University of Waterloo
Department of Psychology
Psychology 292
Basic Data Analysis
Winter 2014

Lectures

Tuesdays and Thursdays, 10:30AM – 12:20PM, RCH 101

Course Description

In this course, you will learn the basics of using descriptive and inferential statistics in the analysis of psychological data. This course emphasizes an understanding of fundamental statistical principles rather than "cookbook" application of statistical formulas. The principles provided in this course will serve as a foundation for more advanced statistical techniques that you may study in later courses. An appreciation of basic statistical principles, furthermore, can help you to be a more critical "consumer" of reported research findings.

Instructor Information

Instructor: Candice Graydon
Office: PAS 2249*
Office Hours: Tuesdays and Thursdays, 1:00 PM – 2:30 PM, and by appointment
Email: candice.graydon@uwaterloo.ca
*Note: You will need to go through an unlocked door marked "lab personnel only" to reach this office.

TA Information

T.A.	Email	Office	Office Hours	Tutorial
Pierre Boucher	p2bouche@uwaterloo.ca	PAS 2237*	Thursdays, 2:00 PM – 3:00 PM	102
Timothy Dunn	t2dunn@uwaterloo.ca	PAS 4211*	Mondays, 10:30 – 11:30	105
Brandon Ralph	bcwralph@uwaterloo.ca	PAS 2257*	Mondays, 3:15-4:15 PM	101
Pauline Summers	pcsummer@uwaterloo.ca	PAS 4012	Wednesdays, 12:30 PM – 1:30 PM	104
Crystal Tse	ctse@uwaterloo.ca	PAS 3240C*	Wednesdays, 10:30 AM – 11:30 AM	106
Jeffrey Wammes	jwammes@uwaterloo.ca	PAS 4227*	Tuesdays, 2:30PM – 3:30PM	103

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Tutorials

Section 101:	Tuesdays	4:30 PM – 5:50 PM	ML 246
Section 102:	Wednesdays	4:30 PM – 5:50 PM	HH 150
Section 103:	Tuesdays	1:00 PM – 2:20 PM	ML 349
Section 104:	Wednesdays	6:00 PM – 7:20 PM	HH 280
Section 105:	Tuesdays	4:30 PM – 5:50 PM	HH 2107
Section 106:	Wednesdays	8:30 AM – 9:50 AM	PAS 1229

Desire to Learn (D2L) for Psychology 292

I will be using the University of Waterloo's Desire2Learn (D2L) system to post the course syllabus, lecture notes, tutorial materials, problem sets, grades, and and other resources you may find useful. Course announcements, and answers to frequently asked questions will also be posted on D2L. Make

sure you check your D2L account regularly to stay on top of the material in the course and any announcements.

Required Text

In lieu of a traditional textbook, students will be asked to subscribe to an online "course" called Statistical Reasoning, which is part of the Open Learning Initiative (OLI) at Carnegie Mellon University. To register, please follow the following instructions:

- Go to OLI's website (http://oli.cmu.edu/), and "sign up" (top right corner)
- Enter your full first name and last name, as they appear on LEARN
- **Important:** Enter your uWaterloo email address as your "Account ID". If you do not, we will not be able to match your records across the OLI and LEARN systems, **and you will not receive grades for your assignments.**
- Once you have finished signing up, a page called "My Courses" will appear. Under my academic courses, enter the following course key: 2014LEC001

Course Requirements and Assessment

Assessment	Weighting	
14 Checkpoints	10%	(online, average of 12 best scores)
3 Unit Tests	60%	(held in class, collectively worth 60%)
Final Exam (Cumulative)	30%	(held during final exam period)
Total	**100%**	
Participation in Psychology Research	2%	Bonus (added to final course grade)

Online Checkpoints (10%)

You will be asked to complete these relatively brief, online assessments, which will be available on OLI's website (http://oli.cmu.edu) throughout the term. There are 14 assigned checkpoints in total. If necessary, you can miss two as final marks are based on the best 12 of 14 checkpoint scores. You are allowed up to two attempts at each checkpoint and will receive feedback on each attempt. Your final score for each checkpoint will be determined by the percentage of correctly answered items from your best-scoring attempt.

Checkpoint(s)	Due Date	Topic
1	January 17	Examining Distributions 1
2	January 24	Examining Distributions 2
3	February 7	Random Variables
4 **and** 5	February 14*	Sampling Distributions 1 and 2
6	February 28	Estimation
7 **and** 8	March 7th*	Hypothesis Testing for population Proportion and Population Mean
9 **and** 10	March 14th*	Two Independent Samples and Matched Pairs
11	March 21	Examining Relationships 1
12	March 28	Examining Relationships 2
13 **and** 14	April 9th*	Case C -> C and Q -> Q and Inferences for Relationships

*Please note that there are two checkpoints due on these dates

Unit Tests (60%)

Three unit tests will be held in class. You will have 75 minutes to complete each test. In a sense, the three tests are non-cumulative, but topics covered in this course naturally build on one another. For example, to carry out a t-test (covered on Test 3), you need to know how to calculate a standard deviation (covered on Test 1). All unit tests are closed-book, but sheets with relevant statistical formulas and tables will be provided so you won't have to memorize them.

The three unit tests, taken together, will account for 60% of your final mark. Your highest test score will count for 25% and your lowest for only 15%, with the intermediate score counting for 20%. This should help to offset, at least somewhat, the effects of a having "bad day" on one of the unit tests. Out of fairness to other students, please note that the instructor cannot offer any further changes in the weighting of the unit tests and final exam, or additional work for extra credit.

If you have a concern about how an item on a unit test was marked, please first have a look at the answer key (posted on LEARN for Psych 292). If the answer key does not address your concern, please arrange to discuss the matter further with the TA who marked the item. (The answer key will indicate who marked each item.) If you still feel that your concern has not been addressed, please put it in writing and submit it to the instructor, who will then discuss it with the TA and make a final decision.

Final Exam (30%)

The final exam is closed-book and cumulative. For the final exam, sheets with relevant statistical formulas and tables will be provided so you won't have to memorize them. Students may also bring and use one additional (double-sided) page of their own notes. This sheet may be hand-written or typed.

Participation in Experiments (up to 2% bonus)

Student participants may earn up to 2 bonus percentage points towards their final mark in Psychology 292 by either: (1) participating in psychology studies conducted by students and faculty in the Department of Psychology and/or (2) writing critical reviews of journal articles. See attached guidelines for participation in psychology research for more details.

Missed/Late Work

Missed Checkpoints

Online checkpoints are due by 23:59 (11:59 PM) on Friday Evenings. Students will not be able to submit checkpoints after this time. Missed checkpoints will receive a grade of zero (no exceptions).

Missed Unit Tests

Unit tests or exams can only be rescheduled in the case of illness (or other medical problems); circumstances of serious distress due to a family emergency or personal crisis; or (for those students who commute) adverse weather on the day of tests. Documentation is required in order to reschedule a test or exam. In the case of illness, a UW verification of illness form is required.

It is important to be aware that, in such cases, the only accommodation that can be offered is rescheduling the test or exam. Once the test or exam has been completed, poor performance due to circumstances such as those outlined above cannot be used as a basis for requesting re-weighting the contribution of the test or exam to the student's final course mark.

A rewrite session will be scheduled for each unit test for those students who were unable to take it at the scheduled time and can provide valid documentation. Scheduled rewrite sessions will be posted on LEARN; please email the TA who will be administering the session (as indicated on LEARN) to confirm that you will be attending the rewrite session. All students who missed the originally scheduled unit test are expected to attend the rewrite session. Exceptions will be granted only if additional documentation is provided covering the date of the rewrite session; decisions about how to proceed then will be made by the instructor on a case-by-case basis.

Tutorials

Each week in tutorial sessions, your TA will guide the group through solutions to a set of target exercises. These target exercises are drawn from unit tests given in previous years. As such, these problems will provide a good example of what one should expect to see on their unit tests this term. The target exercises to be covered each week will be posted in advance. You will likely find the tutorials to be more helpful if you have attempted to solve the problems for yourself prior to each meeting. Although attending tutorials is optional, many students find the tutorials to be the most helpful feature of the course.

Sending Questions by E-mail

This is a large course, and as a result we typically receive lots of e-mail from students with questions about course content, assignments, unit tests and exams, etc. We are happy to receive questions by e-mail and will do our best to answer them promptly. To manage all this e-mail, however, we ask that whenever possible you direct your e-mail questions to your tutorial TA. The TA will either answer your question or forward it to the instructor as appropriate. For basic questions about the course content and scheduling, please be sure to read through the syllabus and announcements on LEARN before sending e-mail, as often the answers to questions we receive can be found there.

How to do well in this course

Here are some things you can do to more effectively learn the material and enjoy the course:
- carefully complete assigned readings each week *before* the lecture
- complete the "Learn by Doing" and "Did I Get This?" activities as you encounter them while doing the assigned reading in the online textbook
- test yourself on problems from previous years' unit tests (downloadable from the course LEARN site)
- ask questions, in lectures and tutorials, if you don't understand something
- see the instructor and/or your TAs during office hours if you need additional help
- See the Psychology Undergraduate website "Student Success" section "Psych 292 or Psych 391 – tips for success" (http://www.psychology.uwaterloo.ca/ugradprog/current/course_info/Improving_Grades.html #Psych292_391_Success)

If you find that you are having trouble with the material and need more help than a TA can provide during tutorial and office hours, you might consider getting help from a tutor. A list of students who recently took the class, did well, and have expressed a willingness to offer tutoring services (either for pay or on a voluntary basis) is available on the course LEARN site. It is left to you to contact and make arrangements directly with a tutor, and obviously it cannot be guaranteed that every student will benefit from tutoring, but working with a tutor may be a useful supplement to the course for those needing a little extra help.

Calculators

For the tutorial exercises, unit tests, and final exam, you will find it helpful to have a calculator, ideally with basic statistical functions (e.g., standard deviation). Please bring your calculator to every class meeting and every tutorial.

Attendance Policy

While highly recommended, lecture and tutorial attendance is not mandatory.

INSTITUTIONAL-REQUIRED STATEMENTS
Institutional-required statements for undergraduate course outlines approved by Senate Undergraduate Council, April 14, 2009

Cross-listed course

Please note that a cross-listed course will count in all respective averages no matter under which rubric it has been taken. For example, a PHIL/PSCI cross-list will count in a Philosophy major average, even if the course was taken under the Political Science rubric.

Academic Integrity

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

Discipline: A student is expected to know what constitutes academic integrity, to avoid committing academic offences, and to take responsibility for his/her actions. A student who is unsure whether an action constitutes an offence, or who needs help in learning how to avoid offences (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.

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.

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.

Other sources of information for students

Academic integrity (Arts) Academic Integrity Office (uWaterloo)

Accommodation for Students with Disabilities

Note for students with disabilities: The AccessAbility Services Office, 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 AS office at the beginning of each academic term.

Research Experience Marks
Information and Guidelines

Experiential learning is considered an integral part of the undergraduate program in Psychology. Research participation is one example of this, article review is another. A number of undergraduate courses have been expanded to include opportunities for Psychology students to earn grades while gaining research experience.

Since experiential learning is highly valued in the Department of Psychology, students may earn a **"bonus" grade of up to 2%** in this course through research experience. Course work will make up 100% of the final mark and a "bonus" of up to 2% may be earned and will be added to the final grade if/as needed to bring your final grade up to 100%.

The two options for earning research experience grades (participation in research and article review) are described below. Students may complete any combination of these options to earn research experience grades.

Option 1: Participation in Psychology Research

Research participation is coordinated by the Research Experiences Group (REG). Psychology students may volunteer as research participants in lab and/or online (web-based) studies conducted by students and faculty in the Department of Psychology. Participation enables students to learn first-hand about psychology research and related concepts. Many students report that participation in research is both an educational and interesting experience. Please be assured 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 s/he participated.

Participation in LAB studies is worth 0.5 participation credits (grade percentage points) for each 30-minutes of participation. Participation in ONLINE studies is worth .25 credits for each 15-minutes of participation. Researchers will record student's participation and will advise the course instructor of the total credits earned by each student at the end of the term.

How to participate?

Study scheduling, participation and grade assignment is managed using the SONA online system. All students enrolled in this course have been set up with a SONA account. You must get started early in the term.

INSTRUCTIONS/DATES/DEADLINES: How to log in to Sona and sign up for studies

*** *Please do not ask the Course Instructor or REG Coordinator for information unless you have first thoroughly read the information provided on this website.****

More information about the REG program is available at:
REG Participants' Homepage

Option 2: Article Review as an alternative to participation in research

Students are not required to participate in research, and not all students wish to do so. As an alternative, students may opt to gain research experience by writing short reviews (1½ to 2 pages) of research articles relevant to the course. The course instructor will specify a suitable source of articles for this course (i.e., scientific journals, newspapers, magazines, other printed media). *You must contact your TA to get approval for the article you have chosen before writing the review.* Each review article counts as one percentage point. To receive credit, you must follow specific guidelines. The article review must:

- **Be submitted before the** last day of lectures**. 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 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.

Course Outline

Lecture	Date	Lecture Topic	OLI module(s)	Covered on Test	Tutorial
1	Tuesday, January 7	Introduction, Course Information	1 (through measures of center)	Test # 1	No Tutorial
2	Thursday, January 9	Displaying data, measures of center	1 (through measures of center)	Test # 1	Tutorial # 1 (Jan 14 or 15)
3	Tuesday, January 14	Measures of spread	1 (from measures of spread)	Test # 1	Tutorial # 1 Jan 14 or 15
4	Thursday, January 16	probability	5	Test # 1	Tutorial # 2 Jan 21 or 22
5	Tuesday, January 21	Random variables	6 (Discrete Random Variables)	Test # 1	Tutorial # 2 Jan 21 or 22
6	Thursday, January 23	Normal distribution 1	6 (Continuous Random Variables)	Test # 2	Tutorial # 3 Jan 28 or 29
Unit Test 1	Tuesday, January 28				
7	Thursday, January 30	Normal Distribution 2	6 (Continuous Random Variables)	Test # 2	Tutorial # 4 Feb 4 or 5
8	Tuesday, February 4	Sampling Distributions 1: Expected Value (EV) and Standard Error (SE)	7	Test # 2	Tutorial # 4 Feb 4 or 5
9	Thursday, February 6	Sampling Distributions 2: Central Limit Theorem	7	Test # 2	Tutorial # 5 Feb 11 or 12
10	Tuesday, February 11	Confidence Intervals 1: population mean	8 and 9	Test # 2	Tutorial # 5 Feb 11 or 12
11	Thursday, February 13	Confidence Intervals 2: population proportion	8 and 9	Test # 2	Tutorial # 6 Feb 25 or 26
12	Tuesday, February 25	Hypothesis testing: one-sample tests	10 (Except type 1 and Type II errors)	Test # 3	Tutorial # 7 Mar 4 or 5
Unit Test 2	Thursday, February 27				
13	Tuesday, March 4	Hypothesis testing: related samples	11 (Matched Pairs)	Test # 3	Tutorial # 7 Mar 4 or 5

Lecture	Date	Lecture Topic	OLI module(s)	Covered on Test	Tutorial
14	Thursday, March 6	Hypothesis testing: independent samples	11 (Independent samples)	Test # 3	Tutorial # 8 Mar 11 or 12
15	Tuesday, March 11	Hypothesis testing: effect size and power 1	10 (Type I and Type II Errors) and Power Module available online on the WISE website (http://wise.cgu.edu/powermod)	Test # 3	Tutorial # 9 Mar 18 or 19
16	Thursday, March 13	Hypothesis testing: effect size and power 2	10 (Type I and Type II Errors) and Power Module available online on the WISE website (http://wise.cgu.edu/powermod)	Test # 3	Tutorial # 9 Mar 18 or 19
17	Tuesday, March 18	correlation	2 (pp. 42 – 51)	As part of cumulative final	Tutorial # 10 Mar 25 or 26
18	Thursday, March 20	Regression 1	2 (pp. 52 – end) 12 (Case Q -> Q)	As part of cumulative final	Tutorial # 10 Mar 25 or 26
Unit Test 3	Tuesday, March 25				
19	Thursday, March 27	Regression 2	2 (pp. 52 – end) 12 (Case Q -> Q)	As part of cumulative final	Tutorial # 11 April 1 or 2
20	Tuesday, April 1	Chi-Square	2 (Case C -> C), 12 (Case C -> C)	As part of cumulative final	Tutorial # 11 April 1 or 2
21	Thursday, April 3	Test selection (review)	12 (Wrap-Up: Inference for Relationships)		No Tutorial