



Psychology 391
Advanced Data Analysis
Fall, 2008



Class Time: Mondays & Wednesdays 2:30 - 3:50
Place: AL 113
Instructor: Jonathan Fugelsang
Office: PAS 4055
Office Hours: Monday & Wednesday 4:30 - 5:30, and by appointment.
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Teaching Assistants:

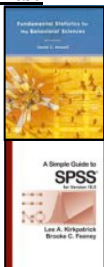
Nathaniel Barr
 Office: PAS 4044
 Office Hour: Tuesday 11:30 - 12:30
 Email: nbarr@artsmail.uwaterloo.ca
 Tutorial: 101 (Wednesday 4:30 - 5:20)

Omid Fotuhi
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Nadia Martin
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 Tutorial: 103 (Thursday 8:30 - 9:20)

Michael Yeomans
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 Office Hour: Thursday 2:00 - 3:00
 Email: myeomans@artsmail.uwaterloo.ca
 Tutorial: 104 (Thursday 5:30 - 6:20)

Texts:



Howell, D. C. (2008). *Fundamental Statistics for the Behavioral Sciences*. Thomson.

Kirkpatrick, L. A. & Feeney, B. C. (2008). *A simple guide to SPSS for Windows (For Version 16)*. Wadsworth.

Course Objectives:

This course builds from the material covered in Psychology 292. Topics that will be covered include: ANOVA, factorial ANOVA, repeated measures and mixed designs, and multiple comparisons associated with those designs. The primary goal of the course is to provide students with a solid understanding of both the logic and computations underlying many of the advanced statistical procedures that psychologists use when analyzing data collected from experiments. An additional goal for this course is that students will learn to perform these statistical analyses using SPSS.

Course Requirements:

Requirement	Date	Value
Test #1	October 6th	25%
Test #2	November 5 th	25%
Test #3	Final Exam Period	25%
Graded Labs (N=3)	Oct 3 rd (5%), Nov 10 th (8%) and December 1 st (8%)	21%
Research Participation (or assignment)		4%

Tests (75%):

In total, there will be three tests in this course. The dates for these tests can be found on the course outline. The content of the tests will be a combination of short answer and long answer, and will involve both conceptual and computational material.

Labs (21%):

There will be three lab assignments in this course. The first lab will be worth 5%, and the remaining two will be worth 8% of your final grade each. As with all work in this course, you are to complete the assignments on your own. It is important that you show all of your work for each assignment (i.e., all calculations). All assignments will be due at the start of class and all late assignments will be penalized. Any assignments handed in after the start of the class in which it is due will be penalized as if it was one class late. For every class that an assignment is late, 25% will be deducted from your assignment grade. For example, if you received 100% on assignment 1 but handed it in one class late you would receive 75% on the assignment.

Research Participation (4%):

Experiential learning is considered an integral part of the undergraduate program in Psychology. Participation in research is one example of this. A number of undergraduate courses have been expanded to include opportunities for Psychology students to volunteer as research participants enabling them to learn first-hand about psychology research and related concepts. Many students report that participation in research is both an educational and interesting experience.

Student participants may earn up to 4 percentage points towards their final mark in Psychology 391 by participating in Psychology studies conducted by students and faculty in the Department of Psychology. Participation is worth .5 participation credits (percentage points) for each half hour session. Researchers will record student's participation and will advise the course instructor of the total points earned by each student at the end of the term. Students who do not wish to participate in research may choose an alternative approach to earning the same number of points; this is explained below in "Alternative to participating in research".

Since experiential learning is highly valued in the Department of Psychology and part of this course, students can earn up to 4% of their final grade by participating in these experiments (i.e., 96% for course work, 4% for REG participation/assignments).

Please note that all Psychology studies have undergone prior ethics review and clearance through the Office of Research Ethics.

Educational focus of participation in research:

To maximize the educational benefits of participating in research, students will receive feedback information following their participation in each study detailing the following elements:

- Purpose or objectives of the study
- Dependent and independent variables
- Expected results
- References for at least two related research articles
- Provisions to ensure confidentiality of data
- Contact information of the researcher should the student have further questions about the study
- Contact information for the Director of the Office of Research Ethics should the student wish to learn more about the general ethical issues surrounding research with human participants, or specific questions or concerns about the study in which sh/he participated.

How do I sign up?

Once you are registered in the course, you will get an account on SONA (our web-based Study Sign-Up system) at <http://uwaterloo.sona-systems.com>. User ID is your Quest ID (eg. j2smith), temporary password is your Student ID (eg 2001234). Log in to your account, read/acknowledge the ORE "Human Subjects/Privacy Policy" then complete a very brief (10 minute) "Prescreen" questionnaire to provide basic demographic info. You won't receive a credit for this and you may decline if you wish however *completing it will increase your eligibility for other studies*. Once you have completed (or declined) the Prescreen questionnaire you should go to "My Profile" and enter your preferred (Alternate) email address. Then you can go to "Study Sign-Up" and select a Psych 391-eligible study that interests you and a day/time that fits your schedule. You'll receive a confirmation email and a reminder the day before the study. Upon completion of the study you are granted your Study Credit and given feedback about the study hypothesis, design and predictions.

When should I sign up?

Right away, the sooner the better!!! The On-line study "Mass Testing Survey F08" (one full credit) will only be offered for a few weeks and you *should do this study as soon as possible*. Researchers often select participants based on their responses and doing this survey increases your eligibility for other studies. Note that you can only do this survey if you have completed the Prescreen questionnaire. Doing both Prescreen and Mass Testing Survey helps you (by providing more qualifying studies and it helps researchers (by identifying more qualified participants) so we would greatly appreciate it if you would do both.

Are there any restrictions to the studies I can sign up for?

Yes ... i) the study must be eligible for a credit in this class (as noted with the study) ii) only 2 of your 4 credits can be for On-line studies and iii) you should try to spread your participation out over the term. The last day to participate for credit is December 1 but you can participate for pay until December 19.

Where can I get more information, instructions, help with login problems etc?

REG website: <http://www.arts.uwaterloo.ca/~regadmin/regparticipant>

REG Coordinator: regadmin@watarts.uwaterloo.ca

Alternative to participating in research:

Students are not required to participate in research, and not all students wish to do so. As an alternative to participation in research, students may submit short reviews (1½ to 2 pages) of journal articles relevant to statistics. Each review article counts as one percentage point. You should contact your TA to get approval before writing the review. To receive credit, you must follow specific guidelines. The review must:

- **Be submitted before November 24. Late submissions will NOT be accepted under ANY circumstances.**
- Be typed
- Fully identify the title, author(s), source and date of the article. A copy of the article must be attached.
- Identify the psychological concepts in the article and indicate the pages in the Myers textbook that are applicable. Critically evaluate the application or treatment of those concepts in the article. If inappropriate or incorrect, identify the error and its implications for the validity of the article. You may find, for example, misleading headings, faulty research procedures, alternative explanations that are ignored, failures to distinguish factual findings from opinions, faulty statements of cause-effect relations, errors in reasoning, etc. Provide examples whenever possible.
- Clearly evaluate the application or treatment of those concepts in the article.
- Keep a copy of your review in the unlikely event we misplace the original.

Students may complete any combination of a) participation in research or b) article review up to a total of 4% points.

Tutorials:

Each student should be registered in a tutorial section. Tutorials are intended to provide students with an opportunity to work through the mechanics of the statistical procedures with a TA in a smaller group setting, as well as give hands on experience with SPSS. For the most part, we will spend class time discussing the logic and rationale behind the statistical procedures covered in this course. The tentative tutorial schedule is posted on page 4 of this syllabus.

Nexus Accounts:

Because you will be required to complete portions of your lab assignments with SPSS, it is important that you obtain a NEXUS account. A NEXUS account will give you access to e-mail, the internet, and a host of different software packages (including SPSS which you will need for the lab assignments). The only cost incurred with a NEXUS account is printing. You can purchase printing at PAS 1080 using your WATCARD. It is strongly recommended that you activate your NEXUS account, find the SPSS statistical package, and become familiar with it. You can obtain a NEXUS account by: (a) going to a NEXUS computer (e.g., one located in PAS 1237), (b) clicking on the link in the bottom-left corner of the login browser, and (c) following the instructions as they are given on the screen.

Helpful suggestions to ensure your success in this (or any) class:

1. Read the chapter before coming to class.
2. Look over the lecture notes before coming to class.
3. Take additional notes to supplement the class notes that are provided (note: I often supplement the text and class note materials with examples that will only be provided during lectures).
4. If you have questions, please ask.
5. Be aware of the due dates.
6. After a chapter has been covered, see if you can complete the exercises at the end of the chapters.
7. Come by and visit one of the TA's or me during office hours.

Note for students with disabilities:

The Office for Persons with Disabilities (OPD), located in Needles Hall, Room 1132, collaborates with all academic departments to arrange appropriate accommodations for students with disabilities without compromising the academic integrity of the curriculum. If you require academic accommodations to lessen the impact of your disability, please register with the OPD at the beginning of each academic term.

Please be aware of the following university policies:

Academic Integrity: in order to maintain a culture of academic integrity, members of the University of Waterloo community are expected to promote honesty, trust, fairness, respect and responsibility.

Grievance: A student who believes that a decision affecting some aspect of his/her university life has been unfair or unreasonable may have grounds for initiating a grievance. Read Policy 70 - Student Petitions and Grievances, Section 4, <http://www.adm.uwaterloo.ca/infosec/Policies/policy70.htm>

Discipline: A student is expected to know what constitutes academic integrity, to avoid committing academic offenses, and to take responsibility for his/her actions. A student who is unsure whether an action constitutes an offense, or who needs help in learning how to avoid offenses (e.g., plagiarism, cheating) or about “rules” for group work/collaboration should seek guidance from the course professor, academic advisor, or the Undergraduate Associate Dean. When misconduct has been found to have occurred, disciplinary penalties will be imposed under Policy 71 – Student Discipline. For information on categories of offenses and types of penalties, students should refer to Policy 71 - Student Discipline, <http://www.adm.uwaterloo.ca/infosec/Policies/policy71.htm>

Appeals: A student may appeal the finding and/or penalty in a decision made under Policy 70 - Student Petitions and Grievances (other than regarding a petition) or Policy 71 - Student Discipline if a ground for an appeal can be established. Read Policy 72 - Student Appeals, <http://www.adm.uwaterloo.ca/infosec/Policies/policy72.htm>

TENTATIVE LECTURE SCHEDULE

Days	Topic	Readings
Sept 8	Introduction to course	
Sept 10	Review of Basic Concepts	Chap: H 1, 2, 4, 5, 6, 8
Sept 15	Hypothesis Testing, T-tests & begin 1-way ANOVA	Chap: H 12-14, 16.1-16.2, K&F 1-9
Sept 17	ANOVA (Handout L1)	Chap: H 16.1-16.2
Sept 22	ANOVA	Chap: H 16.1-16.3, K&F 10
Sept 24	ANOVA	Chap: H 16.3-16.4
Sept 29	ANOVA	Chap: H 16.6-16.11
Oct 1	ANOVA & Basic Review (L1 Due)	Chap: H 16.6-16.11
Oct 6	<u>Test # 1</u>	
Oct 15	Multiple Comparisons: Background (Handout L2)	Chap: H 16.5, S1, K&F 10
Oct 20	Multiple Comparisons: Planned comparisons	Chap: H 16.5, Sup 1
Oct 22	Multiple Comparisons: Post Hocs	Chap: H 16.5, Sup 1
Oct 27	Factorial ANOVA	Chap: H 17.1-17.4, K&F 11
Oct 29	Factorial ANOVA	Chap: H 17.5-17.10
Oct 31	Factorial ANOVA	Chap: H 17.5-17.10
Nov 3	Factorial ANOVA & Midterm Review	
Nov 5	<u>Test #2</u>	
Nov 10	Repeated Measures (L2 due, Handout L3)	Chap: H 18, Sup 2
Nov 12	Repeated Measures	Chap: H 18, Sup 2
Nov 17	Repeated Measures	Chap: H 18, S2, K&F 12
Nov 19	Mixed Designs & Factorial Repeated Measures	Sup 2, K&F 13
Nov 24	Mixed Designs & Factorial Repeated Measures	Sup 2
Nov 26	Mixed Designs & Factorial Repeated Measures	Sup 2
Dec 1	Factorial Repeated measures and Final Review (L3 due)	Sup 2
Exam Period	<u>Test #3</u>	

H - Refers to the Howell (2008) text entitled “*Fundamental Statistics for the Behavioral Sciences*”

Sup - Refers to two chapters from supplemental readings.

K&F: Refer to chapters from the Kirkpatrick and Feeny book “*A Simple Guide to SPSS for Windows*”

L1-L3: Refers to the three lab assignments

TENTATIVE TUTORIAL/REVIEW SCHEDULE

Tutorial #	Date	Objective
No Tutorial	Week of Sept 8 th	----
Tutorial 1	Week of Sept 15 th	t-tests
Tutorial 2	Week of Sept 22 nd	One-way ANOVA
No Tutorial	Week of Sept 29 th	----
Review Session	Tuesday Sept 30 th	Available for questions on Tuesday before Test #1 (location TBA, 9-5)
No Tutorial	Week of Oct 6 th	----
Tutorial 3	Week of Oct 13 th	Multiple Comparisons: A Priori
Tutorial 4	Week of Oct 20 th	Multiple Comparisons: Post Hocs
Tutorial 5	Week of Oct 27 th	Factorial ANOVA with post hocs
No Tutorial	Week of Nov 3 rd	----
Review Session	Tuesday Nov 6 th	Available for questions on Tuesday before Test #2 (location TBA, 9-5)
Tutorial 6	Week of Nov 10 th	Repeated Measures ANOVA with post hocs
Tutorial 7	Week of Nov 17 th	Mixed Factorial ANOVA with post hocs
Tutorial 8	Week of Nov 24 th	Factorial Repeated Measures ANOVA with post hocs
Review Session	TBA	Available for questions on day before Test #3 (location TBA, 9-5)