

# PSYC 6340: Advanced Statistics and Design

Fall 2022

- **Section:** PSYC 5340.001
- **Instructor:** Samantha Estrada PhD
- **Meeting Times:** Wednesday 11:00AM to 1:45PM
- **Location:** HPR Bldg Room 00247
- **Email:** [sestrada@uttyler.edu](mailto:sestrada@uttyler.edu)
- **Office hours:** Wednesdays 2-4 via Zoom or by appointment.

## Office Hours

- If my regular office hours do not work for you, you can also make an appointment for other times through my calendly link: <https://calendly.com/sestrada>
  - You don't have to email me, calendly will notify me. I only ask you to make an appointment through this app because it makes the sharing of zoom links easy plus it goes straight to my calendar so I don't forget!
  - You can also cancel if needed through the app.
  - If the available in calendly hours don't work for you then please email me we can work something out.

## Required Texts

- Navarro DJ and Foxcroft DR (2019). Learning Statistics with jamovi: A Tutorial for Psychology Students and other Beginners. (Version 0.70). DOI: 10.24384/hgc3-7p15 You can download it here: <https://www.learnstatswithjamovi.com/>
- Publication Manual of the American Psychological Association (7th Ed.).(2020).Washington, DC: American Psychological Association.

## Required Software

- We will be using a free and open-source software for our data projects called jamovi. You can download the software here: <https://www.jamovi.org/> and you can watch a tutorial installation here: <https://www.youtube.com/watch?v=syx0f4xCxpk>
- We will also use the free and open-source software G\*Power which can be downloaded here: <https://www.psychologie.hhu.de/arbeitsgruppen/allgemeine-psychologie-und-arbeitspsychologie/gpower.html>
- Both jamovi and G\*Power are available on the virtual desktop.

**Why not SPSS?** Mainly because my objective is to provide a quality course where the content is free and accessible to everyone. SPSS is not a free software, a student license is around > \$180. And this price will only go up once you graduate. Students often tell me that

“everyone is using SPSS in their field” this is not true. Please read these two blog posts as to why SPSS is on decline <https://lindeloev.net/spss-is-dying/> and <http://r4stats.com/articles/popularity/>. Know that jamovi is a user-friendly version of R which is now becoming the most popular statistical software.

**Course Catalog Description:** Includes aspects of complex experimental designs, statistical hypothesis testing, decision theory, multiple regression analysis, ANOVA, distribution-free techniques, and factor analysis.

**Required Prerequisites:** PSYC 2354 and PSYC 2331 (or equivalent undergraduate statistics and research methods courses at another institution) and consent of instructor.

**Student Learning Outcomes:** As a result of this course, successful students will be able to:

- Identify and articulate the theoretical underpinnings of inferential statistics and experimental design.
- Articulate basic principles of statistical analyses, including measures of central tendency, variability, sampling distributions and hypothesis testing.
- Accurately choose and conduct statistical data analyses, using jamovi statistical software, emphasizing the basic assumptions, appropriate uses, and the interpretation of each.
- Employ qualitative, quantitative, and single-case research methods.

## Data Projects

- There will be a data assignment (roughly) for each of the topics we cover. The due date for these assignments will be one week after the topic is covered in class.
- You can pair up with another student to complete the assignment (pairs means *two* people).
  - You will sign-up for a partner in Canvas.
  - Teams may meet online or face to face.
  - I will create the the “team” in Canvas so that only one of you has to submit in Canvas.
  - Unless you find your partner is discriminatory, abusive, intimidating, it is **your** responsibility to communicate with your partner on how to best complete the assigned projects.
- Submission should be made in pdf (I find this distorts student’s APA styled graphs the least)
- Label your assignments as:  
LastNamePartner1.LastNamePartner2.AssignmentName.pdf.
- All assignments **MUST** be turned in on time to receive full credit.

- You will get to drop one assignment no questions asked without it affecting your grade.
- **Homework Data Projects are submitted one week after the topic is covered in class.**

I have gotten a lot of pushback from students in the past regarding teams, to this I have three responses:

- Having people pair up in teams allows me to give more detailed feedback rather than a lot of short, quick feedback
- Do not ask me to write a recommendation letter to PhD programs if you cannot work as part of a team.
- Laptops/Computers inevitably fail at some point in the semester. It's always easier when you have a partner.
- A quote from Thomas Deetjen (2020): *We may idealize the independent researcher that secures their own funds, does their own experiments, writes their own articles and reaps the awards. But effective researchers don't really operate in such isolation. They understand that they accomplish more as part of a research team. Or more broadly, they recognize that their work depends on the previous labors of other scientists.*

## R Data Projects

- Additionally, you will complete roughly 4-5 assignments in R. The goal of these assignments is to better prepare you for PSYC 6341 a course in which we will be using mostly R for our analysis in addition to developing your programming skills. • See the schedule for the due dates.

## Discussion Board

- We will have 2-3 discussion boards covering the topics specific topics learned in class (e.g. Correlation, Descriptives) learning in class. The specific discussion topics may range from discussing articles to evaluating the statistical content of research articles.
- Each discussion will be graded and moderated by the TA and myself
- Each discussion will be worth 10 points.
- There is an available rubric for grading the discussion in Canvas.
- 20% deduction for late posts (2 points for everyday a post is late). After five days it's an automatic zero.
- **Discussions post should be submitted by Wednesday at 11:00 AM of each week.**

## Exams

This class will have a midterm exam and a final project.

## Midterm

You will have two midterm activities:

- *Midterm #1.* A data project utilizing applied concepts using jamovi to replicate a published study.
- You will analyze data from an open source journal and replicate a published study analysis.
- Perform a sensitivity (or power analysis)
- Report your statistical analyses findings in APA Style.
- *Midterm #2.* You will receive a “fake” IRB document that focuses on the quantitative portions of submitting an IRB (e.g. research design, sampling, data collection, instruments and statistical analyses). Your assignment will be to discuss what is lacking in these fake IRB documents based on what you have learned in the course and how these can be improved.

## Final Project

In a group of your choosing, you will work to design and test a hypothesis using one of the provided real data sets posted on Canvas. The final product will consist of a detailed poster/infographic and paper. Part of this final project will consist of:

- Complete a poster or infographic.
- Publishable quality report
- You will participate in a peer review of the literature review for this project.
- You will grade other team members on their level of participation and engagement with the project.
- More information in Canvas.

## Non-optional meeting with Dr. Estrada

- In order to be able to “course correct” you should schedule a meeting with me via calendly if you:
  - Score below 70 on a midterm.
  - Miss two or more data projects or score low (< 6 pts) in multiple data projects.

## Grading

Midterm	20%
Final Data Project	20%
Homework Data Projects	40%

Discussion Board

20%

## Grading Scale

90 - 100%	A
80 - 89%	B
70 - 79%	C
60 - 69%	D
0 - 59%	F

## Email Netiquette

- I will respond to emails Monday to Friday from 8-5 pm.
- Make sure your question isn't addressed in this syllabus.
- When you email me, identify what course you are in. State what section, day, and time you are in. I teach more than one statistics class, and more than one section every day.
- Address me as Dr. Estrada. Do not begin your email with "hey." I'm also not Ms. Estrada.

I am usually quick to respond to student e-mails. However, student e-mails tend to do several things that try my patience. I have a new policy, effective Fall 2019, that outlines why I will not respond to certain e-mails students send. Multiple rationales follow.

- The student could answer their own inquiry by reading the syllabus.
- Do not email me inquiring about your final grade or to help you predict your final grade.
- Grades will be available on Canvas and you should know what you need to pass the course.
- The student should use his/hers UTT email at all times. Do not email me from your private account (eg. [coolguy23@gmail.com](mailto:coolguy23@gmail.com)). If you email me from a personal email, I will NOT respond.
- The student missed class for which there was no exam. I do not need to know the exact reason for a missed class. Students with excusable absences are responsible for giving me a note in hard copy that documents the reason for the missed class. An e-mail is unnecessary unless the impromptu absence involved missing a midterm or final.
- The student wants to know what topics they missed during a class they skipped. The answer is always "you missed what was on the syllabus."
- The students wants to know how many classes they missed at some point during the semester. I assume the student has a better answer to that question than me until the end
- The student is requesting an extension on an assignment for which the syllabus already established the deadline. The answer is always "no".

- The student is “grade grubbing” or asking to round up a grade. The answer is always “no”.
- The student is asking for an extra credit opportunity. PSYC 5340 is a master’s level course there is no extra credit.

### When to contact the Teaching Assistant (TA):

- TAs change semester by semester. To find their information more accurately you can look in the homepage of our class Canvas.
- For question regarding discussion board grades.
- Questions regarding tutoring or review sessions.

**Make-up exams and assignments:** To be eligible for a make-up exam or assignment that was missed due to an absence, you will have to bring in some kind of official documentation for that absence (doctor note, work note, etc). This same policy applies to late work. The only late assignments accepted will have appropriate documentation. You are not to submit a late assignment without first providing documentation (remember you can drop ONE assignment without it affecting your grade). In general, I have a 20% deduction for every day an assignment is late and once an assignment is late it will receive minimum feedback. After five days it’s an automatic zero.

## Tentative Schedule & Topics

### Week 01, 08/24: Data Entry & Importing Data, Graphs

**Textbook:** Navarro & Foxcroft (2019) Chapter 3 (pgs.43 – 55): Getting started with jamovi.

**Textbook:** Navarro & Foxcroft (2019) Chapter 5 (pgs.85 – 96): Drawing Graphs.

**Discussion Board:** Introduction & Replication in Psychology.

**Quiz** Syllabus & Introduction to jamovi.

jamovi installation.

G\*Power installation.

**R Projects:** R and R Studio installation.

### Week 02, 08/31: Descriptive Statistics, Recoding and Computing Variables

**Data Project:** Data Entry & Graphs.

**Discussion Board:** Data Quality & Ethics.

**Reading:** Gelman (2018).

**Textbook:** Navarro & Foxcroft (2019) Chapter 4 (pgs.59 – 84): Descriptive Statistics.

**Textbook:** Navarro & Foxcroft (2019) Chapter 6 (pgs.97 – 117): Pragmatic Matters.

**Reading:** Wheelan (2013).

**R Projects Watch:** Getting started with R and R Studio.

## Week 03, 09/07: Hypothesis Testing & Chi-Square Tests

**Data Project:** Data Management & Descriptives.

**Final Data Project:** Exchange contact information with your team.

**Reading:** Nimon (2012).

**Reading:** Chapter 9 (pgs. 181-206): Hypothesis Testing.

**Textbook:** Navarro & Foxcroft (2019) Chapter 10 (pgs. 211 – 239): Categorical Data Analysis.

- The  $\chi^2$  goodness-of-fit test.
- The  $\chi^2$  test of independence.
- Effect Size.
- Assumptions of the test(s).

**R Projects Watch:** Basic R commands and reading Torfs & Brauer (2014).

## Week 04, 09/14: Comparing Two Means

**Data Project:** Chi-square Tests.

**Final Data Project:** As a team begin perusing the available datasets in Canvas.

**Textbook:** Navarro & Foxcroft (2019) Chapter 11 (pgs.241 – 280): Comparing Two Means.

- Independent Samples t-test (Student test).
- Paired-samples t-test.
- Effect size.

**R Projects:** Basic R Commands project due

## Week 05, 09/21: Correlation and Regression

**Data Project:** Comparing Two Means.

**Discussion Board:** Discussion Board: Correlation & Regression.

**Textbook:** Navarro & Foxcroft (2019) Chapter 12: Correlation and Regression.

**R Projects Watch:** Importing data from Excel and Reading in, Accessing, and Summarizing Data in R

## Week 06, 09/28: Hierarchical Regression

**Reading:** Petrocelli (2003).

Replication activity.

## Week 07, 10/05 Logistic Regression:

**Data Project:** Correlation and Regression.

**Reading:** Stoltzfus (2011).

**Draft** of Literature Review, Hypotheses and Research Question(s). DUE at 11:00 AM on 10/04

**R Projects Watch:** Built-in dataset and packages.

## Week 08, 10/12: Midterm Project

- The exam will open Sunday at 11:59 PM 10/02
- The exam will close Wednesday at 11:00 AM 10/11

## Week 09, 10/19: One Way ANOVA & Factorial ANOVA

**Data Project:** Logistic Regression.

**Peer Review:** Check Canvas for Peer Review instructions. DUE at 11:00 AM on 10/18.

**Textbook:** Navarro & Foxcroft (2019) Chapter 13 (pgs.327 – 360): Comparing several means (One-Way ANOVA).

**Textbook:** Navarro & Foxcroft (2019) Chapter 14 (pgs. 361– 417): Factorial ANOVA.

- Factorial ANOVA 1: balanced designs, no interactions.
- Effect Size.
- Assumption checking.

**R Projects:** R built-in datasets script project

## Week 10, 10/26: Exploratory Factor Analysis

**Data Project:** ANOVA.

**Textbook:** Navarro & Foxcroft (2019) Chapter 15 (pgs.419 – 464): Exploratory Factor Analysis.

**Reading:** Huck (2012) Reliability and Validity chapter.

**DRAFT** Methods section. No peer review needed for this draft.

**R Projects:** Descriptives & t-test script project (TENTATIVE)

## Week 11, 11/02: MANOVA

**Data Project:** EFA.

**Textbook:** Analysis of Covariance ANCOVA (pgs. 384 – 388).

## Week 12, 11/09: Non Parametric

**Data Project:** MANOVA.



## Week 13, 11/16: Final Data Project

## Week 14, 11/23: Turkey Break: No class!

## Week 15, 11/30: Final Data Project: Poster Presentation

Poster Presentation.

## Week 16, 12/07:

Paper submission. DUE at 11:59 PM on WEDNESDAY Week 16, 12/07.

Peer Evaluation. DUE at 11:59 PM on WEDNESDAY Week 16, 12/07.

## University Policies

- UT Tyler Policies: <https://www.uttyler.edu/links/>
- UT Tyler COVID-19 Information and Procedures: <https://www.uttyler.edu/coronavirus/>
- UT Tyler Technology Support: <https://www.uttyler.edu/it/support/student-support.php>
- Disability Services: <http://www.uttyler.edu/disabilityservices>.
- UT Tyler Writing Center (903.565.5995), [writingcenter@uttyler.edu](mailto:writingcenter@uttyler.edu)
- UT Tyler Tutoring Center (903.565.5964), [tutoring@uttyler.edu](mailto:tutoring@uttyler.edu)
- UT Tyler Counseling Center (903.566.7254)
- The Robert R. Muntz Library: <http://www.uttyler.edu/library/>

*I RESERVE THE RIGHT TO MODIFY THIS SYLLABUS AT ANY TIME. THEREFORE, YOUR ATTENDANCE AND ATTENTION TO THE ANNOUNCEMENTS IN CANVAS ARE CRUCIAL BECAUSE IT WILL ASSIST YOU REMAIN CURRENT ON THE MATERIAL AND KNOW WHEN THE SYLLABUS MAY BE MODIFIED.*

## Readings

*Note:* All these readings are available in Canvas in PDF form.

Gelman, A. (2018). Ethics in statistical practice and communication: Five recommendations. *Significance Magazine*, 15(5), 40–43.

Huck, S. (2012). *Reading statistics and research*. Boston, MA: Pearson Education.

Navarro, D., & Foxcroft, D. (2019). *Learning statistics with jamovi: A tutorial for psychology students and other beginners (version 0.70)*.

Nimon, K. F. (2012). Statistical assumptions of substantive analyses across the general linear model: A mini-review. *Frontiers in Psychology*, 3, 322.

Petrocelli, J. V. (2003). Hierarchical multiple regression in counseling research: Common problems and possible remedies. *Measurement and Evaluation in Counseling and Development*, 36(1), 9–22.

Stoltzfus, J. C. (2011). Logistic regression: A brief primer. *Academic Emergency Medicine*, 18(10), 1099–1104.

Thomas Deetjen, P. (2020). *Published: A guide to literature review, outlining, experimenting, visualization, writing, editing and peer review for your first scientific academic journal article*.

Wheelan, C. (2013). *Naked statistics: Stripping the dread from the data*. WW Norton & Company.