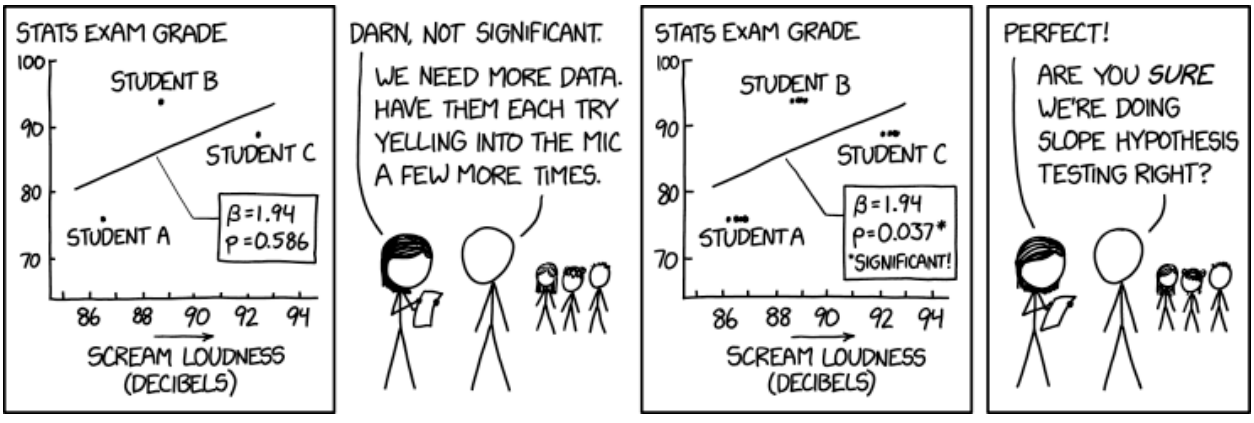
COURSE SYLLABUS
Winter 2025

Instructor: Dr. Jordan Rickles (he/him/his), rickles@seis.ucla.edu
Time: Tuesdays & Thursdays, 12:00PM to 1:50PM
Location: Moore Hall, Room 2120 (or via Zoom)
Office Hours: Tuesdays & Thursdays 2:00 PM - 3:00 PM, or by appointment

Course Description

The phenomena, programs, policies, and people of interest in the research we conduct are often situated in what is referred to as a multilevel, nested, or hierarchical structure. For example, studies in education often encounter students nested within classes and classes nested within schools. Other fields of study may encounter households nested in communities, patients nested in hospitals, or employees nested within work sites. Longitudinal studies, such as describing changes in student achievement over time, can also be viewed as having a multilevel structure (e.g., test scores over time are nested within students). Ignoring these multilevel structures in our analyses can threaten the validity of statistical conclusions and potentially overlook important differences in the relationships and effects we're trying to understand.

This course introduces students to the logic and use of multilevel models for social science research. The first half of the course content will focus on two-level linear models. In the second half, we will extend the concepts and techniques from two-level models to longitudinal growth models and three-level linear models. Time permitting, we will touch on non-linear multilevel modeling and connections to meta-analysis.



https://xkcd.com/2533

Course Objectives for Student Learning
By the end of the course, students will …

- Understand the conceptual and statistical rationale for multilevel modeling
- Understand how multilevel modeling can be used to broaden the kinds of questions one can address in a research study
- Understand how to interpret and critique study findings based on multilevel data
- Have the technical skills to conduct a multilevel analysis
- Understand how to communicate results from a multilevel analysis to academic and non-academic audiences

Prerequisites

- Basic understanding of introductory statistics and linear regression analysis
- Basic familiarity with the R statistical programming language

Course Readings
We will use the following required textbook throughout the course:

Raudenbush, S. W. and Bryk, A. S. (2002). *Hierarchical Linear Models: Applications and Data Analysis Methods* (2nd ed.). Sage Publications.

Other required readings will be assigned on a weekly basis. These readings will be posted to BruinLearn so you can access them for free. See the course schedule for the tentative reading assignment schedule.

Hardware and Software Requirements
Access to a laptop or desktop computer is required. Please contact the instructor if you are not able to access a laptop or desktop computer on a regular basis.

For this class, we will use R for data processing and analysis. Please install the following software on your computer:

- R
- RStudio (recommended but not required)

Instructions for installing R are available here and you can download RStudio here. Both R and RStudio are free. Note: install R before installing RStudio.

The UCLA Statistical Consulting group has an intro to R seminar available online.

Supplemental online resources for R programming:
Wickham, H., Çetinkaya-Rundel, M., & Grolemund, G. (2023). *R for data science*. " O'Reilly Media, Inc." Free online version available: https://r4ds.hadley.nz/

Roback, P. and Legler, J. (2021). *Beyond Multiple Linear Regression: Applied Generalized Linear Models and Multilevel Models in R*. Chapman and Hall/CRC.
Free online version available: https://bookdown.org/roback/bookdown-BeyondMLR/

Class Discussion Forum and Communication with Instructor and Teaching Assistant
We will use Piazza as the class discussion forum. Piazza is a learning forum where you can customize questions/comments to share with instructors or the entire class. Students have the option to insert code, images, videos, tables, links, and text to their Q&A posts. Additionally, posts can be configured to be anonymous.

All questions related to course content should be posted on the Piazza discussion forum. All students can then benefit from the questions and responses. I encourage students to answer questions your classmates post on Piazza discussion forums. Writing out explanations to student questions will improve your own knowledge and will benefit your classmates. I will aim to respond to questions within 24 hours of your post Monday through Friday and within 48 hours if posted on Saturday or Sunday. *Email me directly if you have a question regarding any personal issue*.

We (instructor and students) will be held responsible for using the discussion forum in a way that is consistent with the True Bruin Values and the UCLA Student Conduct Code to "create and maintain a safe, supportive, and inclusive campus community that engages students in order to foster their academic success." Students are encouraged to question and discuss the course content but must do so in a way that is respectful of different backgrounds, viewpoints, and perspectives. Violations of this conduct will be factored into a student's final grade.

Course Assignments and Grading
Your final course grade will be based on the following:

- ***Participation and engagement in class and with the class discussion forum (10%).*** Attending class and being an active participant are fundamental parts of the learning process. Please be on time and attentive during class. One or two absences *will not* impact your grade, but more absences will. If you have extenuating circumstances that require you to miss more than two classes, it is your responsibility to let me know the reason for your absences beforehand so that your participation grade will not be affected. We will use ***check-ins* or *exit tickets in Piazza*** (during or right after lecture) to register attendance and get feedback on your progress and experience in the course.

- ***Four homework assignments (40%).*** We will use individual homework assignments throughout the course to check your understanding of the course content. When working on homework assignments, students can consult with each other and utilize non-human resources. However, *all homework responses must reflect your individual thinking and be written by you*.

- ***Two small group assignments (20%).*** You will work in a group of 3-4 students for two assignments that focus on the application and communication of the course's technical content. As group assignments, they are designed to facilitate discussion and collaboration between students. However, *each student will submit their own assignment*, with one part reflecting the collective thinking and work of the group, and another part reflecting your own individual reflections on the assignment.

- ***A final small group project (30%).*** In Week 8, students will get a final data analysis assignment to complete within a group of 2-3 students. The final project includes two parts. For Part 1, each group will prepare a short in-class presentation for Week 10 that outlines their analysis plan, some preliminary analysis results, and any questions or challenges they've encountered so far. For Part 2, each group will incorporate feedback from the in-class presentation to complete the analysis and then each student will submit a short write-up of the analysis results during finals week. More details will be provided by Week 8.

All assignments should be submitted via BruinLearn before noon on the due date listed for each assignment. Late submissions will be accepted for up to one week after the due date. However, *late submissions will be marked down by 10% if submitted 1-3 days late and by 20% if submitted 4-7 days late* (e.g., a student will get no more than 8 points on a 10-point assignment if submitted 4 days past the due date). I may grant exceptions if you have extenuating circumstances that preclude you from meeting an assignment deadline. It is your responsibility to let me know the reason you cannot meet a deadline before the assignment is due.

The above assignments contribute a total of 100 possible points to your final course grade:

Grade	Plus	Standard	Minus
A	98-100	93-97	90-92
B	87-89	83-86	80-82
C	77-79	73-76	70-72
D	67-69	63-66	60-62
F	59 or lower		

How to Succeed in this Course

The recipe for success in this course is not unique: (a) be an active learner in class, (b) ask questions, (c) participate in discussion, (d) do the required readings, (e) ask more questions, (f) complete the assignments and turn them in on time, (g) keep asking questions, and (h) support your fellow students. Do not hesitate to ask for help, raise questions about the course readings, or provide feedback on ways I can better support your learning. The more proactive you are engaging with the course content and asking for support, the more successful you will be.

Helping You Succeed in this Course

I am here to help you be successful in this course. I will work to promote a supportive and welcoming environment to engage all students in the course content and activities. The lectures are designed to highlight and demonstrate key ideas, with the readings providing more technical and detailed information, so that there is time during class for students to ask questions and engage in discussion of the content. Each week, I will communicate expectations and guidance regarding the course readings and assignments to help you prioritize your time and be prepared to participate in class discussions/activities. In addition, I will be open and available for questions and feedback during class, during office hours (or another scheduled time), and via the class discussion forum. I am happy to engage with you around questions or difficulties that you might be having.

A welcoming environment for parents and caregivers. I take very seriously the often-unrecognized labor of caretaking, especially those of you who are taking care of children/siblings, sick or elderly family members, and other extended networks of care. I will make every reasonable accommodation to help you to manage the school-caretaking balance, and welcome your comments and suggestions on how to achieve this. All exclusively breastfeeding babies are welcome in class as often as is necessary to support the breastfeeding relationship. For older children, there are a variety of situations or gaps in care that may leave you with no other choice than either miss class or bring the child to class. Please don't miss class! It is perfectly acceptable to bring children to class in these situations. And feel free to take a break whenever you need one.

COURSE SCHEDULE

This is a tentative schedule and subject to change.

Readings marked [!] will be a focus of in-class discussion and should be read prior to the assigned class. Come prepared to ask questions about the reading and answer questions about the reading.

Readings marked [s] are supplemental. They are not required but are provided as additional support for learning and understanding the course material.

Week 1: Course Overview and Regression Review
1/7, 1/9
Readings

- Raudenbush & Bryk, Chapter 1

Assignments

- Course introduction survey handed out 1/7, due before class on 1/9
- Homework #1 handed out 1/9, due before class on 1/14

Week 2: Introduction to Multilevel Models and Random Effects
1/14, 1/16
Readings

- Raudenbush & Bryk, Chapter 2 (pp. 16 – 25) & Chapter 4 (pp. 68 – 75)

- Osborne, J. W. (2000). Advantages of Hierarchical Linear Modeling. *Practical Assessment, Research, and Evaluation*, *7*(1), Article 1. https://doi.org/10.7275/pmgn-zx89

- [s] McCoach, D. B., & Adelson, J. L. (2010). Dealing With Dependence (Part I): Understanding the Effects of Clustered Data. *Gifted Child Quarterly*, *54*(2), 152–155. https://doi.org/10.1177/0016986210363076

- [s] McCoach, D. B. (2010). Dealing With Dependence (Part II): A Gentle Introduction to Hierarchical Linear Modeling. *Gifted Child Quarterly*, *54*(3), 252–256. https://doi.org/10.1177/0016986210373475

Assignments

- Group assignment #1 handed out 1/14, to be presented in class on 1/28

Week 3: Two-Level Models with Random Intercept and Slopes
1/21, 1/23
Readings

- Raudenbush & Bryk, Chapter 2 (pp. 25 – 35) & Chapter 4 (pp. 75 – 95)

- [s] Peugh, J. L. (2010). A practical guide to multilevel modeling. *Journal of School Psychology*, *48*(1), 85–112. https://doi.org/10.1016/j.jsp.2009.09.002 (pp. 85 – 100)

Week 4: Use of Multilevel Models to Study Organizational and Contextual Effects
1/28, 1/30
Readings

- Raudenbush & Bryk, Chapter 5 (pp. 99 – 130; pp. 134 – 142; pp. 152 - 158)

- [!] Lee, V. E. (2000). Using Hierarchical Linear Modeling to Study Social Contexts: The Case of School Effects. *Educational Psychologist*, *35*(2), 125–141. https://doi.org/10.1207/S15326985EP3502_6

Assignments

- Homework #2 handed out 1/28, due before class on 2/4

Week 5: Use of Multilevel Models for Multisite and Cluster Randomized Designs
2/4, 2/6
Readings

- Seltzer, M. (2004). The use of hierarchical models in analyzing data from experiments and quasi-experiments conducted in field settings. *The handbook of quantitative methods for the social sciences*, 259-280.

- [!] Thai, K.-P., Bang, H. J., & Li, L. (2022). Accelerating Early Math Learning with Research-Based Personalized Learning Games: A Cluster Randomized Controlled Trial. *Journal of Research on Educational Effectiveness*, 15(1), 28–51. https://doi.org/10.1080/19345747.2021.1969710

- [s] Dong, N., & Maynard, R. (2013). PowerUp!: A Tool for Calculating Minimum Detectable Effect Sizes and Minimum Required Sample Sizes for Experimental and Quasi-Experimental Design Studies. *Journal of Research on Educational Effectiveness*, 6(1), 24–67. https://doi.org/10.1080/19345747.2012.673143

- [s] Bloom, H. S., Raudenbush, S. W., Weiss, M. J., & Porter, K. (2017). Using Multisite Experiments to Study Cross-Site Variation in Treatment Effects: A Hybrid Approach With Fixed Intercepts and a Random Treatment Coefficient. *Journal of Research on Educational Effectiveness*, *10*(4), 817–842. https://doi.org/10.1080/19345747.2016.1264518

Assignments

- Homework #3 handed out 2/6, due before class on 2/11

Week 6: Use of Multilevel Models for Longitudinal Analysis
2/11, 2/13
Readings

- Raudenbush & Bryk, Chapter 6 (pp. 160 – 185)

- Gee, K. A. (2014). Multilevel Growth Modeling: An Introductory Approach to Analyzing Longitudinal Data for Evaluators. *American Journal of Evaluation*, *35*(4), 543–561. https://doi.org/10.1177/1098214014523823

- [s] Peugh, J. L. (2010). A practical guide to multilevel modeling. *Journal of School Psychology*, *48*(1), 85–112. https://doi.org/10.1016/j.jsp.2009.09.002 (pp. 100 – 109)

Assignments

- Homework #4 handed out 2/13, due before class on 2/18

Week 7: Extensions to Three-Level Models and Binary Outcomes
2/18, 2/20
Readings

- Raudenbush & Bryk, Chapter 8 & Chapter 10 (pp. 291 – 309)

- [!] Sirinides, P., Gray, A., & May, H. (2018). The Impacts of Reading Recovery at Scale: Results From the 4-Year i3 External Evaluation. *Educational Evaluation and Policy Analysis*, 40(3), 316–335. https://doi.org/10.3102/0162373718764828

Assignments

- Group assignment #2 handed out 2/18, to be presented in class 2/25 and 2/27

Week 8: Use of Multilevel Models for QuantCrit Research
2/25, 2/27
Readings
Groups will be assigned one of the six following readings to review and present to the class this week. Students are encouraged to read all six readings but will only be responsible for the reading assigned to their group.

- Campbell, S. L. (2023). Ratings in black and white: A quantcrit examination of race and gender in teacher evaluation reform. *Race Ethnicity and Education*, 26(7), 815–833. https://doi.org/10.1080/13613324.2020.1842345

- Cruz, R. A., Kulkarni, S. S., & Firestone, A. R. (2021). A QuantCrit Analysis of Context, Discipline, Special Education, and Disproportionality. *AERA Open*, 7, 23328584211041354. https://doi.org/10.1177/23328584211041354

- Legette, K. B., & Anyon, Y. (2023). Just go to the office! An intersectional exploration of the role of race and gender in discipline referral reasons. *Race Ethnicity and Education*, Online First, 1–21. https://doi.org/10.1080/13613324.2023.2192946

- López, N., Erwin, C., Binder, M., & Chavez, M. J. (2018). Making the invisible visible: Advancing quantitative methods in higher education using critical race theory and intersectionality. *Race Ethnicity and Education*, 21(2), 180–207. https://doi.org/10.1080/13613324.2017.1375185

- Scott, N. A., & Siltanen, J. (2017). Intersectionality and quantitative methods: Assessing regression from a feminist perspective. *International Journal of Social Research Methodology*, 20(4), 373–385. https://doi.org/10.1080/13645579.2016.1201328

- Van Dusen, B., Nissen, J., Talbot, R. M., Huvard, H., & Shultz, M. (2022). A QuantCrit Investigation of Society's Educational Debts Due to Racism and Sexism in Chemistry Student Learning. *Journal of Chemical Education*, 99(1), 25–34. https://doi.org/10.1021/acs.jchemed.1c00352

Assignments
- Final Project assignment handed out 2/25, Part 1 to be presented in class 3/11 and 3/13, Part 2 due by noon on 3/20

Week 9: Extensions to Meta-Analysis
3/4, 3/6
Readings
- Raudenbush & Bryk, Chapter 7

Week 10: Final Project Presentations and Course Reflections
3/11, 3/13

UNIVERSITY POLICIES AND STUDENT RESOURCES

Services for Students with Disabilities

In accordance with Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990, UCLA provides appropriate accommodations and support services to qualified applicants and students with disabilities. If you wish to request an accommodation due to a disability, please contact the Center for Accessible Education as soon as possible at A255 Murphy Hall, (310) 825-1501, (310) 206-6083 (telephone device for the deaf). Website: http://www.cae.ucla.edu/

Title IX

Title IX prohibits gender discrimination, including sexual harassment, domestic and dating violence, sexual assault, and stalking. If you have experienced sexual harassment or sexual violence, you can receive confidential support and advocacy at the CARE Advocacy Office for Sexual and Gender-Based Violence, 1st Floor Wooden Center West, CAREadvocate@caps.ucla.edu, (310) 206-2465. In addition, Counseling and Psychological Services (CAPS) provides confidential counseling to all students and can be reached 24/7 at (310) 825-0768. You can also report sexual violence or sexual harassment directly to the University's Title IX Coordinator, 2241 Murphy Hall, titleix@conet.ucla.edu, (310) 206-3417. Reports to law enforcement can be made to UCPD at (310) 825-1491. Faculty and TAs are required under the UC Policy on Sexual Violence and Sexual Harassment to inform the Title IX Coordinator should they become aware that you or any other student has experienced sexual violence or sexual harassment.

Academic Honesty

UCLA is a community of scholars. In this community, all members including faculty, staff and students alike are responsible for maintaining standards of academic honesty. As a student and member of the University community, you are here to get an education and are, therefore, expected to demonstrate integrity in your academic endeavors. You are evaluated on your own merits. Cheating, plagiarism, collaborative work, multiple submissions without the permission of the professor, or other kinds of academic dishonesty are considered unacceptable behavior and will result in formal disciplinary proceedings usually resulting in suspension or dismissal.

Additional Student Resources
Below is a list of some campus resources available to students.

1. UCLA Campus Assault Resources and Education (CARE) Program:
    - Provides a safe place for survivors of sexual violence to get confidential support.
    - Link: https://careprogram.ucla.edu/

2. UCLA Resilience in Your Student Experience (RISE) Program:
    - Uplifts and supports every Bruin's well-being by providing the education, resources, and tools needed to foster health, healing, and hope.
    - Link: https://risecenter.ucla.edu/

3. UCLA Bruin Shelter:
    - A UCLA undergraduate volunteer organization that operates a shelter for students experiencing houselessness in the greater Los Angeles area.
    - Link: https://bruinshelter.org/

4. UCLA Student in Crisis Campus Case Managers:
    - Case Managers assist students with academic support, referrals to campus and community resources, emergency housing or exploring house options, and provide consultation for the university community regarding students in distress.
    - Link: https://studentincrisis.ucla.edu/who-can-help
    - When to Refer a Student: https://studentincrisis.ucla.edu/when-to-refer-a-student

5. UCLA SE&IS Food Pantry:
    - Food pantry located in Moore Hall #3319 which is available to support our community (staff, students, and faculty). Open Monday through Friday 7am-8pm.

6. Counseling and Psychological services:
    - Offers confidential mental health support to help students thrive academically and personally.
    - Link: https://counseling.ucla.edu/

7. Be Well Bruin:
    - Provides students with access to health and well-being resources.
    - Link: https://bewellbruin.ucla.edu/

8. Economic Crisis Response Team (ECRT):
    - Assists students facing financial hardships with resources and support.
    - Link: https://studentincrisis.ucla.edu/economic-crisis-response

9. Bruin Resources Center:
    - Connects students with resources and programs to support their diverse needs and enhance their UCLA experience.
    - Link: https://brc.ucla.edu/programs

10. Healthy Campus Initiative:
    - Comprehensive suite of resources supporting the emotional, social, and physcial health of UCLA Bruins.
    - Link: https://healthy.ucla.edu/resources/

11. Other Resources:
    - List of Resources (Academic, Mental Health, Health, and more): https://studentincrisis.ucla.edu/resources
    - Title IX Office: https://sexualharassment.ucla.edu/
    - Public Incident Report with the Dean of Students: https://ucla-advocate.symplicity.com/public_report/index.php/pid159057?
    - University of California Police Department (UCPD): https://police.ucla.edu/