

YORK UNIVERSITY  
FACULTY OF HEALTH  
DEPARTMENT OF PSYCHOLOGY  
PSYC 2021.03 B – DATA ANALYSIS I  
FALL 2014

FRIDAY 11:30 – 2:30 AM in CURTIS LECTURE HALL F

Pre- or Co-requisite PSYC 1010.06

with a minimum grade of C in PSYC 1010 if used as a prerequisite

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**TEXTBOOK:**

Required: Wolfram, M. and Cheng, L. Statistical Concepts and Procedures: The Essentials  
York University, Toronto, 2014 extended edition (available in class for \$50.-).

**EVALUATION PROCEDURE** (official grades and unofficial self-assessment):

Grades will be based on the outcome of two tests, worth 50% each. All tests consist of 50% multiple-choice questions and 50% problem questions. The midterm exam will take place on October 17; the date for the final exam will be scheduled by the Registrar's Office during the final exam period, December 9 - 22. To help students monitor their progress, there will be weekly assignments. Detailed collective feedback on these assignments will be provided on a weekly basis, allowing students to compare their work with the solutions given. Carrying out the assignments is highly recommended for students to practice their skills. While such practice will greatly increase the chances of performing well on the exams, assignments do not count towards the course grade.

**PROCEDURES FOR MISSED MIDTERM EXAM:**

Students who fail to write the exam at the scheduled time need to contact the instructor by e-mail within 48 hours. If they can document a valid reason for their absence they will be allowed to write a make-up exam at a time specified by the instructor. The date of the make-up will be the same for all students who missed the test. There will be no individual accommodation. Alternatively, the final will count 100%. For information on documentation consult the Department of Psychology website.

**GOAL OF THE COURSE:**

The goal of this course is statistical literacy and competence in choosing and carrying out statistical analyses appropriate to different research questions. Students will gain a better understanding of the experimental findings to which they are exposed in other courses, and they will be able to interpret and critically evaluate research findings reported in the media. The course will also provide preparation for students who will continue with PSYC 2022, 3030, 4000 or 4170. It is advantageous for students to take this course as early as possible in their course of study.

## **PARTICULARITY OF A STATISTICS COURSE:**

Statistics is an important course. Succeeding in it will open doors for you in your course of study, while failing to succeed will keep these doors shut. Understanding statistics will greatly help you to understand other subject matters, which is the reason why statistics is a mandatory course for psychology majors. Mastering Psych 2021 does not require a special aptitude for mathematics; what it **does require** is a fair amount of **regular work**. According to a questionnaire, successful students spend an average of six hours per week studying statistics in addition to class time. There is, however, a large range in the time required by different students.

Statistics differs from many other courses in that one thing builds on another. Students have to retain it all. The only way this can be achieved is by mastering each part to the point where it becomes automatic. Using statistics then becomes similar to speaking a language fluently without having to explicitly recall each rule. **Lack of investing enough regular time and attention is the one prime reason for failure in this course. The misconception that it is enough to go through the motion of writing exams, appealing to the staff's charity on the basis of what grade is needed and the adversity of one's circumstances is the most frequent reason for repeated failure in this course.** Students are encouraged to call on the teaching staff for extra help to achieve the grades they need; yet the grades themselves are strictly based on demonstrated performance. As Henry Ford said, "Whether you think you can or think you can't, - either way you are right." People tend to live up (or down) to their own expectation. However, positive expectations need to be combined with concrete strategies to move beyond wishful thinking.

## **STRATEGIES TO SUCCEED IN THIS COURSE:**

Maximum efficiency can be achieved by:

- (a) good resource management, i.e. keeping oneself in good operating conditions (i.e. staying healthy and functional) and setting aside weekly time periods for regular homework,
- (b) using several smaller time periods rather than one big block,
- (c) making friends with classmates and working with others (EXCEPT during exams),
- (d) practicing the material by doing the assignments and making use of the models provided,
- (e) asking for help when encountering difficulties, i.e. staying on top rather than letting things slide and hoping to catch up at some future point in time,
- (f) understanding the material AND making its use automatic through practice.

## **CORRESPONDENCE:**

This is not a correspondence course. Attending lectures cannot be substituted by requesting information and explanations from the instructor or the TA via e-mail. When you do need to communicate by e-mail; state "2021" in the subject line and identify yourself clearly (first and last name). Please read your course outline carefully. It contains all the administrative information students tend to ask about.

## **IF YOU FEEL THAT YOU NEED EXTRA HELP:**

- (1) For starters, make an honest effort to cope on your own. Some students hire a tutor to fulfil their need to depend on somebody other than themselves.
- (2) Make use of the resources available; the instructor and the TAs have weekly office hours and are ready to help you.
- (3) Form a study group.
- (4) If you really find that the available resources do not suffice, look for peer tutoring with UPSA.

## COURSE SCHEDULE

Sept.	12	Introduction to the course Introduction to statistics (Chapter 1)
Sept.	19	Making sense out of data – graphic representation (Chapter 2) Measures of central tendencies and measures of dispersion (Chapter 3)
Sept.	26	Introduction to standard scores (Chapter 3 cont'd) Standard scores and the normal curve (Chapter 4)
Oct.	3	Pearson correlation and regression (Chapter 5)
Oct.	10	Review Chapters 1 - 5
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Oct.	17	<b>MIDTERM EXAM (50%)</b> covering chapters 1 – 5
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Oct.	24	Probability (Chapter 6) Introduction to hypothesis testing (Chapter 7)
<b>Oct.</b>	<b>31</b>	<b>FALL READING WEEK aka co-curricular days NO CLASSES</b>
Nov.	7	Hypothesis testing: inferences about a single mean (Chapter 8) Elements of research design; the t-test for correlated samples (Chapter 9)
Nov.	7	<b>Last day to drop course without receiving a grade</b>
<b>Nov.</b>	<b>14</b>	Elements of research design t-test for correlated samples (Chapter 9) t-test for independent samples (Chapter 10)
Nov.	21	t-test for independent samples (Chapter 10 cont'd) Review of z- and t-tests The power of statistical tests and the problem of hypothesis testing (Chapter 11) The confounding effect of N in the outcome of hypothesis testing
Nov.	28	The Chi square test, general principle and goodness of fit test Chi square test for homogeneity, i.e. correlation of categorical data (Chapter 15)
Dec.	5	Review chapters 6 – 11 and 15
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<b>Final Exam</b>	<b>FINAL EXAM (50%) covering chapters 6 – 11 and 15.</b>	
<b>Period</b>	<b>(Dec 9 – 22)</b>	
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## OBSTACLES ON THE WAY OF GETTING THROUGH THIS COURSE AND HOW TO OVERCOME THEM

### 1. LACK OF RECOGNITION THAT THIS COURSE WILL REQUIRE EFFORT

Unfortunately, some students have the idea that investing effort into an activity is a sign of lacking aptitude. This notion seems to be rooted in cultures that do not have a tradition of higher education. One of my students from a low educated background was told explicitly by her family that she may not have what it takes if she really had to work so hard at her courses. Another one of my students felt insulted by the expectation that he had to invest a fair amount of time in a statistics course because, as he put it, he was used to succeeding by virtue of his intellect rather than effort.

Sure, aptitude helps and there are likely to be courses where a “laid back” approach will suffice, but statistics is not one of them. The reason is that using statistics is a skill, similar to a physical sport, lifting weights, playing a musical instrument, or learning to speak a foreign language. Like all skills, it develops gradually and it requires regular distributed practice. Cramming for an exam to make up for periods of inactivity is as limited in results as it would be for a weightlifter preparing for a competition, a musician preparing for a recital or a language learner preparing for a debate. Content learning can be crammed skills cannot.

### 2. LACK OF CONSIDERING NUMBERS

Students are often concerned that their math skills will not suffice. Actually, the amount of math background required to master the material of this course is quite limited. You need to know how to add, subtract, multiply and divide, square and take square roots with the help of a calculator. The one important stumbling block, but one that can easily be overcome with a bit of early practice, is mastering the order of operation. Carrying out mathematical operations does not proceed in a strictly left to right order.

Yet, lack of considering numbers can result in massive and unnecessary losses for students, their parents and for society. Consider that the tuition paid for this course is \$ 690.- (3x this amount for foreign students). A few students do run into unforeseen circumstances; many more fall victim to their lack of commitment and failure to recognize the consequences in terms of numbers. Here is a chart taken from the Yorku.ca website to make the point:

#### FALL/WINTER 2014-2015 SESSION - REFUND TABLE

	<b>Full Refund</b>	<b>10% Course Fee Withheld</b>	<b>20% Course Fee Withheld</b>	<b>60% Course Fee Withheld</b>	<b>No Refund</b>
<b>Term F</b>	Up to and including Sept. 14	Sept. 15 - 21	Sept. 22 - 28	Sept. 29 - Oct. 5	Oct. 6 onward

<b>Cost of slow decision:</b>	\$69.-	\$138.-	\$414.-	\$690.-
<b>Cost in terms of hours at min wage:</b>	6.3 hours	12.5 hours	37.6 hours	62.7 hours

**Cost of no decision:** Students who simply don't show, without officially withdrawing by Nov. 7 not only lose \$690.- but also get stuck with a failing grade, a serious handicap for future studies.

The first task to undertake in this course is to evaluate whether you are able and willing to invest the necessary time and effort to get through this course. If not, you would be far better off dropping out fast before losing time and money. It would be better still to drop one of your other classes to free up some time, since statistics will help to better understand many of the other courses. Furthermore, delaying an essential course carries the risk of jeopardizing your planned course of study. Too many students end up having to change their major after years of study because they neglected a necessary prerequisite.

Note that taking fewer courses tends to be a challenge for those who are in the habit of living beyond their means; yet, it is a habit well worth changing.

### 3. LACK OF RESOURCE MANAGEMENT

Course grades are based on performance. In order to produce good performance one needs to be functional, which in turn requires the effective management of one's resources, notably health and time.

#### a. Health

Lack of health, be it physical, mental or emotional, tends to be expensive. Some of us are in the position of inhabiting a body that is more prone to health problems; yet, such people often keep themselves in better condition than those who take their health for granted. Some of us live in situations that are stressful which has a negative effect on health. Some students have been poorly prepared to deal with the requirement of higher education. Be aware that this is a large university with resources for which you pay. Do make use of them. Here are some that I gleaned from the Yorku website:

#### **Online Writing Instruction** not necessary for statistics, but useful for other courses

The Writing Department provides online instruction in writing during the Fall and Winter sessions for York University students registered in courses in the Faculty of Liberal Arts and Professional Studies. You can send us the draft of a paper you're working on in a course, and one of our instructors will return it to you with comments and suggestions on its structure, organization, and argumentation.



[Contact Us | Counselling & Disability Services | York University](#)

We are located in Room N110 of the Bennett Centre for **Student Services** and can be reached by telephone at 416-736-5297 during our regular operating hours.

[www.yorku.ca/cds/contactus/](http://www.yorku.ca/cds/contactus/)

<http://www.yorku.ca/careers/students/jobsearchprogram/>

#### b. Time management

Probably the most important resource to manage is time, since it is at the basis of many other resources, including health.

**Why make a schedule:** Some people consider a schedule as something artificial that will stifle their creativity and spontaneity. Yet, people, animals and plants have regulated their behavior according to a schedule since time immemorial. What is artificial is the current state of affairs, where the natural cues that used to let us know what is ON and what is OFF have been phased out by technology. There is a widespread illusion that we can do anything at any time and do so successfully; yet, a schedule has a function similar to that of traffic lights. We all know how traffic slows down when the signal lights don't work.

Unless we take the initiative to create our own schedule to replace the one nature used to provide, performance, health and enjoyment will be decreased.

**How to make a schedule:**

1. Make an outline of the week dividing each day into units (hour units are ideal with occasional smaller divisions)
2. Insert activities to which you have already committed (e.g. courses, perhaps also part time job hours). This is the backbone of your schedule, the part that is no longer negotiable. Add time slots needed for commuting.
3. Insert time for activities that keep your circadian clock running smoothly, i.e. times to wake up, times to go to sleep, times for three meals. Make these times as regular as possible.
4. Schedule times for study and also time for recreation. On average 3 hours of study for a three hour course. Some courses will require more (statistics, literature, etc), some will require less but 15 hours for a 5 course load is a good average. Do schedule recreation time, but make sure that (1) it comes AFTER studying and not before, and (2) that it is unconditional and not IF you get your studying done. Think of study and recreation as the two phases of a wave. It has to go both ways, up and down, peaks and valleys. If the scheduled study time is up and you are not yet finished, consider speeding up or focusing on what is most essentials or returning to that part of study at a later time, but don't skip your break.
5. Schedule time for social contacts with friends, family, significant others, children. Let others know when you will be in contact. Some of these contacts may fall under recreational activities; others may be more like obligations (e.g. keeping in touch with ailing Aunt Abigail).
6. Schedule time for chores (e.g. cleaning your place, minding the bills, planning and preparing meals, shopping for groceries, etc, whatever applies to your particular situation). These activities are essentially maintenance; doing them does not advance you, but neglecting them can really slow you down.
7. Leave some free space to accommodate the unexpected as well as overflow from activities that need more time than what you had scheduled for them or simply provide room to do whatever.

The order in which to enter activities into a schedule is similar to filling a box with rocks of different sizes, pebbles and sand. If you start with the big pieces that claim a lot of space, then fill in increasingly smaller items, you can pack a lot into your box. However, if you start with the sand and the pebbles (less important things that can be done at any time), you will not be able to fit the large items (the ones that are more important and have to be done at specific times).