

**PSY 305H1 The Treatment of Psychological Data
Online for January, 2022. In person in starting February 1,
2022 in SS 561(Sidney Smith, Ground Floor).**

Instructor and Teaching Assistant Information

Instructor:

Amanda Sharples, Ph.D.
amanda.sharples@mail.utoronto.ca

Instructor Office hours:

See booking instructions and schedule on Quercus site
Online via Zoom Link provided on Quercus

Teaching Assistants

Natalia Ladyka-Wojcik, natalia.ladyka.wojcik@mail.utoronto.ca
Mo (Eric) Cui: mo.cui@mail.utoronto.ca

Course Description and Objective

How do manage our data, from initial collection to writing up our results?

What is open science? Why is it important to make sure our results are reproducible?

How do we communicate effectively for scientific and popular audiences?

How do we justify our methodological and quantitative decisions?

Up through now, you have learned the basics of how we use statistics to derive meaning from scientific data. This class will translate that knowledge into action. The goal of this class is twofold, depending on what you want to do when you graduate. If you wish to go on to graduate school, this class will allow you to develop skills that are essential to success as a graduate student. If you do not wish to go to graduate school, there are a number of career paths that require research and statistical knowledge, and this course will allow you to develop skills that you can market to these industries, and I will help show you how to do this. In this course, you will learn how to manage data in a way that is well-reasoned and conducive to statistical analysis. You will make decisions on how best to analyze data - a problem that rarely has one correct answer - and you will learn how to justify your decisions. You will embrace the process of reporting statistical results in a clear and reproducible way. You will also learn how to simulate data to help anticipate your analyses before you collect

your data and estimate statistical power. Writing will also be a big part of this class, as you will learn how to report statistical results to both scientific and popular audiences. Altogether, you should emerge from this class being able to follow the process of data analysis from a raw dataset to a publishable final report, being able to readily share this process with others in a clear, open, and reproducible way.

Learning Objectives:

- By the end of this course, you should understand how to manage your data in a way that is transparent and allows for reproducibility.
- By the end of this course, you should be able to think critically about the interpretation of statistics.
- By the end of this course, you should understand how to choose an appropriate statistical test and how to justify your choice.
- By the end of this course, you should have improved your scientific writing skills.
- By the end of this course, you should have improved your time-management skills and ability to respond appropriately to constructive feedback.

Class Structure:

For the month of January - this is the class structure:

Asynchronous Lectures: Lectures will be broken down into short (10-30 minute) videos. These will be posted weekly by 1:00pm Wednesday starting January 12th. Please try to watch each lecture before the next lecture is posted so that you do not fall behind. I chose to make lectures asynchronous as I recognize that many students will struggle to attend a synchronous lecture due to various stressors including work, issues with internet connectivity, and being in a different time-zone. Moreover, issues with internet connectivity could disrupt the lectures and reduce clarity.

Synchronous Discussions: We will meet each Wednesday at 3:00pm starting Wednesday, January 19th. These meetings will be held via zoom and will not be recorded as it is just an opportunity for us to connect, ask questions, and work through activities together and none of what is covered is mandatory. If we move to in person learning, these will end and we will simply have these discussions in class. As long as we remain online, these meetings will continue.

After January:

The current assumption is that we will return to in person learning starting February 1st, 2022. It is possible this will change. If we need to remain online, class structure will remain the same as it is set-up for January. If we do return to in-person learning, we will meet on Wednesdays from 1:00pm-4:00pm in SS561 (Sidney Smith, ground floor). Soem classes will be primarily lectures and some classes will be lectures or the first hour and a half followed by lab activities.

Note about prerequisites: It is your responsibility to ensure that you have met *all* prerequisites listed in the Psychology section of the A&S Calendar for this course. If you lack any prerequisites you WILL BE REMOVED. No waivers will be granted.

Course Resources

Required Readings and Software

Assigned Empirical Articles and Blogposts: See lecture schedule. All articles have been made available on Quercus by the University of Toronto Library.

You will also be required to use software to run data analyses for your labs and final paper. I highly recommend downloading R.

You will need to download both the r package: <https://cran.r-project.org/mirrors.html> And R studio, which is a more user friendly interface for running your analyses: <https://rstudio.com/products/rstudio/download/>. If we are able to return to campus in February, you will be able to access R from the lab.

If you would prefer to use SPSS, you may. Unfortunately, there is a cost for this software, though students may rent it for a cheaper rate: [https://estore.onthehub.com/WebStore/OfferingDetails.aspx?o=0d6f8e6f-fe92-
ea11-812b-000d3af41938&pmv=00000000-0000-0000-0000-000000000000](https://estore.onthehub.com/WebStore/OfferingDetails.aspx?o=0d6f8e6f-fe92-
ea11-812b-000d3af41938&pmv=00000000-0000-0000-0000-000000000000). If we are able to return to campus in February, you will be able to access SPSS from the lab.

I am open to other programs, as well, so long as you are able to fulfill the requirements of all assignments. This means you need to be able to create a syntax file where you explain each component of the data-analysis process. I will primarily be teaching with r and will provide some syntax and support for students using SPSS.

I understand that R has a steep learning curve and can be intimidating to students, especially right now when you are learning with less opportunity for direct interaction with your instructors. However, I 100% believe that you can do this if you put your mind to it. There are many, many online resources available to support your learning, and myself and the TAs will help you during lab sessions. Moreover, being able to put on your grad school application or resume that you have experience using r will help you stand-out. It's a desired skill.

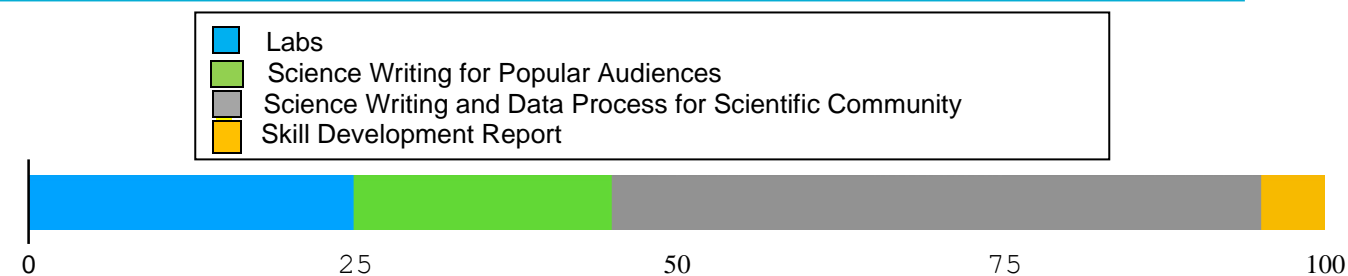
Quercus & Course Materials: All course materials will be made available on the Quercus website, including lecture slides, lecture videos, announcements, and supplementary materials. You are advised to regularly check the announcements section of the Quercus website because you are solely responsible for staying on top of all course announcements made through Quercus. **Note:** I am modelling this course off of the version of this course taught by Dr. Elizabeth Page-Gould. Many of the materials I will be using, including some of the text from this syllabus, were originally created and shared by Prof. Page-Gould. Prof. Page-Gould has made these materials available under a Creative Commons Attribution-NonCommercial-ShareAlike 4.0

International license, available permanently at <http://osf.io/z6mp4> . She has given me explicit permission to use the materials. If you wish to share or re-use the materials, you may, but you must give her credit. If you are going to make any money off the materials, you must contact Dr. Page-Gould for permission.

Ongoing feedback: I've created a survey that students can fill out anonymously after each class to provide me with feedback on lectures. This gives you the opportunity to let me know if I am going through the material too quickly, if there is a particular concept you are really struggling with, if there is something that could be improved about the structure of each class, etc. The link to this survey is available on Quercus. I cannot promise that I will be able to touch on every concern expressed in the feedback surveys. I will be looking for common concerns being expressed by students.

How to get help with the course: The fastest way to get help with the course is to book a student hour with me. If you have a short question that can be answered via email, then please email myself or the TA. Before emailing, please check the course syllabus as most of the important information about the course can be found there.

Course Evaluation



<i>Component</i>	<i>Date</i>	<i>Weight</i>
Labs	See lecture schedule	25%
Science Popular Audience Writing Project	Mar 16	20%
APA Paper Pre-registration	Feb 23	20%
APA Paper Final	Mar30	30%
Skill Development Report	Apr6	5%

Labs (5 total). Classes marked with "(Lab)" in the lecture schedule on the last page of this syllabus will have a corresponding lab exercise. The lab exercises will be the practical application of what you learned from the lecture given in the first half of each class, although they are sometimes cumulative with other things you learned. You are welcome to work on the lab with a partner or in groups, but your final work must clearly be your own. You will submit your completed labs through the "Assignments" section of Quercus by attaching the relevant files to your submission. Please note that some labs will require a bit of work, but some will be pretty easy to complete, so although 5 labs may seem like a lot these vary quite a bit in the amount of work required. In some cases, you will be able to complete the lab exercises during the allotted class time (if we return to in-person learning) or during our online synchronous sessions, but frequently you will need to complete them outside of class. Labs will be due at 11:59 p.m. on the day of class that is two weeks after the date of the lab. Labs will be posted in the "Assignments" section of Quercus no later than the class in which they are introduced. Many lab exercises will involve a corresponding dataset that will be posted in the same section of the Quercus site as the lab.

Science Popular Writing Project. One aspect of your course mark will be writing scientific results for a popular audience, like a science journalist. You will first need to identify a good topic or question to answer. Then, you will need to find a recent study (i.e., published in 2020 or 2021) from an empirical journal that you would like to focus on reporting. After reading the article, you will decide how to shape the story for a non-scientific audience. You will augment the information from the primary article with data that supports or conflicts the primary article's conclusion using a second, independent dataset that you have found from a publicly available dataset or public polling data. Your article should convey the primary results or message visually, in a way that people who do not have a scientific background could understand. Ultimately, science writing is all about clearly communicating an evidence-based message to people who are not familiar with statistics, and that will be a part of the way your assignment is evaluated. You will write up your article to look like a newspaper article or newspaper-style blogpost. The final word count should be about 1000, but not less than 800 nor more than 1200 words. The top submissions will be designed to be attractive and keep the readers' interest, using properly sourced and attributed images. The Science Writing Project will be due at 11:59 p.m. on Wednesday, March 16th through the Quercus Assignments portal.

APA Writing Project. The bulk of your course mark will come from your APA writing project. You must first think up a research question that interests you, obtain primary or secondary data to test this question, and then write an APA-style research report. This requires you to identify a research question, choose the correct analysis to answer it, and complete that analysis with real data. You will also need to run the necessary descriptive statistics for the Methods section. All of these analyses will be done in accordance with open science practices to ensure reproducibility. The dataset that you use can be either: (a) A research dataset you are collecting or have collected (e.g., through a thesis, independent study, or other lab volunteering), or (b) A public dataset that you find through the Internet or other data-sharing sources. You can use one of

the datasets that I give you for labs/examples over the course of the class, but you will have to exchange 8 points for obtaining primary or secondary data that is relevant to your research question (i.e., it will be difficult to earn an A+ in that case). You will submit the project in two stages:

Preregistration Materials. The first submission stage is your Preregistration Materials, and it is due at 11:59 p.m. on Wednesday, February 23rd through the Assignments section of Quercus. For the Preregistration Materials, you will complete the van't Veer and Giner-Sorolla (2016) preregistration template on the Open Science Framework (OSF). Attached to your preregistration materials, you must have: (a) Study materials; (b) Either a simulated dataset or your final dataset plus a data dictionary that documents all variables; (c) An analysis script in either R or SPSS that can be run on the attached dataset. Once you have completed the pre-registration materials on your OSF page, you will submit a "view-only link" through Quercus as your assignment submission.

APA-style Manuscript & Final Materials. The final submission is an APA-style report and the rest of your open science materials. The APA-style Manuscript & Final Materials are due at 11:59 p.m. on Wednesday, March 30 through the Assignments section on Quercus. The APA-style report will include three of the major sections of an APA-style paper (i.e., Methods, Results, and Discussion, including corresponding tables and/or figures to sufficiently illustrate your results) and also three minor sections (i.e., Title Page, Abstract, and References). The abstract is where you will state your research question. You will write it all up like you would for a journal article, strictly adhering to APA Style 6. You will additionally submit the final syntax and data files that reproduce all numbers in your manuscript and all supporting documentation.

Skill Development Report: The final assessment you will need to submit for the course is a skill development report. This will be a 2 page (double-spaced) report where you explain to either a prospective graduate school program or prospective employer the skills that you developed in this specific course and how those skills relate to what you want to do in graduate school or in this prospective career. This will be marked leniently, but again for a grade of A or more, be sure to connect this to material from lectures and provide thoughtful description of skills.

Policy on Lateness: The Covid 19 pandemic has impacted all of our lives in various ways, and I understand that some of you may be facing many additional stressors as a result of this. I understand this and I am happy to support you and work with you so that you can successfully complete this course and have a positive learning experience. For the proposal outline, media assignment, and the final paper, you do not need to contact me so long as your assignment is submitted within 24 hours of the due date. Following this, a 2% late penalty may apply. If you are concerned about meeting a deadline or need assistance making a plan for getting work completed, please contact me as soon as you can so we can work this out together.

Ensuring Transparency in Marking: Your assignments will be marked by the TA and I. Marking these types of assignments can be very challenging and somewhat subjective (my perception of a good argument may differ slightly from the TA's). In order to make this process as fair as possible, I will be creating a detailed rubric for myself and the TA to use when grading these assignments. I will provide you with a copy of these rubrics at least one week before the assignment is due. This should provide you with a clear understanding of how you will be graded before you submit your assignment or test.

Contesting your grade: Please think carefully before contesting your grade for an assignment or lab. Your course instructors and TAs work very hard to mark course assignments as fairly as possible. If you have concerns about how an assignment or lab was graded, you need to submit an official re-grade request form explaining why you think your assignment should be re-graded. This can be found on Quercus under "course materials." You must send this to the person that graded your assignment (either myself or the TA) within 1 week of receiving your grade. We will review your request but reserve the right to remark the entire paper, which means you could lose marks in other sections.

If there has been a calculation error, please just let myself or the TA know and we will re-calculate your grade immediately.

Academic Resources

Accessibility Needs: Students with diverse learning styles and needs are welcome in this course, and we will do everything in our power to ensure that all students have equal opportunities to succeed in the course. If you have a disability/health consideration that may require accommodations, please feel free to approach me and/or Accessibility Services at (416) 978 8060; accessibility.utoronto.ca.

Writing: As a student here at the University of Toronto, you are expected to write well. The university provides its students with a number of resources to help them achieve this. For more information on campus writing centres and writing courses, please visit <http://www.writing.utoronto.ca/>. More info on writing resources available at U of T will be posted on Quercus. I highly recommend that you make use of these. Moreover, I'm more than happy to give you feedback on your writing during my office hours, so feel free to stop by.

Academic Integrity and Plagiarism: Academic misconduct will be taken very seriously in this class. Cheating and plagiarism will not be tolerated and will be reported through the official university channels. Please refer to the University of Toronto's Code of Behaviour on Academic Matters for more information about what constitutes academic misconduct and how academic misconduct will be dealt with: <http://www.governingcouncil.utoronto.ca/Assets/Governing+Council+Digital+Assets/Policies/PDF/ppjun011995.pdf>

Resources for Distressed Students: As a student, you may experience challenges that can interfere with learning, such as strained relationships, increased anxiety,

substance use, feeling down, difficulty concentrating and/or lack of motivation, financial concerns, family worries and so forth. These factors may affect your academic performance and/or reduce your ability to participate fully in daily activities. All of us benefit from support and guidance during times of struggle; there is no shame in needing help or in asking for help. There are many helpful resources available through your college Registrar or through Student Life (studentlife.utoronto.ca and www.studentlife.utoronto.ca/feeling-distressed). An important part of the University experience is learning how and when to ask for help. Please take the time to inform yourself of available resources and do not hesitate to seek assistance from your Teaching Assistant or from me to help learn what supports are available.

Lecture Schedule

I will try my best to stick to this outline, but changes may be made. Changes will be announced on Quercus. All readings can be found in reference list following this page.

Lecture	Date	Topics	Notes
L1	Jan 12	Asking Questions of Science (Lab)	Lab due Jan 26
L2	Jan 19	Simulating Data for Power and Planning (Lab)	Lab due Feb 2
L3	Jan26	Understanding Statistical Analyses (Lab)	Lab due Feb 9
L4	Feb 2	Reproducible Statistical Analyses (Lab)	Lab due Mar 2 (I'm giving an extra week as your pre-registration project is due on Feb 23)
L5	Feb 9	Transparent Data Preparation & Pre-registration	
L6	Feb 16	Popular Science Writing	
	Feb 23	Reading Week	
L7	Mar2	Scientific Publication	
L8	Mar9	Visualization (Lab)	Lab due March 23
L9	Mar 16	Inference	
L10	Mar23	Research Life: Graduate Student Panel. Will be synchronous session prior to lab (2pm-3pm) rather than pre-recorded lectures	
	Mar30	No lectures. Take this extra time to finish your papers.	
L11	Apr6	Open Science	

Assigned Readings

L1:

Syllabus

L2:

Cohen, J. (1992). A power primer. *Psychological Bulletin*, 112, 155-159

L3:

Pages 1-34 of:

West, S. G., Aiken, L. S., & Krull, J. L. (1996). Experimental personality designs: Analyzing categorical by continuous variable interactions. *Journal of Personality*, 64, 1-48.

L4:

Wicherts, J.M., Borsboom, D., Kats, J., & Molenaar, D. (2006). The poor availability of psychological research data for reanalysis. *American Psychology*, 61, 726.

L5:

van't Veer, A. E., & Giner-Sorolla, R. (2016). Pre-registration in social psychology--A discussion and suggested template. *Journal of Experimental Social Psychology*, 67, 2-12.

L6:

CASW: A Guide to Careers in Science Writing (<http://casw.org/casw/guide-careers-science-writing>)

L7:

Leek, J., McShane, B. B., Gelman, A., Colquhoun, D., Nuijten, M. B., & Goodman, S. N. (2017). Comment: Five ways to fix statistics. *Nature*, 551, 557 - 559.

APA: JARS-Quant Guidelines (<https://www.apastyle.org/jars/quantitative>)

LS:

Pages 34-46 of:

West, S. G., Aiken, L. S., & Krull, J. L. (1996). Experimental personality designs: Analyzing categorical by continuous variable interactions. *Journal of Personality*, 64, 1-48.

L9:

Cohen, J. (1994). The earth is round ($p < .05$). *American Psychologist*, 49, 997-1003.

Kerr, N. L. (1998). HARKing: Hypothesizing after the results are known. *Personality*

L10:

APA: Basic of APA Style Tutorial (<http://flash.ltr.apa.org/apastyle/basics/index.htm>)

L11:

Simmons, J.P., Nelson, L. D., & Simonsohn, U. (2011). False-positive psychology: Undisclosed flexibility in data collection and analysis allows presenting anything as significant. *Psychological Science*, 22, 1359-1366.

FiveThirtyEight: Science Isn't Broken: <https://fivethirtyeight.com/features/science-isnt-broken/#part3>