RMTD 484 - Online
Hierarchical Linear Modeling

Instructor: Meng-Jia Wu, Associate professor
Synchronous online class time: Mondays, 1:30-4:00pm
Class Zoom link: https://luc.zoom.us/j/84363282075
On-campus office: Lewis Towers, Room 1040
Office hours: By appointment
Email: mwu2@luc.edu

Course Description

This course is designed for graduate students with considerable experience with linear modeling (e.g., regression, ANOVA, and dummy variables) and abilities to conduct statistical analyses using computer software. The major topics of this course include two-level models for continuous/categorical/count outcomes, three-level models, growth models, and centering. The assumptions and critical issues related to using hierarchical linear models will be discussed. This course focuses on estimating the coefficients and interpreting the results based on the multilevel models, along with understanding fundamental theories behind the modeling techniques. Students will have chances to examine contemporary social research using this technique critically.

School of Education conceptual framework (www.luc.edu/education/mission/)

Our School's conceptual framework is "social action through education." This course contributes to this framework by equipping students with knowledge and experience in statistics used in quantitative research. By conducting, interpreting, and reporting reliable social science studies, researchers can help further the scholarly understanding of the events and practices that influence the field of education. The ultimate outcome of this understanding is to ensure that that all individuals, no matter their ability, race, religion, socioeconomic status, age, or gender benefit from effective research.

Course objectives

Students are expected to understand

- the research designs where HLM most useful;
- the basic structure of HLM models, both nested and longitudinal;
- the similarities and differences between HLM models and other statistical models for nested and longitudinal data;
- the estimates of the coefficients from two-/three- level models;
- the role of error terms in the HLM model; and
- the data assumptions and requirements of HLM models

Students are expected to be able to

- use SPSS to create level 1 and level 2 data files for nested and longitudinal data (if using HLM 6 or earlier version) and import SPSS files into the HLM program;
- analyze nested and longitudinal models in the HLM program;

- examine the output from the HLM program;
- interpret and write the results of the data analysis;
- exporting residual files from the HLM program into SPSS; and
- critique a peer-reviewed journal article that uses HLM.

Required texts

- Raudenbush, S. W. & Bryk, A. S. (2002). *Hierarchical linear models*. Thousand Oaks, CA: Sage Publications.

Free access through our library. Search the title in the library webpage if the link below does not work.
https://luc.primo.exlibrisgroup.com/discovery/fulldisplay?docid=alma9910027903402506&context=L&vid=01LUC_INST:01LUC&search_scope=MyInstitution&tab=LibraryCatalog&lang=en

- HLM 8 manual: The PDF of the HLM 8 manual is available via the HLM 8 Manual option on the Help menu inside of the software.

Strongly recommended

Some concepts and examples from the following book are adopted in this class.

- Hox, J. J. (2010). *Multilevel analysis: Techniques and applications* (2nd ed.). New York, NY: Routledge.

Free access through our library. Search the title in the library webpage if the link below does not work. https://ebookcentral-proquest-com.flagship.luc.edu/lib/luc/detail.action?pq-origsite=primo&docID=574571

Recommended

The following books are good resources:

Kreft, I. G. G. & de Leeuw, J. (1998). *Introducing multilevel modeling*. Thousand Oaks, CA: Sage Publications.

Snijders, T. A. B. & Bosker, R. J. (1999). *Multilevel analysis*. Thousand Oaks, CA: Sage Publications.

Singer, J. D. & Willett, J. B. (2003). A*pplied longitudinal data analysis: Modeling change and event occurrence*. New York: Oxford University Press.

Technology

Students will use the computer packages SPSS and HLM 8 during class and complete assignments at home. Registered students are eligible to obtain a free copy of IBM SPSS Statistics to install on one personal device upon signing the IBM SPSS End-User Agreement. Please see https://www.luc.edu/its/itrs/academicresearchtechnologies/ibmspssstatistics/ Follow the instruction in the "*Instructions for locating the ITS Service Desk's SPSS Statistics Home Use Self Service Request (SSR)*" to make a request in the Service Portal. You also have the option of using IBM SPSS Statistics 27 via Apporto (web-based) if you do not

wish to install it on a personal computer or if your home device does not meet the software or hardware requirements to run SPSS Statistics. Note that SPSS Statistics will not run on a Chrome OS.

With my HLM license, students in this class can download HLM8 software to use during the semester for free. See the instruction in the "Syllabus" tab in our Sakai class site on accessing the software.

Course expectations

Students are expected to use the Sakai website for accessing course materials and submitting assignments. Besides, students should check their LUC email account for important updates about the course. Furthermore, students are expected to use the statistical computing packages SPSS and HLM 8 to complete analyses both in and outside of class. Weekly readings should be finished either before or right after the class. Attending classes and submitting assignments on time are also expected.

Evaluation

The final grade is based on points accumulated on homework assignments, final presentation, participation, and the final exam. The distribution of the proportion for each item is:

Assignments	60%
Final presentation	10%
Participation	10%
Final exam	20%

Assignments: There are totally six assignments. They are different in length. You can work individually or with another student in this class and submit group work. You are encouraged to run the analyses and discuss the results orally with other students/groups. However, each student/group should write up the answers independently. [!!] *Do not circulate your final work through emails outside of your group to avoid intentional or unintentional plagiarism.* Late assignments will automatically be worth half of their original point value unless a prior arrangement has been made with the instructor. [!!] *Please note that there will be no makeup work for the points you lost in the assignments.*

Final presentation: This activity is designed to demonstrate your understanding of the application of HLM through the study conducted in your field. You will search and present a paper of your choice as if you were one of the authors. We may use VoiceThread to record the presentation and share with the class. A specific guideline will be posted.

Participation: Class participation includes but is not limited to login in class on time, stay in class, submit assignments by due dates, participate in-class activities and discussions, ask and answer questions, listen to and respect other people's views, thoughts, and opinions. If you must be absent from class because of illness or

emergency, notify the instructor as early as possible. Miss more than one class throughout the semester may impact your final grade.

Final exam: An online exam will be given at the end of the semester. [!!] *Students are expected to work on the exam independently*. More details will be discussed in the class.

The grade ranges in terms of percentage are:

100.0-90.0 = A	84.9-80.0 = B+	69.9-65.0 = C+	54.9 and below= F
89.9-85.0 = A-	79.9-75.0 = B	64.9-60.0 = C	
	74.9-70.0 = B-	59.9-55.0= C-	

Loyola University Chicago

School of Education

**Additional information provided by the School*

School of Education Commitment - COVID-19

Loyola's School of Education (SOE) recognizes that this is an unprecedented time. We understand that moving into the 2021-2022 academic year while living in the context of the COVID-19 pandemic may stir feelings of uncertainty, fear, or anxiousness. We want you to know that your safety, health, and well-being, as well as that of our faculty and staff, remain our primary concern. We want to be able to support you in any way that we can. We ask you to embody the Jesuit value of *Cura Personalis*, or care for the whole person, as we prepare to learn together. We ask that you consider your way of being in this community, to act with care, and treat all with dignity to keep yourself and others safe. If you are not feeling well, please use Loyola's SYMPTOM Checker. It can be found on the webpage or APP Loyola Health under the **COVID -19 Related Information Tab** at the top of the page.

The University understands that you may encounter obstacles that make reaching academic goals more difficult. We strongly encourage you to access the Student Resources on Loyola's COVID-19 Response webpage for information, supports, and resources on basic needs such as housing, food, financial aid, and medical and mental health. This web page also offers information on official University communications, access to technology, and student services. All Loyola University Chicago administrators, faculty, and advisors are also here for you.

The SOE is committed to working with all students to address any challenges that may arise during the semester. Please reach out to your professor as early as possible to discuss any accommodations you think may be necessary in order for you to successfully complete your coursework. Active and engaged communication with all of your professor is encouraged. We know the FALL 2021 Return to Campus will be like no other, but through collaboration, communication, and shared responsibility, we will not only get through this difficult time; we will thrive.

COVID-19 Required Personal Safety Practices

We all have a part to play in preventing the spread of COVID-19. Following a simple set of required personal safety practices can lower your own risk of being infected and can help protect others. All members of the Loyola community are expected to follow these practices while on any of the University's campuses. **Face masks or face coverings must be worn by all students, faculty, and staff while on any of Loyola's campuses, when in the presence of others, in classrooms, and in public settings where other social distancing measures are difficult to maintain.** Appropriate use of face masks or coverings is critical in minimizing the risks to others around you, as you can spread COVID-19 to others even if you do not feel sick. Please be sure to review all LUC REQUIRED Safety Protocols.

COVID-19 Reporting Protocol

In preparation for our upcoming semester, Loyola University Chicago's Emergency Response Management team has been working to develop protocols in accordance with Centers for Disease Control and Prevention (CDC) guidelines that help ensure the health and safety of our community. Given the rising number of COVID-19 cases across our country, it is very likely that incidence within our community will occur in the fall. Students, faculty, and staff who have tested positive for COVID-19 must report their case to the University as soon as possible. **If you have tested positive for the virus, please contact us at covid-19report@LUC.edu or by calling 773-508-7707. All COVID-19-related questions or feedback should continue to be sent to covid-19support@LUC.edu, not the new case reporting email address.**

Syllabus Addendum

1. Smart Evaluation

Towards the end of the course, students will receive an email from the Office of Institutional Effectiveness reminding them to provide feedback on the course. They will receive consistent reminders throughout the period when the evaluation is open, and the reminders will stop once they have completed the evaluation.

- The evaluation is completely anonymous. When the results are released, instructors and departments will not be able to tell which student provided the individual feedback.
- Because it is anonymous and the results are not released to faculty or departments until after grades have been submitted, the feedback will not impact a student's grade.

The feedback is important so that the instructor can gain insight in to how to improve their teaching and the department can learn how best to shape the curriculum.

2. Dispositions

All students are assessed on one or more dispositional areas of growth across our programs: ***Professionalism, Inquiry, and Social Justice.*** The instructor in your course will identify the dispositions assessed in this course and you can find the rubrics related to these dispositions in LiveText. *For those students in non-degree programs, the rubric for dispositions may be available through Sakai, TaskStream or another platform.* Disposition data is reviewed by program faculty on a regular basis. This allows faculty to work with students to develop throughout their program and address any issues as they arise.

3. LiveText and Digication

All students, *except those who are non-degree*, may have access to LiveText to complete the benchmark assessments aligned to the Conceptual Framework Standards and all other accreditation, school-wide and/or program-wide related assessments. You can access more information on LiveText here: LiveText.

Digication is Loyola's ONLINE portfolio platform. Many of the School of Education programs utilize Digication for Assessment and data collection to manage accreditation and licensure requirements. Your professor and Program chair will work with you to better understand submission requirements that are specific to courses and programs.

The expected behaviors for the specific dispositions for this class and the evaluation rubric are listed below:

Area	Target	Acceptable	Unacceptable
Systematic Inquiry	Candidate communicates effectively and appropriately with faculty and peers.	Candidate is working on communicating effectively and appropriately with faculty and peers.	Candidate is unable to communicate effectively and appropriately with faculty and peers.
Responsibilities for General and Public Welfare	Candidate's written work is appropriate and effective for the course.	Candidate's written work is sometimes appropriate and effective for the course.	Candidate's written work is inappropriate and ineffective for the course.
Timeliness	Candidate is able to meet all deadlines.	Candidate is sometimes able to meet all deadlines.	Candidate is unable to meet all deadlines.
Accountability	Candidate attends all classes and fulfills all professional obligations.	Candidate sometimes attends classes and fulfills professional obligations.	Candidate's attendance to class is inconsistent and is unable to fulfill all professional obligations.
Collegiality	Candidate is able to work with peers.	Candidate is sometimes able to work with peers.	Candidate is unable to work with peers.
Integrity/Honesty	Candidate respects the viewpoints of others.	Candidate sometimes respects the viewpoints of others.	Candidate has difficulty respecting the viewpoints of others.
Integrity/Honesty	Candidate recognizes potential conflicts	Candidate sometimes recognizes potential conflicts	Candidate has difficulty recognizing potential conflicts

	and handles them appropriately.	and handles them appropriately.	and handling them appropriately.
Integrity/Honesty	Candidates appropriately represent procedures, data, and findings – attempting to prevent misuse of their results.	Candidates represent procedures, data, and findings in a manner that is likely to allow the misuse of their results.	Candidates misrepresent procedures, data, and findings. There is minimal attempt to prevent misuse of their results.

4. Privacy Statement

Assuring privacy among faculty and students engaged in online and face-to-face instructional activities helps promote open and robust conversations and mitigates concerns that comments made within the context of the class will be shared beyond the classroom. As such, recordings of instructional activities occurring in online or face-to-face classes may be used solely for internal class purposes by the faculty member and students registered for the course, and only during the period in which the course is offered. Students will be informed of such recordings by a statement in the syllabus for the course in which they will be recorded. Instructors who wish to make subsequent use of recordings that include student activity may do so only with informed written consent of the students involved or if all student activity is removed from the recording. Recordings including student activity that have been initiated by the instructor may be retained by the instructor only for individual use.

5. Student Support

Students are urged to contact the instructor should they have questions concerning course materials and procedures. If students have any special circumstance that may have some impact on your course work, please let the instructor know so a plan can be established. In addition, if students require assignment accommodations, please contact the instructor early in the semester so that arrangements can be made with Student Accessibility Center (SAC) (http://www.luc.edu/sac/).

6. Center for Student Access and Assistance (CSAA)

Should you encounter an unexpected crisis during the semester (e.g., securing food or housing, addressing mental health concerns, managing a financial crisis, and/or dealing with a family emergency, etc.), you are strongly encouraged to contact the Office of the Dean of Students by submitting a CARE Referral for yourself or a peer in need of support: **www.LUC.edu/csaa**. If you are uncomfortable doing so on your own, please know that your instructor can submit a referral on your behalf.

This link directs students to statements on essential policies regarding *academic honesty*, *accessibility*, *ethics line reporting* and *electronic communication policies and guidelines*. We ask that you read each policy carefully.

This link will also bring you to the full text of our conceptual framework that guides the work of the School of Education – ***Social Action through Education.***

7. Syllabus Addendum Link

   https://www.luc.edu/education/academics/syllabi/

Tentative schedule

R & B: *Raudenbush, S. W. & Bryk, A. S. (2002)*; Hox: *Hox, J. J. (2010).*

Week	Dates	Topics	Related Readings *
1	8/30	Introduction to HLM	
2	9/6	**~*~ Labor Day – no class ~*~**	
3	9/13	HLM Software & Data Preparation	Hox: Ch. 1 HLM 8 Manual: Ch.2
4	9/20	Basic two-level model 1: Null Models & random intercept Models	Woltman, Feldstain, MacKay, & Rocch, 2012
5	9/27	Basic two-level model 2: Centering & interaction	R & B: Ch. 2 Hox: Ch. 2
6	10/4	Basic two-level model 3: Statistical assumptions & issues	R & B: Ch. 3 Hox: Ch. 2 HLM 8 Manual: Ch. 1
7	10/11	**~*~Mid-semester break – no class ~*~**	
8	10/18	Basic two-level model 4: Examples	Hox: Chs. 4 R & B: Chs. 4 & 9
9	10/25	Longitudinal HLM: Linear	R&B, Ch.6
10	11/1	Longitudinal HLM: Non-Linear	Hox, Ch. 5 HLM 8 Manual: Ch. 8
11	11/8	HGLM: Dichotomous Data & proportion	Hox, Ch. 6 HLM 8 Manual: Ch. 7
12	11/15	HGLM: Categorical & Count data	R & B: Ch. 10 Hox: Ch. 7
13	11/22	Three-Level models Cross-classified multilevel models	Hox, Ch. 9; R & B, Ch. 8 HLM 8 Manual: Chs. 3 & 4
14	11/29	Multilevel approach to meta-analysis/Other topics of interests	R & B: Ch. 7; Hox, Ch. 11
15	12/6	Presentations	
16	12/11	Final Exam Week	

*More specific readings (e.g., real world studies using HLM) are listed in the end of the PPT slides for each topic.