Intro to Mixture Modeling
EDLD 610 – 4 Credits – CRN 17199

Fall 2015 Syllabus
Meeting Days/Time: Mondays 9:00 - 12:50 AM
Location: 115 Lokey Education Bldg.

Instructor: Mark Van Ryzin, Ph.D.
E-Mail: markv@uoregon.edu
Address: 102S Lokey Education Bldg
Office Hours: by appointment

DESCRIPTION
We will become familiar with the basics of mixture modeling, in which we probe a sample for evidence of discrete sub-populations with distinctive data profiles. This will include distinctive combinations of values of discrete variables (i.e., Latent Class Analysis or Latent Profile Analysis) or distinctive patterns of change in a single variable or pair of variables over time (i.e., Latent Class Growth Analysis).

COURSE PREREQUISITES
HLM I/II and/or SEM II or similar coursework.

OBJECTIVES
In this course, you will become familiar with:
• SAS Proc Traj (Latent Class Growth Analysis).
• SAS Proc LCA (Latent Class Analysis) and LTA (Latent Transition Analysis)
• SAS TVEM (Time-Varying Effects Models)
• Mplus (Growth Mixture Modeling, time permitting).

REQUIRED READINGS


**OPTIONAL READINGS**


**SOFTWARE**

Students are required to have SAS software available on a laptop computer for this class. SAS can be obtained from the University of Oregon IT help desk: [https://it.uoregon.edu/is-tech-desk](https://it.uoregon.edu/is-tech-desk).

Some later parts of this course focus on features specific to Mplus software. No publicly available copy of Mplus software is available on campus. You can download a free copy of Mplus through the website [http://www.statmodel.com](http://www.statmodel.com).

**CLASS PROJECT**

The main project is a term paper presenting an analysis of a substantive nature that applies one of the techniques covered by this course. It will be due on Tuesday of finals week at 5pm. It is highly encouraged to analyze your own data set, but you can also use one of various datasets that are publicly available. The paper should be written in the APA format with approximately 12-18 double-spaced pages. Individuals can develop their own papers or work in teams of two. The paper will be submitted in three pieces (3rd week, 7th week, and finals week) as follows:
**Part 1**
The first part will have five sections: the theoretical background, proposed research questions and hypotheses (supported by theory), a description of the dataset, how you will address the research questions, and the initial findings from descriptive analyses. This would be equivalent to the Introduction and Methods sections of a research paper, including the first paragraph of a Results section where correlations are reported (in a table). The Methods should include: a Participants section where you describe the sample; a Measures section where you describe the measures (including reliability data); and, an Analysis Plan where you describe your statistical techniques for the benefit of the naïve reader; this section could also contain a representation of your hypothesized model using equations or a diagram. You can use SAS or another statistical package (e.g., SPSS) to perform the descriptive analysis. This analysis should include reporting and interpretation of correlations between your outcome variable(s) and your predictors and control variables, as well as correlations among the predictors and control variables; please present these in a table in APA style. You should also report the N, mean and standard deviation for each variable, the nature of the distributions (skewness, kurtosis, etc.) and, for categorical variables, report the percentage of the sample in each category. The instructor will provide feedback on the assignment which you should address in your later versions. Each analysis assignment will build upon and incorporate earlier versions; the end result will be a completed research paper that you can submit for publication.

**Part 2**
You will report on your modeling results in a manner similar to a full Results section of a research paper. All results should be presented in tables using APA standards. The instructor will provide feedback on this assignment which you should address in your final version to be handed in during finals week. Be sure to include the revised text from Part 1 along with Part 2.

**Part 3**
You will submit a final paper that utilizes your previous sections (i.e., Introduction, Methods, Results) along with a Discussion section that (1) reviews the results and their implications for theory and practice in your field, (2) discusses the limitations of the paper, and (3) suggests new avenues for research. This section should address the research questions and hypotheses you presented initially, and when discussing implications for the field, you should refer back to the research surveyed in the Introduction.

**GRADING POLICY**
Your final grade for this course will be determined based on the class project (Part 1: 25%; Part 2: 25%; Part 3: 25%), the presentation of the project to the class (15%), and class participation (10%). Your final grades will be based on the total number of points accrued during the term. Final letter grades for the course will be calculated as follows:

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<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>A+</td>
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*Please note that if this class is taken P/NP, 83% (B-level) or higher is required to pass.*
## TENTATIVE SCHEDULE OF TOPICS AND ASSIGNMENTS

<table>
<thead>
<tr>
<th>Week</th>
<th>Day</th>
<th>Due Dates</th>
<th>Topics</th>
<th>Readings</th>
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<tbody>
<tr>
<td>1</td>
<td>Sep 28</td>
<td>Introduction to Latent Class Growth Analysis (LCGA) and Proc Traj; model definition, graphing, starting values, confidence intervals, model adequacy</td>
<td>Nagin, 1999; Jones et al., 2001</td>
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<td>2</td>
<td>Oct 5</td>
<td>Review and lab assignment; Proc Traj with non-normal data (i.e., dichotomous, count)</td>
<td>Van Ryzin et al., 2009; Nagin et al., 2003</td>
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<td>3</td>
<td>Oct 12</td>
<td>Review and lab assignment; risk factor predictors of group membership; time-varying covariates</td>
<td>Nagin &amp; Trembley, 2001; Jones &amp; Nagin, 2007</td>
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<td>4</td>
<td>Oct 19</td>
<td>Review and lab assignment; outcome variables and Wald tests</td>
<td>Nelson et al., 2015; Anderson et al., 2010</td>
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<tr>
<td>5</td>
<td>Oct 26</td>
<td>Review and lab assignment; dual-trajectory models</td>
<td>Nagin &amp; Tremblay, 2005; Côté et al., 2007</td>
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<td>6</td>
<td>Nov 2</td>
<td>Latent Class Analysis (LCA)</td>
<td>Lanza et al., 2007</td>
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<td>7</td>
<td>Nov 9</td>
<td>Review and lab assignment; Latent Transition Analysis (LTA)</td>
<td>Lanza &amp; Collins, 2008</td>
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<tr>
<td>8</td>
<td>Nov 16</td>
<td>Review and lab assignment; LTA with distal outcomes</td>
<td>Lanza et al., 2013</td>
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<td>9</td>
<td>Nov 23</td>
<td>Review and lab assignment; Time-Varying Effects Models (TVEM)</td>
<td>Shiyko et al., 2012</td>
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<td>10</td>
<td>Nov 30</td>
<td>Project presentations; Growth Mixture Models (GMM) in Mplus (time permitting)</td>
<td>Jung &amp; Wickrama, 2008</td>
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<td>11</td>
<td>Dec 7</td>
<td>Project Part 3</td>
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## COURSE STRUCTURE
The course will use a traditional lecture and laboratory format. Lecture slides will be made available on Blackboard, and students are expected to download and bring them to the class. Students are expected to read assigned readings before each class meeting.

## ATTENDANCE POLICY
Attendance at all class and participation to discussions is required.

## ABSENCE POLICY
Students must contact the instructor in case of illness or emergencies that preclude fulfilling course requirements scheduled or attending class sessions. Messages can be left on the instructor's voice mail or e-mail at any time of the day or night, prior to class. If no prior arrangements have been made before class time, the absence will be unexcused. In case of an emergency, the instructor will determine whether the emergency qualifies as an excused absence.
COURSE INCOMPLETES
Students are expected to be familiar with university policy and procedures. See http://interact.uoregon.edu/pdf/sas/AIncGrdCon.pdf.

ACADEMIC MISCONDUCT POLICY
All students are subject to the regulations stipulated in the UO Student Conduct Code (http://www.uoregon.edu/~conduct/). This code represents a compilation of important regulations, policies, and procedures pertaining to student life. It is intended to inform students of their rights and responsibilities during their association with this institution, and to provide general guidance for enforcing those regulations and policies essential to the educational and research missions of the University.

CONFLICT RESOLUTION
Several options, both informal and formal, are available to resolve conflicts for students who believe they have been subjected to or have witnesses bias, unfairness, or other improper treatment. It is important to exhaust the administrative remedies available to you including discussing the conflict with the specific individual, contacting the Department Head, or within the College of Education you can contact Joe Stevens, Associate Dean for Academic Affairs, at stevensj@uoregon.edu or Surendra Subramani, Diversity Coordinator, at surendra@uoregon.edu. Outside the College, you can contact:
• UO Bias Response Team: 346-1139 or http://bias.uoregon.edu/whatbrt.htm
• Conflict Resolution Services 346 -0617 or http://studentlife.uoregon.edu/programs/crs/
• Affirmative Action and Equal Opportunity: 346-3123 or http://aaeo.uoregon.edu/

DIVERSITY
It is the policy of the University of Oregon to support and value diversity. To do so requires that we:
• respect the dignity and essential worth of all individuals.
• promote a culture of respect throughout the university community.
• respect the privacy, property, and freedom of others.
• reject bigotry, discrimination, violence, or intimidation of any kind.
• practice personal and academic integrity and expect it from others.
• promote the diversity of opinions, ideas and backgrounds which is the lifeblood of the university.