Advanced Seminar in Educational Psychology:

**Growth Curve Analysis for Longitudinal Data**

**EPSY 590, Section GCM (CRN 34354)**

## Wednesdays 8:00 – 10:50 a.m. CST

**Spring, 2017**

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Office hours: Tu 3:00 pm – 5:00 pm in person or electronically via Skype or Google Hangouts (please email me so I know to log on). First come, first served (no appointments possible). Other times available by appointment.

#### Course Description (from Graduate Catalogue):

Seminar in educational psychology; topics relate to the areas of specialization represented by the various divisions within the department.

**Course Outline**

This course is an intermediate/advanced statistics course for students who are interested in learning modern approaches to analyzing longitudinal data, such as growth in student reading, math, or science proficiency over time; changes in substance abuse, psychopathology, delinquency, employment; physical, cognitive, or emotional growth; or other change over time.

Longitudinal research is by far the most powerful way to study change—whether physical (infants grow longer), language (toddlers learn new words), intellectual (children gain knowledge), socio-emotional (couples learn how to manage conflict), mental (unemployed people become depressed), and so on. Only in the last 25 years or so have we developed powerful statistical methods for studying growth, which comprise a family of techniques called growth curve analysis. These are far superior to older approaches such as RM ANOVA/ regression (and other General Linear Model approaches) and older approaches used in SEM (Structural Equation Modeling).

In this course, we will read about and practice doing analyses using growth curve modeling to answer research questions such as:

* How does children’s vocabulary grow in the toddler years? Is there an advantage to reaching the critical 50-word threshold earlier?
* How does children’s level of phonemic awareness at the beginning of first grade affect how much their reading progresses during first grade?
* Does teacher emotional support matter for growth in math skills from kindergarten through first grade?
* After controlling for grades from the previous year, how do differences in math instruction affect achievement for the current year?
* Do the answers to the questions above differ for students at different ages? Ethnicities? different levels of prior knowledge?

and many, many other questions.

The emphasis for this course is on understanding the material in order to apply it, not on memorization.

**Course objectives:**

At the end of this course, with the aim of becoming a better user and consumer of growth curve modeling, students will be able to:

1. Judge whether data are suitable for growth curve analysis
2. Use R to do a complete analysis of growth data, including
	1. creating a long dataset
	2. creating fitted growth trajectories
	3. fitting a series of models and choosing the best model, and
	4. creating prototypical growth trajectories
	5. running analyses in a multilevel modeling framework AND
	6. running analyses in a structural equation modeling framework
3. Interpret these results, and write up results in journal style
4. Understand the methods and results of journal articles using growth curve approaches, including linear, curvilinear, growth curve in SEM, and latent class models
5. Be able to critique a manuscript that uses growth curve modeling, including identifying common errors made when conducting and interpreting such studies.

**Text and readings:**

The textbook for the course is Grimm, K. J., Ram, N., & Estabrook, R. (2017). *Growth modeling structural equation and multilevel modeling approaches*. NY: Guilford Press. ISBN 9781462526062. List price is $75.00, often available used for less; ebook available for the same price (ISBN 9781462526079) as of 1/3/2017. The companion website to the book is at http://www.guilford.com/grimm-materials

A second required volume should be accessed via the UIUC library Journals Easy Search database: the special issue of *Monographs of the Society for Research in Child Development* from December, 2006, Vol. 71, No. 3. (ISSN 0037-976X).

The articles for weekly class readings can all be obtained through the University Libraries by entering the doi in the library’s main page Easy Search box, as demonstrated in class.

Other required handouts will be posted to Blackboard—please download the *Glossary of growth curve terms* before the second class meeting.

**Access to computers, prerequisite computer, statistics, and math skills:**

This course **requires** access to the following computer resources:

*Compass 2g/Blackboard*—The course is listed as Growth Curve Modeling. **Please check Blackboard regularly for class handouts and updates.**

*R* and *RStudio*—Access to the free versions of R and RStudio on a home or work computer OR on the UIUC campus (e.g., Scholarly Commons). Students may choose to use another program for assignments, but I will be teaching using R syntax and output, and I cannot provide technical assistance for programs other than R, SPSS, or Mplus. Students may choose to form special interest groups around different programs, and I can set up chat areas in *Blackboard* to facilitate this.

*Excel*—Access to a standard version of Excel or an equivalent spreadsheet/graphing program

A *printer* for PowerPoints, homework, R output, and journal articles

This course assumes you are proficient with basic arithmetic in Excel (addition, subtraction, multiplication, division, squaring, use of parentheses) and cell references (such as $G$4 or $G4 or G$4).

This course assumes you have completed graduate-level statistics in the social sciences through multiple regression/EPSY 581. It does not assume knowledge of matrix algebra or calculus.

This course assumes you are comfortable with basic algebra—substituting in equations, multiplying out and rearranging terms.

#### Class Attendance

 Students should attend class each session, except in the case of illness and/or extenuating circumstances, in which case you should email me in advance. Lectures are video recorded. In addition to course content, instruction in using software, and other material that is not in the assigned readings will be covered in class. Out of respect for all of us in the classroom, I ask that you not check email or do other computer work during class time.

**Students with Disabilities:**

To obtain disability-related academic adjustments and/or auxiliary aids, students with disabilities must contact the course instructor and the Disability Resources and Educational Services (DRES) as soon as possible. To contact DRES you may visit 1207 S. Oak St., Champaign, call 333-4603 (V/TDD), or e-mail a message to disability@uiuc.edu.

 To insure that disability-related concerns are properly addressed from the beginning, students with disabilities who require assistance to participate in this class are asked to see the instructor as soon as possible.

**Academic Integrity:**

 Academic dishonesty may result in a failing grade. Every student is expected to review and abide by the Academic Integrity Policy: <http://education.illinois.edu/edpsy/about/academic-integrity>. Please note that you are responsible for reading this policy. Ignorance is not an excuse for any academic dishonesty. Plagiarism or fair use violations will be dealt with without exceptions. <http://education.illinois.edu/edpsy/academicintegrity>. The final project—and all draft portions submitted throughout the semester—must be submitted through UIUC’s SafeAssign interface in Blackboard and will be checked for plagiarism..

The Illinois Student Code should also be considered as a part of this syllabus. Students should pay particular attention to Article 1, Part 4: Academic Integrity. Read the Code at the following URL: <http://www.admin.uiuc.edu/policy/code/>

Evaluation

Student grades will be earned by students’ achievement on the following assignments. Please see the weekly schedule for due dates:

|  |  |
| --- | --- |
| Weekly statistical analysis homework assignments (11 x 6% ea.) | 66% |
| Weekly article homework assignments ([6 given minus 2 dropped = 4] x 1% ea.) | 4%  |
| Weekly quizzes ([13 given minus 3 dropped = 10] x 1% ea.) | 10% |
| Final project | 20% |
| TOTAL | 100% |

*No Extra Credit:*

 Your course grades are based only on the above information. There will be no extra-credit opportunities. Please do not ask for exceptions.

**A note about auditors**

 UIUC policy requires that auditors formally register for the course. I welcome auditors, and I strongly recommend that you complete the regular course requirements (i.e., complete readings, homeworks, quizzes, and a final project). I will provide auditors with the same individualized feedback provided to all other course members. How much you learn will depend strongly on how many of the assignments you complete; I will discourage “lecture only” auditing of this course, as I believe you won’t get much out of it.

#### Assignments

**1) Statistical analysis homework assignments (11 x 6% ea.).** The goal of these assignments is to help you learn growth curve modeling by carrying out analyses on data sets that are posted on Blackboard. All homeworks for the semester are in one large Word file on Blackboard. Homework must be typed or neatly handwritten. Please pay close attention to detail when you are answering questions. Please attach all relevant parts of the printout, regardless of which program you use. Unless prior arrangements are made, 5% of the grade for that assignment will be deducted for each day assignments are handed in late; the “day” begins at the start of class.

In order to encourage mastery of the material, if you wish to revise a homework assignment based on my comments, you may revise each homework once **within two class meetings from the due date (i.e., one week after my due date for giving feedback to you)**. The easiest way to do this is to hand write your changes on the graded version and hand it back to me. Your grade will be based on the best score of the two submissions—original and revised.

If you have not used Blackboard before for your courses, helpful information will be found at <https://online.illinois.edu/getting-started/learning-management-systems/illinois-compass-2g/illinois-compass-2g-faqs>

2) Article homework assignments ([6 - 2 dropped] = 4 x 1% ea.)

The goal of these assignments is to help you, in small steps, learn how to critically read some of the statistics in published journal articles in your field. Homework must be typed or neatly handwritten. Article homework assignments **may not** be revised for a higher grade. Unless prior arrangements are made, 5% of the grade will be deducted for each day assignments are handed in late; the “day” begins when assignments are due at the start of class.

3) Weekly online quizzes (see syllabus for dates; [13 given minus 3 dropped = 10] x 1% ea. = 10%)

 There will be a quiz lasting 15-20 minutes each week; it must be completed electronically **before** the next class meeting. The quizzes are accessed through Blackboard, and the quiz portal closes when class begins (i.e., at 7:55 am every Wednesday). The quiz can be taken as early as 5 days before the due date, so you may take the quiz as soon as you feel you are ready. Each quiz will consist of 4-6 questions of 1-2 points each for a total of 6-7 points. You may use a crib sheet with notes on one side of one 8½” x 11” sheet of paper. Please have a calculator handy for quizzes. No other papers, books, or resources are permitted on quizzes. Do email me if you run into any technical problems with Blackboard. The lowest 3 quiz grades will be dropped; therefore, no makeup quizzes are permitted. **A major goal of the quizzes is to help you figure out what you know and what you still need to study more** (to become more metacognitive about statistics).

4) Final project (see weekly schedule for due date; 20%)

 The final project involves choosing a growth curve research question, analyzing data, and preparing a conference-style presentation in PowerPoint. This can be a new research question posed about a class dataset or you may find your own data (I can suggest publicly-available datasets). Students are welcome to work individually or in a pair. We will discuss the final project as the semester progresses, and I will provide detailed directions about the project including a few sample presentations and rubric.

## Important Regulations

Students are responsible for all information transmitted in class meetings. This includes lecture material that may or may not be included in the readings, announcements about deadlines or changes of deadlines, meeting course requirements, etc.

Please notify me in advance if any assignment deadlines conflict with a religious observance.

**Grades will be earned according to the following system**

97-100 = A+ 93-96.9 = A 90-92.9 = A-

87-89.9 = B+ 83-86.9 = B 80-82.9 = B-

77-79.9 = C+ 73-76.9 = C 70-72.9 = C-

67-69.9 = D+ 63-66.9 = D 60-62.9 = D-

#### Below 59.9 = F

# Weekly Schedule

| Date/Week | Topic | Readings to complete before class | Assignments due in class |
| --- | --- | --- | --- |
| 1/18/2017Week 1 | Introduction to the course, the study of growth, and the basic concepts of growth curve modeling, R dataset importing and (re)structuring | None—first day of class | None—first day of class |
| 1/25/2017Week 2 | Exploratory analyses of longitudinal data using OLSR spaghetti plots and OLS regression(1/30/2017 tenth day add/ drop deadline) | Grimm, Ram, & Estabrook (GRE) Chapters 1-2 ANDMonographs of the SRCD, Chapter 2AND 3 articles | Quiz 1 completed BEFORE class (Covers 1/18)Homework 1Article homework A |
| 2/1/2017Week 3 | The level 1 model | GRE Appendix A ANDMonographs of the SRCD, Chapter 4AND the same 3 articles | Quiz 2 completed BEFORE class(Covers 1/25)Homework 2Article homework B |
| 2/8/2017Week 4 | The level 2 model and fit statistics for modeling with MLM | GRE Chapter 3 (skip/skim SEM) AND 3 articles | Quiz 3 completed BEFORE class(Covers 2/1)Homework 3Article homework C |
| 2/15/2017Week 5 | Merging the Level 1 and Level 2 models; Introducing R for growth curve modeling in MLM (nlme) | http://gseacademic.harvard.edu/~alda/ AND 3 articles | Quiz 4 completed BEFORE class(Covers 2/8)Homework 4Article homework D |
| 2/22/2017 Week 6 | Integrating level 1 and level 2 models; steps in a growth curve analysis; comparing models in MLM (nlme) | GRE Ch. 5 (skip/skim SEM)AND 3 articles | Quiz 5 completed BEFORE class(Covers 2/15)Homework 5Article Homework E |
| 3/1/2017Week 7 | Growth curve approaches for AYP; Centering; Introduction to GCM in SEM (OpenMx) | GRE Ch. 3 SEM section and Appendix B AND3 articles | Quiz 6 completed BEFORE class(Covers 2/22)Homework 6Article Homework F |
| 3/8/2017 Week 8 | Uneven sampling occasions; Weighting | GRE Ch. 4AND 3 articles | Quiz 7 completed BEFORE class (Covers 3/1)Homework 7 |
| 3/15/2017 Week 9 | Time-varying predictors | GRE Ch. 8 TVC sections AND3 articles | Quiz 8 completed BEFORE class (Covers 3/8)Homework 8 |
| 3/22/2017 | SPRING BREAK NO CLASS |
| 3/29/2017Week 10 | Discontinuous change | GRE Chs. 10-11 spline model sections AND 3 articles | Quiz 9 completed BEFORE class (Covers 3/15)Homework 9 |
| 4/5/2017Week 11 | Curvilinear change; 3-level models | GRE Ch. 10 curvilinear models sections AND3 articles | Quiz 10 completed BEFORE class (Covers 3/29)Homework 10 |
| 4/12/2017Week 12 | Advanced GCM in SEM and Diagnosing types of missing data | GRE Ch. 6 (all) and Ch. 8 multivariate growth model sections AND 3 articles | Quiz 11 completed BEFORE class(Covers 4/5)Homework 11 |
| 4/19/2017Week 13 | Growth mixture modeling, Part 1 | GRE Ch. 7 AND4 articles | Quiz 12 completed BEFORE class (Covers 4/12) |
| 4/26/2017Week 14 | Growth mixture modeling, Part 2  | 4 articles | Work on final project |
| 5/3/2017Week 15 | Catch up class/Work on projects | No readings | Quiz 13 completed BEFORE class (Covers 4/19 & 4/26)And work on final project |
| 5/10/2017Week 16 | Final project due | None | Final project PowerPoint live presentation and paper submitted via Blackboard |

**Readings—**All available full text from UIUC libraries, all can be obtained via links below

Week 2 Spaghetti plots

Carreker, S. H., Neuhaus, G. F., Swank, P. R., Johnson, P., Monfils, M. J., & Montemayor, M. L. (2007). Teachers with linguistically informed knowledge of reading subskills are associated with a Matthew effect in reading comprehension for monolingual and bilingual students. *Reading Psychology, 28*(2), 187-212. <http://www.library.illinois.edu/proxy/go.php?url=http://dx.doi.org//10.1080/02702710601186456> **Focus on pp. 192-197.**

Pan, B. A., Rowe, M. L., Singer, J. D., & Snow, C. E. (2005). Maternal correlates of growth in toddler vocabulary production in low-income families. *Child Development, 76*(4), 763-782. <http://www.library.illinois.edu/proxy/go.php?url=http://dx.doi.org//10.1111/j.1467-8624.2005.00876.x> **Focus on pp. 765-768.**

Seltzer, M. H., Frank, K. A., & Bryk, A. S. (1994). The metric matters: The sensitivity of conclusions about growth in student achievement to choice of metric. *Educational Evaluation and Policy Analysis, 16*(1), 41-49. <http://search.ebscohost.com.proxy2.library.illinois.edu/login.aspx?direct=true&db=eric&AN=EJ484357&site=ehost-live> **Focus on pp. 41-44.**

Week 3 Level 1/Greek

Pan, B. A., Rowe, M. L., Singer, J. D., & Snow, C. E. (2005). Maternal correlates of growth in toddler vocabulary production in low-income families. *Child Development, 76*(4), 763-782. <http://www.library.illinois.edu/proxy/go.php?url=http://dx.doi.org//10.1111/j.1467-8624.2005.00876.x> **Focus on pp. 765-766.**

Seltzer, M. H., Frank, K. A., & Bryk, A. S. (1994). The metric matters: The sensitivity of conclusions about growth in student achievement to choice of metric. *Educational Evaluation and Policy Analysis, 16*(1), 41-49. <http://search.ebscohost.com.proxy2.library.illinois.edu/login.aspx?direct=true&db=eric&AN=EJ484357&site=ehost-live> **Focus on pp. 45-47.**

Seltzer, M., Choi, K., & Thum, Y. M. (2003). Examining relationships between where students start and how rapidly they progress: Using new developments in growth modeling to gain insight into the distribution of achievement within schools. *Educational Evaluation and Policy Analysis, 25*(3), 263-286. <http://www.library.illinois.edu/proxy/go.php?url=http://www.jstor.org/stable/3699495> **Focus on pp. 269-271.**

Week 4 Level 2/Greek

Gutman, L. M., Sameroff, A. J., & Cole, R. (2003). Academic growth curve trajectories from 1st grade to 12th grade: Effects of multiple social risk factors and preschool child factors. *Developmental Psychology, 39*(4), 777-790. <http://search.proquest.com/docview/614450860?accountid=14553> **Focus on pp. 782-783.**

Huttenlocher, J., Haight, W., Bryk, A., Seltzer, M., & Lyons, T. (1991). Early vocabulary growth: Relation to language input and gender. *Developmental Psychology, 27*(2), 236-248. <http://search.proquest.com/docview/614368212?accountid=14553> **Focus on pp. 240-242.**

Hammer, C. S., Lawrence, F. R., & Miccio, A. W. (2007). Bilingual children's language abilities and early reading outcomes in Head Start and kindergarten. *Language, Speech, and Hearing Services in Schools, 38*(3), 237-248. <http://search.ebscohost.com/login.aspx?direct=true&db=a9h&AN=25732269&site=ehost-live> **Focus on pp. 239-240.**

Week 5 Level 1 and Level 2/Greek

Ticha, R., Espin, C. A., & Wayman, M. M. (2009). Reading progress monitoring for secondary-school students: Reliability, validity, and sensitivity to growth of reading-aloud and maze-selection measures. *Learning Disabilities Research & Practice, 24*(3), 132-142. <http://www.library.illinois.edu/proxy/go.php?url=http://dx.doi.org//10.1111/j.1540-5826.2009.00287.x>

Moyle, M. J., Weismer, S. E., Evans, J. L., & Lindstrom, M. J. (2007). Longitudinal relationships between lexical and grammatical development in typical and late-talking children. *Journal of Speech, Language, and Hearing Research, 50*(2), 508-528. <http://www.library.illinois.edu/proxy/go.php?url=http://dx.doi.org//10.1044/1092-4388(2007/035)> **Focus on pp. 511-512 and 522-523, skip the cross-lagged analyses.**

Wright, R., John, L., Ellenbogen, S., Offord, D. R., Duku, E. K., & Rowe, W. (2006). Effect of a structured arts program on the psychosocial functioning of youth from low-income communities: Findings from a Canadian longitudinal study. *Journal of Early Adolescence, 26*(2), 186-205. [http://www.library.illinois.edu/proxy/go.php?url=http://dx.doi.org/10.1177/0272431605285717](http://www.library.illinois.edu/proxy/go.php?url=http://dx.doi.org/10.1177/0272431605285717%20) **Focus on pp. 190-200.**

Week 6 Comparing models

Swanson, H. L., Jerman, O., & Zheng, X. (2008). Growth in working memory and mathematical problem solving in children at risk and not at risk for serious math difficulties. *Journal of Educational Psychology, 100*(2), 343-379. <http://www.library.illinois.edu/proxy/go.php?url=http://dx.doi.org//10.1037/0022-0663.100.2.343>

Uchikoshi, Y. (2006). Early reading in bilingual kindergartners: Can educational television help? *Scientific Studies of Reading, 10*(1), 89-120. <http://www.library.illinois.edu/proxy/go.php?url=http://dx.doi.org//10.1207/s1532799xssr1001_5>

Van Horn, M. L., & Ramey, S. L. (2003). The effects of developmentally appropriate practices on academic outcomes among former head start students and classmates, grades 1-3. *American Educational Research Journal, 40*(4), 961-990. <http://www.library.illinois.edu/proxy/go.php?url=http://dx.doi.org//10.1080/02568543.2012.633843>

Week 7 Value added models & SEM

Ho, A. D. (2008). The problem with "proficiency": Limitations of statistics and policy under no child left behind. *Educational Researcher, 37*(6), 351-360. <http://www.jstor.org/stable/25209011>

Koretz, D. (2008). A measured approach. *American Educator, 32*(3), 18-22. <https://www.aft.org/sites/default/files/periodicals/koretz.pdf>

Thomas, S., Peng, W. J., & Gray, J. (2007). Modelling patterns of improvement over time: Value added trends in English secondary school performance over ten years. *Oxford Review of Education, 33*(3), 261-295. <http://www.library.illinois.edu/proxy/go.php?url=http://dx.doi.org/10.1080/03054980701366116>

Week 8 Uneven sampling occasions

Aikens, N. L., & Barbarin, O. (2008). Socioeconomic differences in reading trajectories: The contribution of family, neighborhood, and school contexts. *Journal of Educational Psychology, 100*(2), 235-251. <http://www.library.illinois.edu/proxy/go.php?url=http://dx.doi.org/10.1037/0022-0663.100.2.235>

Alley, D., Suthers, K., & Crimmins, E. (2007). Education and cognitive decline in older Americans: Results from the AHEAD sample. *Research on Aging, 29*(1), 73-94. <http://www.library.illinois.edu/proxy/go.php?url=http://​dx.​doi.​org/​10.​1212/​01.​wnl.​0000341782.​71418.​6c>

Nese, J. F., Biancarosa, G., Cummings, K., Kennedy, P., Alonzo, J., & Tindal, G. (2013). In search of average growth: Describing within-year oral reading fluency growth across Grades 1–8. *Journal of School Psychology, 51* (5), 625-642. <http://www.library.illinois.edu/proxy/go.php?url=http://dx.doi.org/10.1016/j.jsp.2013.05.006>

Week 9 Time-varying covariates

Voight, A., Shinn, M., & Nation, M. (2012). The longitudinal effects of residential mobility on the academic achievement of urban elementary and middle school students. *Educational Researcher, 41*(9), 385-392. [http://www.library.illinois.edu/proxy/go.php?url=http://dx.doi.org//10.3102/0013189X12442239](http://www.library.illinois.edu/proxy/go.php?url=http://dx.doi.org//10.3102/0013189X12442239%20)

Beitchman, J. H., Jiang, H., Koyama, E., Johnson, C. J., Escobar, M., Atkinson, L., et al. (2008). Models and determinants of vocabulary growth from kindergarten to adulthood. *Journal of Child Psychology and Psychiatry, 49*(6), 626-634. <http://search.ebscohost.com/login.aspx?direct=true&db=eric&AN=EJ794835&site=ehost-live>

Rhodes, R. E., Blanchard, C. M., Benoit, C., Levy-Milne, R., Naylor, P.-J., Symons Downs, D., & Warburton, D. E. R. (2014). Social cognitive correlates of physical activity across 12 months in cohort samples of couples without children, expecting their first child, and expecting their second child. *Health Psychology,* 33(8), 792-802. <http://www.library.illinois.edu/proxy/go.php?url=http://dx.doi.org//10.1037/a0033755>

Week 10 Discontinuous change

Kieffer, M. (2012). Before and after third grade: Longitudinal evidence for the shifting role of socioeconomic status in reading growth. *Reading and Writing, 25*, 1725-1746. <http://www.library.illinois.edu/proxy/go.php?url=http://dx.doi.org//10.1007/s11145-011-9339-2>

Wouters, S., De Fraine, B., Colpin, H., Van Damme, J., & Verschueren, K. (2012). The effect of track changes on the development of academic self-concept in high school: A dynamic test of the big-fish-little-pond effect. *Journal of Educational Psychology, 104*(3), 793-805. <http://www.library.illinois.edu/proxy/go.php?url=http://dx.doi.org//10.1037/a0027732>

Dai, T., & Cromley, J. G. (2014). Changes in implicit theories of ability in biology and dropout from STEM majors: A latent growth curve approach. *Contemporary Educational Psychology*, *39*(3), 233-247. <http://www.library.illinois.edu/proxy/go.php?url=http://dx.doi.org//10.1016/j.cedpsych.2014.06.00>

Week 11 Curvilinear change

Schulte, A. C., Stevens, J. J., Elliott, S. N., Tindal, G., & Nese, J. F. (2016). Achievement gaps for students with disabilities: Stable, widening, or narrowing on a state-wide reading comprehension test? *Journal of Educational Psychology, 108*(7), 925-942. <http://www.library.illinois.edu/proxy/go.php?url=http://dx.doi.org//10.1037/edu0000107>

Rojas, R., & Iglesias, A. (2013). The language growth of Spanish-speaking English language learners. *Child Development, 84*(2), 630-646. <http://search.ebscohost.com/login.aspx?direct=true&db=sih&AN=86170877&site=ehost-live>

Wei, X., Lenz, K. B., & Blackorby, J. (2013). Math growth trajectories of students with disabilities: Disability category, gender, racial, and socioeconomic status differences from ages 7 to 17. *Remedial and Special Education*, *34* (3), 154-165. <http://search.ebscohost.com/login.aspx?direct=true&db=eric&AN=EJ1009009&site=ehost-live>

Week 12 Nested models, growth on growth, missing data

Jackson, D. L. (2010). Reporting results of latent growth modeling and multilevel modeling analyses: Some recommendations for rehabilitation psychology. *Rehabilitation Psychology, 55*(3), 272-285. <http://www.library.illinois.edu/proxy/go.php?url=http://dx.doi.org//10.1037/a0020462>

Sonnenschein, S., Stapleton, L. M., & Benson, A. (2010). Native language proficiency, English literacy, academic achievement, and occupational attainment in limited-English-proficient students: A latent growth modeling perspective. *American Educational Research Journal, 47*(2), 358-389. <http://www.library.illinois.edu/proxy/go.php?url=http://dx.doi.org//10.3102/0002831209349215>

Nocentini, A., Calamai, G., & Menesini, E. (2012). Codevelopment of delinquent and depressive symptoms across adolescence: Time-invariant and time-varying effects of school and social failure. *Journal of Clinical Child & Adolescent Psychology*, *41*(6), 746-759. <http://search.ebscohost.com/login.aspx?direct=true&db=a9h&AN=83216310&site=ehost-live>

Week 13 GMM basics

Hirai, R., Frazier, P., & Syed, M. (2015). Psychological and sociocultural adjustment of first-year international students: Trajectories and predictors. *Journal of Counseling Psychology*, *62*(3), 438-452. <http://search.ebscohost.com/login.aspx?direct=true&db=bth&AN=108436058&site=ehost-live>

de Haan, A. D., Deković, M., den Akker, A. L., Stoltz, S. E., & Prinzie, P. (2013). Developmental personality types from childhood to adolescence: Associations with parenting and adjustment. *Child Development*, *84*(6), 2015-2030. <http://search.ebscohost.com/login.aspx?direct=true&db=sih&AN=91914645&site=ehost-live>

Bonanno, G. A., Mancini, A. D., Horton, J. L., Powell, T. M., LeardMann, C. A., Boyko, E. J., ... & Smith, T. C. (2012). Trajectories of trauma symptoms and resilience in deployed US military service members: Prospective cohort study. *The British Journal of Psychiatry*, *200*(4), 317-323. <http://www.library.illinois.edu/proxy/go.php?url=http://dx.doi.org//10.1192/bjp.bp.111.096552>

Choe, D. E., Stoddard, S. A., & Zimmerman, M. A. (2014). Developmental trajectories of African American adolescents’ family conflict: Differences in mental health problems in young adulthood. *Developmental Psychology,* 50(4), 1226-1232. <http://www.library.illinois.edu/proxy/go.php?url=http://dx.doi.org//10.1037/a0035199>

Week 14 GMM methodological

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**Student Profile**

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Program (Ph.D./Ed.D., etc; Department): \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_

Advisor: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Preferred e-mail address: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Phone number (in case email does not work): \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

What year of graduate school are you in? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

What kind of research participants and/or school subjects/domains are you most interested in?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

What ages/grades of participants are you most interested in? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

What statistics courses have you already taken:

|  |  |  |
| --- | --- | --- |
| Topic/course | Software used | Year taken (approx., e.g., 2010) |
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|  |  |  |
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Write down one or more research questions that would require longitudinal data analysis. These questions could be for a study you are planning, are involved in, or from a published study you have read.