Course Objectives
The goals of this course are to familiarize students with (1) generalized linear mixed (multilevel) models that are often used in the social sciences, and (2) best practices in the models' applications and interpretations. These models are extensions of classic linear regression models, and they go by many names: multilevel models, hierarchical models, mixed models, etc. Throughout the course, models and methods will be introduced conceptually and will be illustrated using real and simulated data.

At the end of this class, students should have working knowledge of linear and generalized multilevel models and be able to competently apply and interpret such models in the analysis of their own research data.

Course Requirements & Grading
Students will read a contemporary text and various articles on the development and application of multilevel models. They will complete eight structured data analysis assignments and submit brief written reports of results (5% each; 40% total). Using a problem and a dataset of their own choosing, students will design and carry out an analysis of data using multilevel modeling. They will present their results in a seminar session of the class (15%), and they will report their results in a formal scientific paper following APA guidelines (45%).

Instructor
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Time and Place
Lecture: M 9:30-11:20 Room 3102 (Psychological Sciences Building)
Lab: T 9:30-10:20 Room 255 (Peirce Hall)

Prerequisites
Graduate coursework in regression and ANOVA, or by permission.

Texts

Other Readings (*Assigned with week noted in parenthesis)


**Policies**

- **Attendance:** This is an elective graduate class. If you do not want to be here, then drop the class. If you want to be here, come to class.
- **Missing class:** If you miss class or lab, it is your responsibility to know all material covered and find out what announcements have been made. Classmates are helpful.
- **Assignments:** Assignments are to be handed in on the specified date. There will be a penalty of 20% off of the earned credit for every day late (i.e. 1% of final grade for each day).
- **Collaborating:** You can, and are even encouraged to, collaborate on assignments. However, each student is responsible for handing in his/her own assignment in his/her own words/syntax. You cannot collaborate on the final project.
- **Class materials:** Presentations, data, and syntax/code (unless otherwise credited) are subject to the instructor’s copyright and should not be sold or shared without my permission. Similarly, please do not record me without my permission. If you need special accommodations, please see me at the onset and/or provide appropriate documentation.
• Purdue’s Honor Pledge: Academic integrity is one of the highest values that Purdue University holds. Individuals are encouraged to alert university officials to potential breeches of this value by either emailing integrity@purdue.edu or by calling 765-494-8778. While information may be submitted anonymously, the more information that is submitted provides the greatest opportunity for the university to investigate the concern. “As a boilermaker pursuing academic excellence, I pledge to be honest and true in all that I do. Accountable together - we are Purdue.”

CAPS Information
Purdue University is committed to advancing the mental health and well-being of its students. If you or someone you know is feeling overwhelmed, depressed, and/or in need of support, services are available. For help, such individuals should contact Counseling and Psychological Services (CAPS) at 765-494-6995 and http://www.purdue.edu/caps/ during and after hours, on weekends and holidays, or through its counselors physically located in the Purdue University Student Health Center (PUSH) during business hours.
<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>Reading</th>
<th>Assignment due (Mondays)</th>
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<tr>
<td>1</td>
<td>01/08/18 Overview, review, core concepts, clustered data</td>
<td>SB Ch1-3; GH Ch1-2</td>
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<td>2</td>
<td>01/15/18 MLK Day (no class)</td>
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<td>3</td>
<td>01/22/18 Random intercept model/RM ANOVA/MANOVA</td>
<td>SB Ch4; GH Ch11,22</td>
<td>Ex1: Plots, expectations</td>
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<td>01/29/18 Hierarchical linear model</td>
<td>SB Ch5; GH Ch12-13</td>
<td>Ex2: Compare approaches</td>
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<td>5</td>
<td>02/05/18 Model specification</td>
<td>SB Ch6,8; GH CH12,24</td>
<td>Ex3: Random effects</td>
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<td>6</td>
<td>02/12/18 Model checking</td>
<td>SB Ch10</td>
<td>Ex4: Testing hypotheses</td>
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<tr>
<td>7</td>
<td>02/19/18 Model checking</td>
<td>SB Ch10</td>
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<tr>
<td>8</td>
<td>02/26/18 Variance decomposition</td>
<td>SB Ch7,13</td>
<td>Ex5: Testing assumptions</td>
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<td>9</td>
<td>03/05/18 Power analysis</td>
<td>SB Ch11; GH Ch20</td>
<td>Ex6: Reliability; <strong>Project idea</strong></td>
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<td>03/12/18 Spring Break (no class)</td>
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<td>11</td>
<td>03/19/18 Longitudinal MLM</td>
<td>SB Ch15</td>
<td>Ex7: N versus n</td>
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<td>12</td>
<td>03/26/18 Longitudinal &amp; Generalized MLM</td>
<td>SB Ch15,17; GH Ch17</td>
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<td>13</td>
<td>04/02/18 Generalized MLM</td>
<td>SB Ch17</td>
<td>Ex8: Trajectories</td>
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<td>14</td>
<td>04/09/18 Multivariate MLM/Multilevel Mediation</td>
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<td><strong>Paper draft</strong></td>
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<td>04/16/18 Open questions/Project presentations</td>
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<td>16</td>
<td>04/23/18 Project presentations</td>
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<td>17</td>
<td>04/30/18 Project presentations</td>
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<td><strong>Final paper</strong></td>
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SB = Snijders & Bosker
GH = Gelman & Hill