

**THE UNIVERSITY OF TEXAS AT AUSTIN
SCHOOL OF SOCIAL WORK
HIERARCHICAL LINEAR MODELING**

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| Course Number: | SW 395K | Instructor's name: | Catherine Cubbin, PhD |
| Unique Number: | 62260 | Office Number: | SWB 3.208G, CLA 2.622G, |
| Semester: | Spring, 2017 | Office Phone: | 512-232-0625 |
| Meeting Time: | Tuesdays, 8:30-11:30 | Office Hours: | Tuesdays, 11:30-12:30, or by appt |
| Meeting Place: | SWB 1.214 | Instructor's email: | ccubbin@austin.utexas.edu |

I. Course Description

This applied, hands-on course for doctoral students provides an introduction to the basic concepts and applications of hierarchical linear models. The course will cover applications in social sciences research (e.g., neighborhood effects research, school effects research), growth curve modeling (e.g., repeated measures on individuals), and well as introduce models for dichotomous outcomes. Topics will include multilevel data structures, model building and testing, fixed and random effects, and interpretation of results. Students are expected to have taken regression analysis. Depending on the software selected for the course, students may be required to complete training in the form of a workshop or tutorials before the first day of class.

II. Course Objectives

At the end of this course, students should be able to:

1. Specify a social science research question requiring hierarchical linear modeling
2. Understand when and why hierarchical linear models should be used
3. Apply hierarchical linear models to nested data
4. Correctly interpret analysis results from hierarchical linear models
5. Effectively communicate analysis results in writing

IIIa. Required Texts

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

Luke, D. A. (2004). *Multilevel Modeling*. Thousand Oaks, CA: Sage. ISBN: 9780761928799

IIIb. Required Readings

Cubbin C, Pickle LW and Fingerhut L. Social context and geographic patterns of homicide among U.S. Black and White males. *American Journal of Public Health* 2000;90:579-587.

Cubbin C and Winkleby MA. Protective and harmful effects of neighborhood-level deprivation on individual-level health knowledge, behavior changes, and risk of coronary heart disease. *American Journal of Epidemiology* 2005;162:559-568.

Cummins S, et al. Understanding and representing 'place' in health research: A relational approach. *Social Science & Medicine* 2007;65:1825-1838.

Diez-Roux AV. Multilevel analysis in public health research. *Annu Rev Public Health* 2000;21:171-192.

Duncan C, Jones K, Moon G. Context, composition and heterogeneity: Using multilevel modeling in health research. *Soc Sci Med* 1998;46:97-117.

- Dunn EC, Milliren CE, Evans C, Subramanian SV, Richmond TK. (2015). Disentangling the relative influence of schools and neighborhoods on adolescents' risk for depressive symptoms. *American Journal of Public Health* 2015; 105:732-740.
- Division of Statistics + Scientific Computation, 2015. *Multilevel Modeling Tutorial Using SAS, Stata, HLM, R, SPSS, and Mplus*.
- Ene, M, Leighton, EA, Blue, GL, Bell, BA. Multilevel models for categorical data using SAS®PROC GLIMMIX: The basics. SAS Paper 3430-2015.
- Goodman, E., Huang, B., Wade, T. J., & Kahn, R. S. (2003). A multilevel analysis of the relation of socioeconomic status to adolescent depressive symptoms: does school context matter?. *The Journal of pediatrics*, 143(4), 451-456.
- Han W and Huang C. The forgotten treasure: bilingualism and Asian children's emotional and behavioral health. *American Journal of Public Health* 2000;100:831-838.
- Hofmann, David A., and Mark B. Gavin. "Centering decisions in hierarchical linear models: Implications for research in organizations." *Journal of Management* 1998; 24: 623-641.
- Hong L et al. Neighborhood socioeconomic context and emergency department visits for dental care in a U.S. Midwestern metropolis. *Public Health* 2015;129:252-257.
- Kubik, M. Y., Lytle, L. A., Hannan, P. J., Perry, C. L., & Story, M. (2003). The association of the school food environment with dietary behaviors of young adolescents. *American journal of public health*, 93(7), 1168-1173.
- Marsiglia FF, Kulis S, Yabiku ST, Nieri TA and Coleman E. When to intervene: Elementary school, middle school or both? Effect of *keepin' it REAL* on substance use trajectories of Mexican heritage youth. *Prev Sci* 2011;12:48-62.
- Riskind RG, et al. Sexual identity, partner gender, and sexual health among adolescent girls in the United States. *American Journal of Public Health* 2014;104:1957-1963.
- Singer JD. Using SAS PROC MIXED to Fit Multilevel Models, Hierarchical Models, and Individual Growth Models. *Journal of Educational and Behavioral Statistics* 1998;23:323-355.
- Subramanian SV. The relevance of multilevel statistical methods for identifying causal neighborhood effects. *Social Science & Medicine* 2004;58:1961-1967.
- Umberson U, Liu H, Powers D. Marital status, marital transitions, and body weight. *Journal of Health and Social Behavior* 2009;50:327-343.
- Winkleby M, Cubbin C, Ahn D. Effect of cross-level interaction between individual and neighborhood socioeconomic status on adult mortality rates. *American Journal of Public Health* 2006;96:2145-2153.
- Woltman H, Feldstein A, MacKay JC, Rocchi M. An introduction to hierarchical linear modeling. *Tutorials in Quantitative Methods for Psychology* 2012;8:52-69.
- Xiao H, Tan F and Goovaerts P. Racial and geographic disparities in late-stage prostate cancer diagnosis in Florida. *J health Care Poor Underserved* 2011;22:187-199.

IIIc. Recommended Texts

- Delwiche LD, Slaughter SJ (2012). *The Little SAS Book: A Primer*, 5th edition. Cary, NC: SAS Institute.
- Hancock, Gregory R., and Ralph O. Mueller. *The reviewer's guide to quantitative methods in the social sciences*. Routledge, 2010.
- Littell RC, et al (2006). *SAS for Mixed Models* (2nd ed.). Cary, NC: SAS Institute.
- O'Connell, A.A. & McCoach, D.B. (2008). *Multilevel modeling of educational data*. (Eds.) Charlotte, NC: Information Age Publishing.
- Raudenbush SW, Bryk AS (2002). *Hierarchical linear models: Applications and data analysis methods* (2nd ed.). Thousand Oaks, CA: Sage Publications.

Singer JD, Willett JB (2003). Applied Longitudinal Data Analysis: Modeling change and event occurrence. Oxford: Oxford University Press.

Snijders TAB, Bosker R (2011). Multilevel Analysis: An Introduction to Basic and Advanced Multilevel Modeling (2nd ed.). Thousand Oaks, CA: Sage Publications.

IV. Teaching Methods

The primary means of instruction will be interactive lectures, guest lectures, hands-on in-class and take-home exercises, computer exercises working with SAS, and class discussions from the assigned readings. Students will be expected to have done the assigned reading and activities before class and to actively participate in class.

V. Course Assignments and Student Evaluation

1. Exams (60 points): There will be three in-class exams (a mix of closed and open book), 20 points each. Some exams involve data analysis using pre-specified datasets.
2. Journal club (10 points): Students will be expected to present 2 critical overviews (5 points each) of a journal article based on HLM analysis and lead the discussion on the selected article. Journal articles will be selected by the instructor.
3. "Journal-ready" interpretation of results (15 points): The final assignment will be based on an HLM analysis of a provided dataset and research question. Students will be required to conduct the analyses, write a detailed data analysis plan, present the results in table format, and interpret the results. APA style is recommended.

Further guidelines on the exams, journal club, and final assignment will be given in class.

4. Class attendance/participation/homework assignments (15 points): You are expected to learn from interacting with other students in the class. Thus, students are expected to attend all classes and to arrive on time. Students who miss multiple classes without medical documentation during the semester and/or show up late will lose points. Leaving class early will be counted as an absence unless the student provides a reasonable cause for doing so in advance (i.e., before the day of class) and receives the instructor's permission. Students are expected to do assigned readings before the class time and actively participate in class discussions. Homework assignments will be required to be uploaded to Canvas by 8am on the day they are due.

VI. University and School of Social Work Policies

THE UNIVERSITY OF TEXAS HONOR CODE. The core values of The University of Texas at Austin are learning, discovery, freedom, leadership, individual opportunity, and responsibility. Each member of the university is expected to uphold these values through integrity, honesty, trust, fairness, and respect toward peers and community.

PROFESSIONAL CONDUCT AND CIVILITY IN THE CLASSROOM. The professor expects students to act as professionals in class. This means students should arrive on time for class, be prepared to participate in the class discussion, and show respect for one another's opinions. A course brings together a group of diverse individuals with various backgrounds. Students are influenced and shaped by such factors as

ethnicity, gender, sex, physical abilities, religious and political beliefs, national origins, and sexual orientations, among others. We expect to learn from each other in an atmosphere of positive engagement and mutual respect. Social Work also deals with complex and controversial issues. These issues may be challenging and uncomfortable, and it would be impossible to offer a substantive classroom experience that did not include potentially difficult conversations relating to challenging issues. In this environment we will be exposed to diverse ideas and opinions, and sometimes we will not agree with the ideas expressed by others. Nevertheless, the professor requires that students engage one another with civility, respect, and professionalism.

DOCUMENTED DISABILITY STATEMENT. Any student who requires special accommodations must obtain a letter that documents the disability from the Services for Students with Disabilities area of the Division of Diversity and Community Engagement (471-6259 voice or 471-4641 TTY for users who are deaf or hard of hearing). A student should present the letter to the professor at the beginning of the semester so that needed accommodations can be discussed and followed. The student should remind the professor of any testing accommodations no later than five business days before an exam. More information may be found at <http://diversity.utexas.edu/disability/>.

UNANTICIPATED DISTRESS. Students may experience unexpected and/or distressing reactions to course readings, videos, conversations, and assignments. If so, students are encouraged to inform the professor. The professor can be responsive and supportive regarding students' participation in course assignments and activities, but students are responsible for communicating clearly what kind of support is desired. If counseling is needed, students may contact a service provider of their choosing, including the UT Counseling Center at 512-471-3515 or online at <https://cmhc.utexas.edu/>.

POLICY ON SCHOLASTIC DISHONESTY. Students who violate University rules on scholastic dishonesty are subject to disciplinary penalties, including the possibility of failure in the course and/or dismissal from the University. Since such dishonesty harms the individual, all students, and the integrity of the University, policies on scholastic dishonesty will be strictly enforced. For further information, the student may refer to the Web Site of the Student Judicial Services, Office of the Dean of Students (<http://deanofstudents.utexas.edu/conduct/>).

POLICY ON SOCIAL MEDIA AND PROFESSIONAL COMMUNICATION. Public social networks are not private. Even when open only to approved or invited members, users cannot be certain that privacy will exist among the general membership of sites. If social work students choose to participate in such forums, please assume that anything posted can be seen, read, and critiqued. What is said, posted, linked to, commented on, uploaded, subscribed to, etc., can be accessed and archived, posing potential harm to professional reputations and prospective careers.

Social work students who use social media (i.e. Facebook, Twitter, etc.) and other forms of electronic communication (i.e. blogs, etc.) must be mindful of how their communication may be perceived by clients, colleagues, faculty, and others. Social work students are expected to make every effort to minimize material which could be considered inappropriate for a professional social worker in training. Because of this, social work students are advised to manage security settings at their most private levels and avoid posting information/photos or using any language that could jeopardize their professional image.

Students are asked to consider the amount of personal information posted on these sites and are obliged to block any client access to involvement in the students' social networks. Client material should not be referred to in any form of electronic media, including *any* information that might lead to the

identification of a client or compromise client confidentiality in *any* way. Additionally, students must critically evaluate any material that is posted regarding community agencies and professional relationships, as certain material could violate the standards set by the School of Social Work, the Texas Code of Conduct for Social Workers, and/or the NASW Code of Ethics.

Social work students should consider that they will be representing professional social work practice as well as The University of Texas at Austin School of Social Work program while in the classroom, the university community, and the broader area communities.

USE OF COURSE MATERIALS. The materials used in this course, including, but not limited to exams, quizzes, and homework assignments, are copyright protected works. Any unauthorized duplication of the course materials is a violation of federal law and may result in disciplinary action being taken against the student. Additionally, the sharing of course materials without the specific, express approval of the professor may be a violation of the University's Student Honor Code and an act of academic dishonesty, which could result in further disciplinary action. This sharing includes, among other things, uploading class materials to websites for the purpose of distributing those materials to other current or future students.

RELIGIOUS HOLIDAYS. By UT Austin policy, students must notify the professor of a pending absence at least fourteen days prior to the date of observance of a religious holy day. If the student must miss a class, examination, work assignment, or project in order to observe a religious holy day, the professor will give the student an opportunity to complete the missed work within a reasonable time after the absence.

CAMPUS CARRY POLICY. The University's policy on concealed fire arms may be found here: <https://campuscarry.utexas.edu>. You also may find this information by accessing the Quick Links menu on the School's website.

USE OF E-MAIL FOR OFFICIAL CORRESPONDENCE TO STUDENTS. Email is recognized as an official mode of university correspondence; therefore, students are responsible for reading their email for university and course-related information and announcements. Students are responsible for keeping the university informed about a change of e-mail address. Students should check their e-mail regularly and frequently—daily, but at minimum twice a week—to stay current with university-related communications, some of which may be time-sensitive. Students can find UT Austin's policies and instructions for updating their e-mail address at <https://cio.utexas.edu/policies/university-electronic-mail-student-notification-policy>.

CLASSROOM CONFIDENTIALITY. Information shared in class about agencies, clients, and personal matters is considered confidential per the NASW Code of Ethics on educational supervision and is protected by regulations of the Family Educational Rights and Privacy Act (FERPA) as well. As such, sharing this information with individuals outside of the educational context is not permitted. Violations of confidentiality could result in actions taken according to the policies and procedure for review of academic performance located in sections 3.0, 3.1, and 3.2 of the Standards for Social Work Education.

TITLE IX REPORTING. In accordance with Title IX of the Education Amendments of 1972, the University of Texas at Austin is committed to maintaining a learning environment that is free from discriminatory conduct based on gender. Faculty, instructors, staff, and/or teaching assistants in their supervisory

roles are mandated reporters of incidents of sex discrimination, sexual harassment, sexual violence, or sexual misconduct. Students who report such incidents will be informed of University resources. Incidents will be reported to the University's Title IX Coordinator and/or the Title IX Deputy for the SSW, Professor Tanya Voss. Students, faculty and staff may contact Professor Voss to report incidents or to obtain information. Further information, including student resources related to Title IX, may also be found at <http://socialwork.utexas.edu/dl/files/academic-programs/other/qrg-sexualharassment.pdf>.

SAFETY. As part of professional social work education, students may have assignments that involve working in agency settings and/or the community. As such, these assignments may present some risks. Sound choices and caution may lower risks inherent to the profession. It is the student's responsibility to be aware of and adhere to policies and practices related to agency and/or community safety. Students should notify the professor regarding any safety concerns.

BEHAVIOR CONCERNS ADVICE LINE (BCAL). If students are worried about someone who is acting differently, they may use the Behavior Concerns Advice Line to discuss by phone their concerns about another individual's behavior. This service is provided through a partnership between the Office of the Dean of Students, the Counseling and Mental Health Center (CMHC), the Employee Assistance Program (EAP), and The University of Texas Police Department (UTPD). Call 512-232-5050 or visit <http://operations.utexas.edu/units/csas/bcal.php>.

EMERGENCY EVACUATION POLICY. Occupants of buildings on the UT Austin campus are required to evacuate and assemble outside when a fire alarm is activated or an announcement is made. Please be aware of the following policies regarding evacuation:

- Familiarize yourself with all exit doors in the classroom and the building. Remember that the nearest exit door may not be the one you used when entering the building.
- If you require assistance to evacuate, inform the professor in writing during the first week of class.
- In the event of an evacuation, follow the professor's instructions.
- Do not re-enter a building unless you are given instructions by the Austin Fire Department, the UT Austin Police Department, or the Fire Prevention Services office.

GRADING SCALE

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|----------------|----|
| 94.0 and Above | A |
| 90.0 to 93.999 | A- |
| 87.0 to 89.999 | B+ |
| 84.0 to 86.999 | B |
| 80.0 to 83.999 | B- |
| 77.0 to 79.999 | C+ |
| 74.0 to 76.999 | C |
| 70.0 to 73.999 | C- |
| 67.0 to 69.999 | D+ |
| 64.0 to 66.999 | D |
| 60.0 to 63.999 | D- |
| Below 60.0 | F |

VII. Additional Class Policies Affecting Course Grade

LATE ASSIGNMENT POLICIES: Except in the case of extreme emergencies, and then only with the permission of the instructor, late assignments will not be accepted without penalty. Students are expected to turn in all required assignments on the specified due date at the beginning of class. Electronic copies as e-mail attachments will be allowed only under special circumstances when the student cannot be present in class. Students will lose 3 points for each day that an assignment is late. If the due date is a problem, then the student must contact the instructor and negotiate another due date at least 48 hours PRIOR to the date specified in the course syllabus.

COMPUTER AND OTHER ELECTRONIC DEVICE USE POLICIES: Computer and Other Electronic Device Use Policies: Using a laptop is permitted for completing the class-related computer exercises or taking notes during the interactive lectures. Students frequently use laptop computers in class to conduct tasks that are not related to the course contents (e.g., working on papers for other classes, checking e-mails, surfing Internet news) and resort to cell-phone texting while in class. Such behaviors are unprofessional and disruptive to other students and the instructor. All communication devices will be turned off while in class, and can be used only during class breaks. Students who break the computer use and cell phone policies and who engage in any other tasks that are unrelated to the course (e.g., reading newspapers and articles for other classes, playing games) may be asked to leave the classroom.

VIII. Course Calendar

| Date | Content and Assignments | Readings | Homework assignment |
|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| Week 1 1/17/17 | Overview of the course Overview of HLM <i>Review SAS pre-work</i> | <ul style="list-style-type: none"> • Luke, pgs. 1-9 • Duncan et al, 1998 | <ul style="list-style-type: none"> • SAS Basics exercise |
| Week 2 1/24/17 | Theoretical & statistical considerations for multilevel models <i>Review homework</i> | <ul style="list-style-type: none"> • Hox, Chapter 1 • Luke, pgs. 9-15 • Woltman et al, 2012 | <ul style="list-style-type: none"> • SAS: data cleaning and checking assumptions |
| Week 3 1/31/17 | Building a full HLM model <i>Review homework</i> | <ul style="list-style-type: none"> • Hox, Chapters 2-3 • Diez-Roux, 2000 | <ul style="list-style-type: none"> • SAS: regression • HLM equations |
| Week 4 2/7/17 | Two Level HLM Models: School Effect Centering Distribute Test #1 Objectives <i>Review homework</i> | <ul style="list-style-type: none"> • Hox, Chapter 4 • Luke, pgs. 15-53 • Hofman, 1998 • Division of Statistics + Data Sciences, 2015 (<i>only the SAS-related material</i>) | <i>Study for Exam</i> |
| Week 5 2/14/17 | Review for Exam #1 Exam #1 Distribute Journal Club guidelines | | <ul style="list-style-type: none"> • Centering |
| Week 6 2/21/17 | Two Level HLM Models: School Effect <u>Journal Club</u> <i>Review exam</i> <i>Review homework</i> | <ul style="list-style-type: none"> • Singer, School effect example only, Pp. 323-339 • Goodman, 2003 • Kubik, 2003 | <ul style="list-style-type: none"> • Replicate Singer, school effects • Equations & interpreting coefficients |
| Week 7 2/28/17 | Two level HLM Models: Neighborhood Effect SAS skills: merging data, etc. Sampling <u>Journal Club</u> <i>Review homework</i> | <ul style="list-style-type: none"> • Cummins, 2007 • Subramanian, 2004 • Winkleby, 2006 • Cubbin, 2005 | <ul style="list-style-type: none"> • <i>Shdatppnew</i> dataset exercise on two level models (modeling and assessing fit) |
| Week 8 3/7/17 | Two Level HLM Models: Growth Models <u>Journal Club</u> <i>Review homework</i> | <ul style="list-style-type: none"> • Hox, Chapter 5 • Singer, Growth model example only, Pp. 340-351 • Luke, pgs. 62-72 • Han, 2010 | <ul style="list-style-type: none"> • Replicate Singer, growth models • Long and wide data transformation |

| Date | Content and Assignments | Readings | Homework assignment |
|---------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|
| | | <ul style="list-style-type: none"> Marsiglia, 2011 | |
| March 13-17 Spring Break | | | |
| Week 9 3/21/17 | Two Level HLM Models: Growth Models Dr. Powers' guest lecture video Distribute Test #2 Objectives <i>Review homework</i> | <ul style="list-style-type: none"> Umberson, 2009 | <i>Study for Exam</i> |
| Week 10 3/28/17 | Review for Exam #2 Exam #2 | | <ul style="list-style-type: none"> Growth models modeling exercise |
| Week 11 4/4/17 | Two Level Models: Binary, Categorical, & Count Outcomes <u>Journal Club</u> <i>Review homework</i> | <ul style="list-style-type: none"> Hox, Chapters 6-7 Luke, pgs. 53-58 Cubbin, 2000 Ene, 2015 Hong, 2015 Riskind, 2014 | <ul style="list-style-type: none"> Two level binary model using <i>Shdppdatnew</i> dataset |
| Week 12 4/11/17 | Multilevel Survival Analyses <i>Guest lecture: Chris Van Fosson, PhD candidate, Nursing</i> <i>Review homework</i> | <ul style="list-style-type: none"> Hox, Chapter 8 Possibly additional article(s) to be assigned | <ul style="list-style-type: none"> Survival analysis homework using <i>Shdppdatnew</i> dataset |
| Week 13 4/18/17 8:15-11:00 | Cross-classified Models <i>Guest lecture: Dr. Tasha Beretvas</i> <i>Review homework</i> | <ul style="list-style-type: none"> Hox, Chapter 9 Possibly additional article(s) to be assigned | <ul style="list-style-type: none"> Work on final assignment |
| Week 14 4/25/17 | Three-level Models & Multilevel Meta-analyses Distribute Test #3 Objectives <u>Journal Club</u> | <ul style="list-style-type: none"> Luke, pgs. 59-62 Hox, Chapter 11 Xiao, 2011 Dunn, 2015 | <i>Study for Exam</i> |
| Week 15 5/2/17 | Review for Exam #3 Exam #3 | | <ul style="list-style-type: none"> Work on final assignment |

Final assignment is due in hard copy on May 9th at noon.