Faculty of Health
Department of Psychology
PSYC 2021 3.0 N: STATISTICAL METHODS I
Tuesdays and Thursdays, 2:30-4:00p.m., Curtis Lecture Hall F
Winter 2019

Instructor and T.A. Information

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Course Prerequisite(s): Course prerequisites are strictly enforced

- HH/PSYC 1010 6.00 (Introduction to Psychology), with a minimum grade of C when used as a prerequisite.

Course Credit Exclusions

Please refer to York Courses Website for a listing of any course credit exclusions.

Course website: Moodle

Course Description

This is the first course in statistics that most psychology (and other) majors take in university. This class will introduce you to the basic principles underlying statistical analysis in psychology and prepare you for future classes in statistics which will focus on more advanced techniques. More specifically, this course will introduce you to the type of variables utilized in psychology, statistical and graphical methods for summerizing variable information, two-variable correlation, and comparing two independent or paired-sample means. Hypothesis significance testing will be introduced, however the focus will be on understanding relationships among variables. Data analysis using statistical software will be carried out with the open-source software R (www.r-project.org) and the free version of RStudio (www.rstudio.com).

Course Textbook:

Navarro, D. (2015). Learning Statistics with R: A tutorial for psychology students and other
        beginners (version 0.6)
https://compcogscisydney.org/learning-statistics-with-r/
* Note that the textbook can be either downloaded as a pdf or purchased in hard copy on the text website.

Program Learning Outcomes

Upon completion of this course, students should be able to:

1. Compute descriptive statistics and inferential statistics.
2. Interpret and report the results of descriptive statistics and inferential statistics.
3. Distinguish between the role of descriptive statistics and inferential statistics.

Topics Covered

- Defining Key Statistical Terms
- Frequency Distributions
- Central Tendency
- Variability
- z-Scores/Normal Distribution
- Probability
- Sampling Distribution
- Confidence Intervals
- Power
- Effect Size
- Hypothesis Testing
- Correlation (Pearson at minimum)
- χ^2 Goodness of Fit
- χ^2 Test of Independence
- One-sample t-test
- One-sample z-test
- Two independent samples t-test
- Paired samples t-test

Effect size is included as part of all inferential statistics covered in this course.

Specific Learning Objectives

Upon completing all learning components designed for this course, students will be able to:

- Understand the nature of statistical data in the field of psychology.

- Identify type of variables (continuous, categorical) and investigate relationships between variables.

- Construct, present, interpret and report on graphical displays, summary statistics, confidence intervals, significance tests (e.g., *p*-values).

- Know for what objectives and under what conditions a statistical method is applicable.

- Verify that data satisfy the conditions required for conducting a statistical analysis and the research objectives are compatible with the objectives of the statistical methods being used.

- Identify and investigate the impacts of outliers in data analysis.

- Realize common misconceptions and know how to avoid such interpretations.

Course Requirements and Assessment:

Assessment	Date of Evaluation (if known)	Weighting
Pop Quizzes	Weekly in Lectures	5%
Assignment #1	January 31	7.5%
Assignment #2	February 14	7.5%
Midterm Test	February 28	25%
Assignment #3	March 14	7.5%
Assignment #4	March 28	7.5%
Final Exam (cumulative)	April 5-20	40%
Total		100%

Description of Course Assessments

    1. Pop Quizzes in Lectures (5%):

Pop quizzes will be given in the lectures. The pop quizzes will be very easy. They will be based on the lecture notes and homework questions. Each pop quiz will have only one question and will take approximately 5 minutes to complete. The pop quizzes begin in the third week of the course. There are 11 pop quizzes scheduled in the term. Missed pop quiz receives a zero, but the lowest score (e.g., one of the zeros, if you have any) will be dropped. The pop quizzes will be posted on our Moodle page for the course. You will submit your answer online. If there is an issue with having an access to the internet, you may use a paper to write your answer to a pop quiz and submit it to Asal in class.

    2. Assignments (4 x 7.5% = 30%):

There are four assignments for the course that requires you to analyze data (including using R) and write up the results of the studies. You will be given the assignments one week before they are due. Please note that you will be deducted 10% (of the 7.5% allotted to each assignment; i.e., 0.75% of your final grade) for each day (not including the weekends) that your assignment is late. Typed written report of each data analysis with its R outputs are submitted at the beginning of a lecture when the assignment is due.

    3. Midterm Test (25%):

There is one midterm test scheduled for 1-hour and 15-minutes in the course, which will be held during class on Thursday Feb. 28th. The midterm test is based on the material covered in lectures from Weeks 1 to 6. Weekly homework questions are good preparation for the test. The midterm test is a combination of multiple-choice and problem-based questions that aims to assess your understanding of conceptual ideas and your knowledge of interpreting R input/output (you will not need to write out R codes on the test). You are allowed to use a basic calculator during the test, one that allows you to add, subtract, divide, multiply and take a quare root of a number (phones, tablets, etc. cannot be used as calculators). You may bring to the test a one letter-sized (8.5" x 11") hand-written aid sheet using only one side of the page. Statistical tables that you may need will be provided.

4. Final Exam (40%):

The final exam will be cumulative and covers all course material. The format of the final exam is similar to the midterm test. However, the final exam is scheduled for three hours and will be held during winter examination period (April 5th – 20th). You may bring to the final exam a one letter-sized (8.5" x 11") handwritten aid sheet using both sides of the sheet. Statistical tables that you may need for the exam will be provided. You need to use a basic calculator for the exam (note: electronic devices cannot be used as calculators and are not permitted during the exam).

Grading as per Senate Policy

The grading scheme for the course conforms to the 9-point grading system used in undergraduate programs at York (e.g., A+ = 9, A = 8, B+ = 7, C+ = 5, etc.).

Assignments and tests will bear either a letter grade designation or a corresponding number grade (e.g. A+ = 90 to 100, A = 80 to 89, B+ = 75 to 79, etc.)

(For a full description of York grading system see the York University Undergraduate Calendar - Grading Scheme for 2018-19)

Late Work/Missed Tests or Exams

Students with a documented reason for missing a course test, such as illness, compassionate grounds, etc., which is confirmed by supporting documentation (Attending Physician Statement which can be found at: http://myacademicrecord.students.yorku.ca/pdf/attending-physicians-statement.pdf may request accommodation from the Course Instructor. Further extensions or accommodation will require students to submit a formal petition to the Faculty.

Important New Information Regarding Missed Tests

For any missed tests or late assignments, students MUST complete the following online form **within 48 hours of the missed test**: HH PSYC: Missed Tests/Exams Form. This form will be received and reviewed in the Psychology undergraduate office. Failure to complete the form within 48 hours of the original deadline will result in a grade of zero for the test.

Missed Test: Please note in completing the online form you will also need to include formal documentation to verify the circumstances for missing the test (e.g., completed Attending Physician's Statement Form) – this documentation should be submitted **within 7 days of the missed test**. Upon completion of the online form and after receipt of your supporting documentation you will have two options:

1. *One opportunity to write a make-up test (this will be scheduled at a day and time to be announced by the instructor and may take a different form from the original test.

2. Opt to have the weight of the missed test added to your cumulative final exam.

*Note: If the make-up test is missed, option 2 will take immediate effect provided that the appropriate notification and documentation were received.

Missed Final Exam: If final exam is missed, the student is required to complete the online form **within 48 hours of the missed exam** and provide formal documentation (i.e., Attending Physcian Statement Form and Final Exam Deferred Standing Agreement Form) **within 7 days of the missed final exam.**

Add/Drop Deadlines

For a list of all important dates please refer to: <u>Fall/Winter 2018-19 - Important Dates</u>

	FALL (F)	YEAR (Y)	WINTER (W)
Last date to add a course **without permission** of instructor (also see Financial Deadlines)	Sept. 18	Sept. 18	Jan. 16
Last date to add a course **with permission** of instructor (also see Financial Deadlines)	Oct. 2	Oct. 23	Jan. 30
Drop deadline: Last date to drop a course without receiving a grade (also see Financial Deadlines)	Nov. 9	Feb. 8	March 8
Course Withdrawal Period (withdraw from a course and receive a grade of "W" on transcript – see note below)	Nov. 10 - Dec. 4	Feb. 9 - Apr. 3	March 9 - Apr. 3

*Note: *You may withdraw from a course using the registration and enrolment system after the drop deadline until the last day of class for the term associated with the course. When you withdraw from a course, the course remains on your transcript without a grade and is notated as "W". The withdrawal will not affect your grade point average or count towards the credits required for your degree.*

Information on Plagiarism Detection

Turnitin will be used to detect any evidence of plaigirism.

Electronic Device Policy

We will be exploring statistical ideas using free software R and RStudio. Therefore, it is recommended that students bring their own laptop to class to practice statistical activities. However, students are asked to only use their computer for course-related purposes. Electronic devices are not permitted during the midterm test and the final exam.

Attendance Policy

Students are expected to attend all classes as weekly class activites build on the previous week's material.

Academic Integrity for Students

York University takes academic integrity very seriously; please familiarize yourself with <u>Information about the Senate Policy on Academic Honesty</u>.

It is recommended that you review Academic Integrity information <u>SPARK Academic Integrity modules</u>. These modules explain principles of academic honesty.

Test Banks

The offering for sale of, buying of, and attempting to sell or buy test banks (banks of test questions and/or answers), or any course specific test questions/answers is not permitted in the Faculty of Health. Any student found to be doing this may be considered to have breached the Senate Policy on Academic Honesty. In particular, buying and attempting to sell banks of test questions and/or answers may be considered as "Cheating in an attempt to gain an improper advantage in an academic evaluation" (article 2.1.1 from the Senate Policy) and/or "encouraging, enabling or causing others" (article 2.1.10 from the Senate Policy) to cheat.

Electronic Devices During a Test/Examination

Electronic mobile devices of any kind are not allowed during a test or examination. Students are required to turn off and secure any electronic mobile device in their bag which is to be placed under the chair while a test/exam is in progress. Any student observed with an electronic device during a test/exam may be reported to the Undergraduate Office for a potential breach of Academic Honesty.

Academic Accommodation for Students with Disabilities

While all individuals are expected to satisfy the requirements of their program of study and to aspire to do so at a level of excellence, the university recognizes that persons with disabilities may require reasonable accommodation to enable them to do so. The [York University Accessibility Hub](#) is your online stop for accessibility on campus. The [Accessibility Hub](#) provides tools, assistance and resources. Policy Statement.

Policy: York University shall make reasonable and appropriate accommodations and adaptations in order to promote the ability of students with disabilities to fulfill the academic requirements of their programs.

The nature and extent of accommodations shall be consistent with and supportive of the integrity of the curriculum and of the academic standards of programs or courses. Provided that students have given sufficient notice about their accommodation needs, instructors shall take reasonable steps to accommodate these needs in a manner consistent with the guidelines established hereunder.

For Further Information please refer to: [York university academic accommodation for students with disabilities policy](#).

Course Materials Copyright Information

These course materials are designed for use as part of the PSYC2021N course at York University and are the property of the instructor unless otherwise stated. Third party copyrighted materials (such as book chapters, journal articles, music, videos, etc.) have either been licensed for use in this course or fall under an exception or limitation in Canadian Copyright law.

Copying this material for distribution (e.g. uploading material to a commercial third-party website) may lead to a violation of Copyright law. [Intellectual Property Rights Statement](#).

Course Schedule

This is our tentative course schedule. Modifications to this course schedule may be made based on the rate at which we are able to cover the material.

Week	Day	Topic	Readings
1	Jan. 3rd	Introduction to Learning Statistics	Ch.1
2	Jan. 8th & 10th	Introduction to Research Design • Variables & Their Scale of Measurement • Experimental & Non-experimental Research Introduction to R and RStudio	Ch. 2, 3
3	Jan. 15th & 17th	Descriptive Statistics; Grpahing Data • Displaying and Describing Categorical Data o Frequncy Distribution Tables o Bar Charts • Displaying and Descrining Quantitative Data o Measure of Central Tendency o Histograms, Stem-and-leaf Displays o Measure of Variability o Measure of Position; Z-Scores (Standarized Scores) o Skew and Kurtosis	Ch. 5, 6 Ch. 4, 7, 8.1
4	Jan. 22nd & 24th	Descriptive Statistics; Graphing Data • Displaying and Descrining Quantitative Data o Measure of Variability o Measure of Position; Z-Scores (Standarized Scores) o Boxplots o Skew and Kurtosis • Bivariate Descriptive Statistics o Correlation o Scatterplots • Undesrstanding and Comparing Distributions o Descriptive Statistics for Each Group o Side-by-side Boxplots	
5	Jan. 29th & 31st	Introduction to Probability • Basic Probability Rules • Binomial Model • Normal Model • Normal Approximation to Binomial **Assignment #1 (7.5%) Due in Lecture on Jan. 31st**	Ch. 9
6	Feb. 5th & 7th	Estimating unknown quantities from a sample • Sampling Distribution of Sample Means	Ch. 10
7	Feb. 12 & 14th	Estimating unknown quantities from a sample • Estimating a Confidence Interval **Assignment #2 (7.5%) Due in Lecture on Feb. 14th**	
Reading Week: Feb. 16th – 22nd		

8	Feb. 26th & 28th	Hypothesis Testing • Hypothesis Testing for a Quantiative Mean (*t*-test) • Hypothesis Testing for a Population Proportion (z-test) **Midterm Test (25%) is on Thursday Feb. 28th at 2:30p.m.**	Ch.11 Ch. 13 (13.1, 13.2)
9	Mar. 5th & 7th	Hypothesis Testing • Effect Size, Sample Size, and Power Categorical Data Analysis: • The Chi-squared Goodness-of-fit Test	Ch.11 (11.8) Ch. 12 (12.1, 12.5, 12.6)
10	Mar. 12th & 14th	Categorical Data Analysis • The Chi-squared Test of Independence • Effect Size **Assignment #3 (7.5%) Due in Lecture on Mar. 14th**	Ch. 12 (12.2, 12.3, 12.4, 12.5, 12.6, 12.7, 12.8)
11	Mar. 19th & 21st	Comparing Two Means • The Independent Samples *t*-test • The Independent Samples *t*-test (Welch Test) • The Paired Samples *t*-test • Effect Size	Ch. 13 (13.3 – 13.8)
12	Mar. 26th & 28th	• Testing non-normal data with Wilcoxon Test • Fisher Exact Test • McNemar Test • Sign Test **Assignment #4 (7.5%) Due in Lecture on Mar. 28th**	Ch. 13 (13.9, 13.10)
Note: Final Exam (cumulative: 40%) is scheduled during winter examination period Apr. 5th – 20th.			