person has received an additional trust that inherently entails conducting one's affairs as a student within the constraints of civil society. In this class I will expect you to behave in a way that is respectful of others, their right to receive (and deliver) elements of a college education, and their identities as unique persons in the world. I expect us all to act toward others as we would like them to act toward us.

I will also expect you not to plagiarize, steal or otherwise procure tests or other class materials that are not supposed to be publicly available (including copyright violations), or cheat on examinations. Do not copy and/or turn in other people's work. Do not allow other people to use your own good work. Do not trust previous tests and assignments for this class, as they change subtly over time. In general, do your own work. If

you have questions or concerns about what constitutes cheating please see me. I will give you an F for any of these infractions, and I will make an appreciable effort to have you dismissed from the university. Oscar Wilde has noted, "Life is too important to be taken seriously." Still, I value the notion that we in a university setting should never lie, cheat, or steal, or, really, to tolerate such behavior in others.

Here are some other dos and don'ts that will also be a part of our code of conduct in class. Some of them of course are my own and arbitrary. The rest are somebody else's – and just as arbitrary:

1. Far beyond the particulars of this course, do respect the divine principle of the universe, which seems also to be detectable in other people. As one deity is said to have put it: "Inasmuch as you have done it to the least of these [e.g., other students and the teacher, other enemies], you have done it also to me."
2. Do remember that this course is about a limited area of conceptual content; don't forget that there are bigger realities. This is just a course.
3. Don't talk trash in excess. Occasional right-brain language epithets may be okay for emphasis, but learn to use your language more elegantly than that (or remain silent). In a related vein, don't abuse the rest of the class with your use of cell phones, MP3 players (including iPods), hand-held gaming systems, your laptop computer, and the like.
4. Do take some time off from constant work during the semester. Do remember to reflect on things beyond the course. (This is not an injunction to ditch class, but rather a reminder to place your studies in a larger perspective.)
5. Do let those who support and have supported your educational efforts know how much you appreciate them sometime during the term.
6. Don't attack the person of another member of the class.
7. Don't sexually (or otherwise) harass a member of the class.
8. Don't steal others' work, and don't let them steal yours – it amounts to the same thing. (Plagiarism will net you an F in the

- course and my effort to get you removed from the university permanently.)
9. Don't distort the truth, about your data, its sources, or your colleagues.
 10. Do be satisfied with where you are in your own professional development. Others may be farther along than you, but don't waste time envying them. Do work to become who you were meant to be.

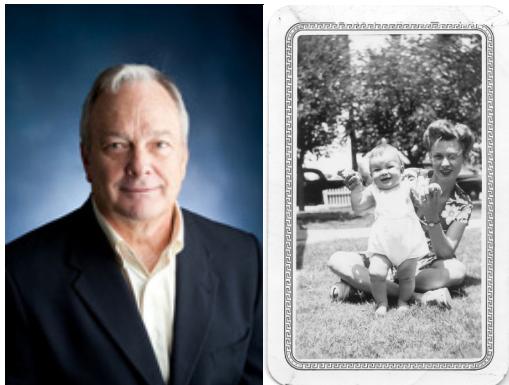
REQUESTS FOR SPECIAL ACCOMMODATIONS:

Faculty members are encouraged to include in their course syllabi the following statement: Students requesting accommodations for disabilities must go through the Academic Support Committee. For more information, please contact the Director of Disability Resources and Services, Halladay Student Services Building, Room 303D, (903) 886-5835.

Section 10 - Faculty are encouraged to include in their course syllabi the following statement: Students requesting accommodations for disabilities must go through the Academic Support Committee. For more information, please contact the Director of Disability Resources and Services, Halladay Student Services Building, Room 303D, (903) 886-5835.

Section 11 - Faculty are required to include in their course syllabi the following statement: "All students enrolled at the University shall follow the tenets of common decency and acceptable behavior conducive to a positive learning environment." (See Student's Guide Handbook, Policies and Procedures, Conduct)

GUY TEACHING COURSE:



Steve Ball

Associate Professor of Psychology

Office: Henderson 235

Phone (In Developmental Cognition Lab – switches to fax after 7 rings, sometimes fewer): 903-886-5586 – go to Binnion 101 to find me in the lab

Community Counseling & Psychology Clinic: Binnion 101 (903-886-5660)

Office hours posted once the semester begins

Appendix 1

Students' Guide to Research Participation (EMS)

<http://tamu-commerce.sona-systems.com/>

What is Research Participation?

Exposure to research is essential to your gaining a better understanding of the scientific study of psychology. It is how we add new knowledge in psychology. Being involved in research is a good way to experience first-hand and learn about the scientific enterprise. We believe there are two key ways to experience research activity at this level: 1) read about related scientific investigations; 2) experience research as a volunteer participant; or some combination of both. The class in which you received this handout allows you to fulfill up to 6 research credits through one or both of these activities.

In what type of research studies will I participate?

All studies you will participate in have been reviewed and approved by the Texas A&M University-Commerce Institutional Review Board (IRB) and by the Department of Psychology, Counseling, & Special Education. Studies vary widely. Many involve completing questionnaires or carrying out tasks on the computer. Some are even fun, and you'll learn something from all of them.

What are my rights as a research participant?

Your participation is voluntary and you may withdraw from any study at any time. Your data will be kept confidential. If you have any further questions about your rights as a research participant, you may contact the IRB head, Carmen Salazar (Carmen_Salazar@tamu-commerce.edu). More information about your rights will be provided to you prior to each study for which you sign up.

How will my research participation credit be calculated?

You will receive 1 credit for each hour of research participation. Studies lasting 30 minutes or less are worth $\frac{1}{2}$ credit. For example, a 30 min. study = 0.5 research credits; 60 min = 1 credit; 1 $\frac{1}{2}$ hours = 1.5 credits... etc.

How many research credits may I complete?

You may participate in as much research as you wish, but at a minimum you must complete 5 research credits in order to get the full extra credit (by participating in research, or alternative assignments, or a mixture of both). However, if you show up on time to all the studies you sign up for you will receive 1 free research credit. In other words, if you show up to all your studies on time you only need to complete 4 research credits. *As noted in the syllabus above, you may earn up to 40 points of extra credit in this course. That translates into 8 points per credit (or 10 if you show up on time to the first four projects you sign up for). You may participate in as many projects as you like, of course, but you may receive no more than 40 points worth of extra credit in this course, regardless of its source.*

What if I cannot go to a study I signed up for?

If for whatever reason you cannot attend a study that you have signed up for you need to cancel your appointment before the start of the study. There are 2 ways to cancel an appointment. First, if you cancel 24 hours before a study you can do this online through the Experiment Management System (EMS) website. Second, if it is the same day of the study you can call or email the experimenter – their contact information will be available in the EMS.

What if I sign up for a study but forget to go?

If you fail to show up for a study (without canceling prior to the start of the study) you will receive an email alerting you that you were listed as a “no show” for that study. Additionally on the EMS website you will see a “failure to appear” message in your list of studies completed. If this occurs you are no longer eligible to receive the 1 free credit that participants who are on time to all of their studies receive, and you will have to complete the full 5 credits.

What will happen if I fail to participate in studies or do the alternative assignments?

If you fail to complete your research requirement for the class your grade in the class will be not be affected. This is an extra credit opportunity and is not requisite for course completion.

What if I do not wish to participate in research studies?

If you do not wish to participate in research studies, you may use the alternative assignment option. You must consult your instructor for information about this option (see Appendix 2).

What is the difference between an online study and a laboratory study?

There are two types of studies that are conducted through the EMS system. You can sign up for both online studies and laboratory studies through the EMS system, however you are only allowed to complete 50% experiment credits through online studies (the system will not allow you sign up for more than 50% credits of online studies). A laboratory study requires that you attend the experiment at a specific time and place (e.g., Henderson Hall, Room 202, at 12:30 pm on September 6th).

As a CHEC student, be certain that you check the location of a study and ONLY sign up for a study that you can reasonably attend. For example, if the study says that the location is in any other location than CHEC, you must travel to Commerce, or perhaps some other city, in order to participate. Studies taking place at CHEC will have CHEC in the study name and location.

How do I find and sign up for research participation opportunities?

Throughout the semester, researchers in the Psychology Department will post their research studies in the Experiment Management System (EMS) online. It is up to you to check the EMS regularly to find and sign up for research studies that fit into your schedule. Detailed instructions for how to use the EMS are listed in the following pages of this handout.

If I decide to participate in research, what are my responsibilities?

You are responsible for...

1. Registering with the Experiment Management System (at <http://tamu-commerce.sona-systems.com/>). You can keep your login information if you already have an account.
2. Scheduling appointments for research participation.
3. Writing down important information about the studies for which you sign up (e.g., name of study/time/location of your experiment, name and contact information of the experimenter).
4. Showing up on time, at the correct location for your scheduled research appointments (you must cancel online, or email/phone the experimenter before the start time of the study if you cannot attend).
5. Keeping track of how many credits you need to complete (you can do this on the EMS website). Everyone is allowed to complete up to 5 credits, however if you are on time for all of your appointments you only need to complete 4 credits. If you would like to participate in more experiments, that option is available to you but the maximum amount of credits for which you will get points toward your final grade is 5.

Appendix 2

Students' Guide to Research Alternatives for Credit

In lieu of participation in someone's empirical research for credit, you may also review and describe/critique the use of statistical procedures and inference in contemporary, published research articles in selected areas.

In Appendix 1 you perhaps noted that there you will have a choice of a finite number of empirical projects, each serving the needs of some researcher with a unique set of needs for your participation. You have some latitude in your choices, of course, but the system assumes that what you gain from participation will be some general acquaintance with valid research practices which transcend any particular study. The core purpose of the system is to get research done with willing participants, *not* to educate the participant.

The article critiques you write will serve a similar dual purpose: you will become acquainted with selected research practices, and a faculty member will have an opportunity to advance her or his research agenda.

1. Each critique completed will be worth either 10 or 0 points toward the maximum of 40 bonus points you can earn for this course, that is, it is graded on an all-or-none, pass-fail basis – basically as research participation is.
2. The articles must investigate the particulars of one (or more) of the following broad conceptual areas:
 - a. Theory of mind in children and adolescents
 - b. Working memory
 - c. Concept shifts
3. The articles must be published in one of the following journals since January 1, 2010:
 - a. *Psychological Science*
 - b. *Child Development*
 - c. *Developmental Psychology*
 - d. *Journal of Experimental Child Psychology*
 - e. *British Journal of Developmental Psychology*
 - f. *European Journal of Developmental Psychology*
- 4.