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The University of Texas at Austin

EDP 380C 16: Hierarchical Linear Modeling

Unique: 13230

Fall 2026

Lecture	Tuesday and Thursday 2:00 PM - 3:30 PM
Location	SZB 4.302
Credits	3 credits

Instructor	Man Chen
Pronouns	She/her/hers
Office	SZB 5.308L
Email	man.chen@austin.utexas.edu
Office hours	Thursday, 3:30 PM – 5:00 PM or by appointment

Course Description

EDP 380C.16 Hierarchical Linear Modeling (HLM) introduces the fundamental concepts and applications of hierarchical linear, or multilevel, models. Topics include random intercept models, random slope and intercept models, models for longitudinal data, and multilevel generalized linear models. HLM is a methodology that can be used for analyzing various nested data structures, such as students within schools, or repeated measurement occasions within individuals. The primary objective of this course is for students to understand when and how to use hierarchical linear models, with an emphasis placed both on the statistical concepts underlying the modeling framework and the application of these methods to datasets using statistical software.

Pre-requisites

- EDP 480C.4 Correlation and Regression Methods
- Experience with at least one statistical software for data management and analysis (e.g., R, SAS, Stata, Python). For example, you should be able to load a dataset, calculate summary statistics for a set of variables in a dataset, create new variables and add them to a dataset, and fit linear regression models in your preferred language.

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Learning Outcomes

By the end of this course, students will be able to:

1. Identify the properties of nested data and explain why multilevel modeling is appropriate for such data.
2. Summarize and visualize data within and across levels of a multilevel structure.
3. Select, specify, and fit multilevel models appropriate for various forms of clustered data.
4. Interpret multilevel model results and communicate the findings clearly.

Course Materials

Required Textbook

- Snijders, T.A.B., & Bosker, R.J. (2012). *Multilevel analysis: An introduction to basic and advanced multilevel modeling*. (2nd ed.). Sage.

References

- Raudenbush, S.W., & Bryk, A.S. (2002). *Hierarchical linear models: Applications and data analysis methods* (2nd ed.). Newbury Park, CA: Sage.
- Hox, J., Moerbeek, M., & van de Schoot, R (2017). *Multilevel analysis: Techniques and applications* (3rd ed.). Routledge. The electronic version of the second edition is available through the UT library.
- Luke, D.A. (2020). *Multilevel modeling* (2nd ed.). Thousand Oaks, CA: Sage. The electronic version is available online through the UT library.

Sharing of Course Materials Is Prohibited

No materials used in this class, including, but not limited to, lecture hand-outs, videos, assessments (quizzes, exams, papers, projects, homework assignments), in-class materials, review sheets and additional problem sets, may be shared online or with anyone outside of the class without my explicit, written permission. Unauthorized sharing of materials may facilitate cheating. The University is aware of the sites used for sharing materials, and any materials found online that are associated with you, or any suspected unauthorized sharing of materials, will be reported to Student Conduct and Academic Integrity in the Office of the Dean of Students. These reports can result in initiation of the student conduct process and include charge(s) for academic misconduct, potentially resulting in sanctions, including a grade impact.

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Course Requirements, Grading, and Policies

Statistical Computing

We will use the R environment (R and R studio) for demonstrations in this class. In principle, you are welcome to use any other programs instead, but I won't be able to provide examples and technical support for any software not demonstrated in class.

R: https://www.r-project.org

RStudio: https://posit.co/download/rstudio-desktop/

Getting Help with Technology

Students who need assistance with technology for this course should contact Enterprise Technology.

Classroom Expectations

- **Class attendance**. Except for approved accommodation or unavoidable circumstances, in-person attendance is required. If you must miss a class, please notify me in advance whenever possible. You will be responsible for any course materials and announcements that you missed.
- **Class participation and feedback.** Student participation is an integral part of this course, and your feedback is important to me. Although class participation is not included in the course grade, I strongly encourage you to engage actively in class activities and discussions. Some class meetings will include hands-on lab sessions in which you will practice coding and applying multilevel modeling techniques. **Please bering a labtop to each class meeting unless instructed otherwise.** You will be invited to complete one survey at the beginning of the semester and another in the middle of the semester. These surveys provide opportunities for you to share your learning experience, which will help me adjust the course content and instruction to better support your learning.
- **Respectful learning environment.** Please be respectful to each other and maintain a healthy learning environment in all course activities. Any concern in this regard should be brought to the attention of the instructor.

Classroom Recording Statement

HOP 2-9970 prohibits students from recording class instruction (audio or video) unless a student obtains the instructor's permission or Disability & Access has approved audio recording as an accommodation.

Evaluation & Grading

The course includes six assignments and an individual class project. The class project consists of a proposal, an oral presentation, and a final paper. For the project, you will analyze a dataset that has a multilevel structure. You may use your own dataset, or select from publicly available datasets. I will suggest several sources to help you identify a suitable dataset.

- **Assignments (54% = 6 * 9% each).** Each assignment accounts for 9% of the final grade. Each assignment will consist of several questions related to the statistical methods and models recently covered in class. Students are expected to summarize and visualize the data, fit and compare different models, and interpret the results in a similar way demonstrated in class. Assignments will be posted on Canva, and deadlines will be specified in class. Assignments will be submitted and graded through Canvas. Students may discuss the homework assignments with others but the responses should be your own work.
- **Class project (46% = 8% for proposal + 8% for presentation + 30% for final paper)**
    - **Project proposal (8%).** The proposal should introduce your research questions, describe the dataset and its multilevel structure, identify relevant variables, and outline your proposed analytical approach.
    - **Project presentation (8%).** Each student will give a brief presentation of their class project during one of the final two class meetings. The presentation should summarize the research questions, dataset, multilevel models and methods, key findings, and conclusions.
    - **Final paper (30%).** The final paper should present the project as a concise research paper. The paper should begin with a discussion of the general questions of interest and a description of the data with tables and graphs. For the multilevel analysis, each paper will likely consider issues related to (1) identifying appropriate level-1 and/or level-2 predictor variables to enter into the model, (2) deciding between fixed versus random effects, (3) comparing competing models, and (4) interpreting data analysis results and discussing the findings and implications.

Late Work

Unless arrangements are made with the instructor in advance, a late work (assignment or proposal) will be accepted within two days after the due date but with a 20% of points deduction. There are no makeup assignments for missed work.

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Extra Credit

There will be extra credit questions in some assignments.

Grade Breaks

A tentative rubric for assigning final grades is provided below. The instructor reserves the right to modify the rubric.

Grade	A	A−	B+	B	B−	C+	C	C−	D+	D	D−	F
Cutoff	93%	90%	87%	84%	80%	77%	74%	70%	67%	64%	60%	<60%

AI Policy Statement

In accordance with the University's Institutional Rules on Student Services and Activities, Chapter 11, students accept the responsibility to always uphold academic integrity and an honor code reflective of a scholarly community devoted to academic and personal success. All members of the University community are fully accountable and responsible for any output they produce as part of academic work. They are also responsible for following the guidance specified in the Texas Statement on Academic Integrity and avoiding prohibited uses of generative AI tools outlined in the Information Security Office's guidance on Acceptable Use of Generative AI Tools.

In this course, generative AI use is partially permitted.

- **Generative AI use shall be permitted on a partial basis**, provided that students 1) use AI responsibly, 2) practice critical discernment and conduct meaningful human review of any output generated by AI, and 3) properly disclose use according to the disclosure policies in this syllabus. Unless instructed otherwise, you may use generative AI to 1) obtain explanations of statistical concepts, 2) debug R code that you have written, or 3) receive grammar-level feedback on writing that you have drafted yourself. You may not upload or paste assignment questions, course materials, or restricted datasets into any generative AI tool. You may not use generative AI to conduct statistical analyses, interpret results, produce all or part of a response to a homework question, or generate or substantially rewrite content for your final paper.
- **Disclosure**. If you use Generative AI tools, you must disclose that use at the end of your submission. Descriptions of your use of AI tools should include: 1) the name and version of each tool; 2) the purpose(s) of using the AI tool; 3) a full description of how you used the tool; and 4) whether and how you reviewed and verified the output generated by the AI tools. Using AI tools without authorization or failing to disclose AI use, even when AI use is permitted, may constitute academic misconduct under UT Austin's Institutional Rules and may be referred to Student Conduct and Academic Integrity in the Office of the Dean of Students for resolution.

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Academic Integrity Expectations

Students who violate University rules on academic misconduct are subject to the student conduct process. A student found responsible for academic misconduct may be assigned both a status sanction and a grade impact for the course. The grade impact could range from a zero on the assignment in question up to a failing grade in the course. A status sanction can include a written warning, probation, deferred suspension or dismissal from the University. To learn more about academic integrity standards, tips for avoiding a potential academic misconduct violation, and the overall conduct process, please visit the Student Conduct and Academic Integrity website at: http://deanofstudents.utexas.edu/conduct.

Religious Holy Days

By UT Austin policy, you must notify me of your pending absence for a religious holy day as far in advance as possible of the date of observance. If you must miss a class, an examination, a work assignment, or a project to observe a religious holy day, you will be given an opportunity to complete the missed work within a reasonable time after the absence.

Carrying of Handguns in My Personal Office

Per my right, I prohibit carrying of handguns in my personal office. Note that this information will also be conveyed to all students verbally during the first week of class. This written notice is intended to reinforce the verbal notification and is not a “legally effective” means of notification in its own right.

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Course Outline & Tentative Schedule

All instructions, assignments, readings, rubrics and essential information will be on the Canvas website. Check Canvas regularly. **Changes** to the schedule may be made at my discretion if circumstances require. I will announce any such changes in class and will also communicate them via a Canvas announcement. It is your responsibility to note these changes when announced, and I will do my best to ensure that you are notified of changes with as much advance notice as possible.

Week	Dates	Topics	Readings	Assignments
Week 1	8/25, 8/27	Syllabus, Regression review	Syllabus	
Week 2	9/1, 9/3	Regression review cont.; Introduction to HLM	S & B Chs 1-2	
Week 3	9/8, 9/10	Statistical treatment of clustered data	S & B Ch 3, Hox Ch 1, Kreft & de Leeuw Ch 2	Assignment 1 due on 9/13
Week 4	9/15, 9/17	Random intercept models	S & B Ch 4, Hox Ch 2	
Week 5	9/22, 9/24	Random intercept models cont.	S & B Ch 4, Hox Ch 2	Assignment 2 due on 9/27
Week 6	9/29, 10/1	Random slope models	S & B Ch 5, Hox Ch 2	
Week 7	10/6, 10/8	Random slope models cont.	S & B Ch 5, Hox Ch 2	Assignment 3 due on 10/11
Week 8	10/13, 10/15	Longitudinal data analysis	S & B Ch 15, Hox Ch 5	Proposal due on 10/16
Week 9	10/20, 10/22	Longitudinal data analysis cont.	S & B Ch 15, Hox Ch 5	Assignment 4 due on 10/25
Week 10	10/27, 10/29	Three-level models	S & B Chs 4, 5, Hox Ch2	
Week 11	11/3, 11/5	Testing and model specification	S & B Ch 6, Hox Ch 3	Assignment 5 due on 11/8
Week 12	11/10, 11/12	Assumptions, Effect sizes, and Power	S & B Ch 7, 10-11, Hox Ch 12	
Week 13	11/17, 11/19	Multilevel generalized linear models	S & B Ch 17, Hox Chs 6,7	Assignment 6 due on 11/22
Week 14	11/24, 11/26	Fall break/Thanksgiving; no classes		
Week 15	12/1, 12/3	Presentations	Handouts	Final paper due on 12/12

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How Will You Learn?

Teaching Modality Information

This is a fully in-person course and class meetings will be held in-person throughout the semester. As such, in-person attendance is required, other than normal emergency accommocations. There will be no course recording.

Communication

The course Canvas site can be found at https://utexas.instructure.com/courses/1458574. All the readings, lecture notes, assignments, quizzes, and announcements are posted on Canvas. You are responsible for ensuring that the primary email address you have recorded with the university is the one you will check for course communications because that is the email address that Canvas uses.

Asking for Help

Learn as much as possible. You're welcome to ask questions during class. If there is not enough time, please come to my office hours. If you can't make it to the office hours, please make arrangements with me in advance.

Accessible/Compliant Statement

If you are a student with a disability, or think you may have a disability, and need accommodations, please contact Disability and Access (D&A). Contact and more details are available on D&A's website: http://disability.utexas.edu. If you are already registered with D&A, please share your accommodation letter with me as early as possible in the semester so we can discuss how your approved accommodations will be implemented in this course.

University Policies and Resources for Students

Please refer to the University Policies and Resources for Students Canvas page for a list of resources that are important for you as you engage with and navigate your course and the university.