Psyc 646 - Issues and Methods in Longitudinal/Developmental Research
Course Syllabus - Spring 2006
Dr. Adam Winsler

Instructor:	Adam Winsler, Ph.D.	Office:	2023 David King Hall
Phone:	703-993-1881	Office Hours:	Tues 11-12:00am, Wed 11-12:00am, + by appt.
Email:	awinsler@gmu.edu	URL:	http://classweb.gmu.edu/awinsler
Class Schedule	Tuesday 1:30–4:10 pm	Location:	ENT 277
Credit Hours:	3	Prerequisites:	PSYC 611/612

Course Description & Goals

Developmental psychology is all about studying stability and change in individual functioning over time. Other areas within psychology (i.e., I/O, Cognitive, Clinical, Biological) that have historically tended to study fixed, static, trait-like processes are now becoming increasingly interested in change processes over time within their respective units of analysis (groups, organizations, neuronal systems). Even developmental psychologists have, often, in the past, simply described what children are like at different ages rather than answered the more difficult questions of how and why individuals change over time. This is partly due to the fact that the field has only recently begun to develop sophisticated theories about the complex, dynamic nature of developmental systems. What is more, research methods and statistical procedures lag far behind contemporary developmental theory as most procedures have been based on static rather than dynamic models. Developmentalists (and others interested in change over time) must understand and make due with the methodological and statistical techniques that are currently available to the science. This course is designed to assist students as they grapple with such issues and has 4 major goals:

1) To help students think about the nature of development and different theories of change, and how these ideas may or may not fit well with current methods and statistics. We will explore current theoretical advances in understanding change over time, including contributions from developmental psychopathology, evolutionary psychology, behavior genetics, life-span development, and nonlinear, dynamic, transactional, and self-regulating developmental systems theories. Issues to be discussed for example, include probabilistic epigenesis, equifinality, intraindividual vs. interindividual stability and change over time, qualitative and quantitative development, linear vs. nonlinear change, reliability in measuring 'static' constructs vs. change over time in 'dynamic' constructs, unidimensional vs. multidimensional change, regressive and irreversible change, causality, mediation, moderation, and risk.

2) To understand current research methods, designs, and measurement issues in studying change. Topics include design options (cross-sectional, longitudinal, sequential, microgenetic, and cross-species experimental, quasi-experimental, and correlational designs) and measurement options (raw scores, difference/gain scores, covariates, individual growth curves, latent structural modeling...) for studying change over time.

3) To introduce students to various classic [Repeated Measures (M)ANOVA] and relatively new (Growth Curves and Survival Analysis) statistical procedures available for analyzing individual change over time.

4) To provide students with hands-on experience analyzing a longitudinal/developmental data set from start to finish.

Required Reading

1)   Selected articles (download from WebCT)

2)   Taris, T.W. (2000). <u>A primer in longitudinal data analysis</u>. Thousand Oaks, CA: Sage. (at bookstore)

3)   Singer, J. D., & Willett, J.B. (2003). <u>Applied longitudinal data analysis: Modeling change and event occurrence</u>. New York: Oxford University Press.   (at bookstore)

Additional free optional electronic resource that goes with the Singer/Willett text (Data sets and analysis code in SPSS and other stat packages) http://www.ats.ucla.edu/stat/examples/alda.htm

Course Requirements and Assignments

The activities of this course are designed to provide students with scaffolded learning experiences engaging in the skills and activities required in the culture of academia (i.e. engaging in scholarly discourse and group discussion, critically evaluating research, conceiving of and conducting data analyses, interpreting statistics, writing up research reports, and collaborating with others).

1)   **Class Participation** This is an advanced doctoral seminar course that requires active discussion and contribution from each member of the class. Each student is expected to have had some (in some cases - extensive) experience with at least some of the issues discussed in the class and the course will be greatly enhanced if we can benefit from each individual student's expertise.

Students' participation grade will be based on the instructor's rating of a) the quantity and quality of students' verbal participation in weekly seminars. Obviously, if you are not in class (for whatever reason - even a good one), you cannot participate that day and your participation grade will be affected.

2)   **Theory of Change Paper**

Students will write a paper (≈ 10-15 pages) on the student's own specific theory of development/change for a domain/construct of particular interest to the student. Student will articulate their conception of change in the construct of interest and refer to as many of the relevant terms and concepts discussed in class to date as possible. This paper can be on the same construct that is the topic of the data analysis project but it does not have to be.   Due in class on **Tuesday–March 21**.

3)   **Data Analysis Project**. The other main assignment in this course is for students to analyze a longitudinal, developmental data set from beginning to end: from coming up with a brief theory of change for the phenomenon, to deciding on questions and hypotheses, to deciding on the data manipulation techniques and statistical procedures needed to do the analyses, to running the procedures, to interpreting the results, to writing the research report. Students may use their own data set (if one is available to them, if it is longitudinal, with at least three time points AND if it is approved by the instructor) or one provided by the instructor. The data must already be in some kind of electronic form (i.e., database, spreadsheet, or statistical package file). Because of the depth of the work and the fact that the end result of this project may be eventually worthy of publication, students are encouraged to obtain a data set with which they have some reasonable personal interest/commitment. It is expected that multiple office meetings between students and the instructor will be needed in order to complete the assignment.

We will be using SPSS mostly for the course, but students may use whatever statistical package they like to analyze the data, however, two points qualify this statement : 1) the program needs to be able to do the analyses that are required to answer the questions well, and 2) the farther away you get from the

packages I know well, the less help I will be able to give you. A variety of different statistical procedures (some discussed in the class and some not) will likely be needed to answer the student's research questions, however, each student is required to include either a growth curve or a survival analysis.

<u>Students may work collaboratively with one (1) other student</u> for the data analysis project and, in fact, are strongly encouraged to do so. In this situation, one project would be turned in with both students' names on it.

The project will be divided into the following meaningful chunks and turned in along the way as follows:

<u>Phase I</u> - Definition/approval of the data set, variables, study design, and area of study.

A fairly-detailed, codebook-like description of all variables in the data set and the nature of the variables, plus a brief description of the study, its design, goals, and background. Due in class on **Tuesday – Feb 7**

<u>Phase II</u> – Conceptualization of Change, Research Questions, Hypotheses, and Data Analysis Plan

A list of the main research questions, the main hypotheses, and a very specific description of how you are going to go about testing the hypotheses (procedures used on what X and Y variables etc…). Also needed here is an articulation of how the construct(s) measured in your data set are conceptualized as changing. (A smaller version of the theory of change paper) Due in class on **Tuesday– Feb 28**.

<u>Phase III</u> - Exploratory Data Analysis (EDA)

Annotated output from your exploratory and preliminary analysis procedures, including data cleaning, transformations, data reduction, and recoding procedures if any. Also include a description of how the results of the EDA affect your data analysis strategy. Due in class on **Tuesday– April 4**.

<u>Phase IV</u> - Final Report

An APA style research report of the results of your analyses, complete with a brief introduction to the topic, a brief method and procedures section, an expanded results section (in which you describe what was done, and why, and what was found), and a brief discussion section. Due in class on **Tuesday– May 5**.

4) **Oral Presentation**. At either the university-scheduled time for the final exam or another time toward the end of the course negotiated by the class as a whole, students will give an oral presentation to their fellow class members briefly summarizing their course project, described above.

5) **Final Activity**. At the same meeting when we have the oral presentations (described above) students will complete/turn in/engage in some sort of final, cumulative, integrative review, activity/exercise/exam. The nature and format of this final activity will be decided upon and negotiated as a class and determined as soon as possible.

Grading Procedures

Students' final grades will be determined as follows:

• Project		50%	• Theory of Change Paper	20%
- Part I	5%		• Participation	10%
- Part II	10%		• Oral Presentation	10%
- Part III	10%		• Final Activity	10%
- Part IV	25%			

Materials Available on Reserve (Johnson Center Library or somehow)

1) Examples of good projects

Course Technology Use

The course website is located at: http://webct41.gmu.edu You will log into this with your own individual MyWebCT account, and from there access the Psyc 646 001 WebCT page. To do this, simply enter the URL above in any browser, log in with your mason username and regular email password (unless you have already changed your webct password). Then change your password to something you like/will remember by going to password settings. We will use WebCT this semester for four purposes:

1) Course Materials - Various course materials (syllabus, notes on readings, handouts, guidelines/grading criteria for assignments…) are/will be available from this site.

2) Online discussion and posting of materials - Discussion of and reflection on course content, inside and outside of class, is critical for sustained student learning and motivation. This semester, students in this course will not be limited to the discussion which occurs in the classroom. Using GMU's WebCT platform, students in this course may also participate in electronic discussions in which students type in messages that are stored in a central web location and are accessible for all other students in the course (and the instructor) to read and respond to. Students can also use this feature to post and share documents with other students in the class.

Tentative Course Outline

Date	Topic(s)	Reading(s)
Tuesday- Jan 24	Intro, Overview, and Planning of the Course + SPSS	
Tuesday– Jan 31	Probabilistic Epigenesis, Overlapping Wave, and Life Span Perspectives on Development	• Siegler (1996a) • Siegler (1996c) • Baltes et al. (1998) • Gottlieb (1998)
Tuesday– Feb 7	Transactional, Emergent, and Self-Organizing Developmental Systems **Phase I Due**	• Kazdin et al. (1997) • Cicchetti (1994) • Sameroff (2000) • Lewis (2000)
Tuesday– Feb 14	Risk, Causality, Mediation, Moderation, Time, and Longitudinal Research	• Richters (1997) • Bergman & Magnusson (1997) • Rutter & Pickles (1991) • Rutter (1997)
Tuesday– Feb 21	Variable-Based, Person-Oriented, and Microgenetic Approaches to Studying Development	• Taris (2000, Ch. 1) • Siegler (1996d) • Lavelli, et al. (2005) • Mitchell & James (2001)
Tuesday– Feb 28	Conceptualizing and Measuring Stability and Change - I **Phase II Due**	• Taris (2000, Ch. 3) • Collins (1991) • Patterson (1995) • Rogosa (1995)
Tuesday– Mar 7	Conceptualizing and Measuring Stability and Change - II	• Taris (2000, Ch. 4) • Kraemer (1994) • Taris (2000, Ch. 2) • van Geert & van Dijk (2002)
Tuesday– Mar 14	NO CLASS - SPRING BREAK	
Tuesday– Mar 21	Developmental Research Designs and Methodological Challenges **Theory of Change Paper Due**	• Tabachnick & Fidell (1996) • Winsler (2006) • van der Kloot (1998)
Tuesday– Mar 28	Individual Growth Curves - I	• Singer/Willett (2003, Ch. 1) • Singer/Willett (2003, Ch. 2) • Singer/Willett (2003, Ch. 3)
Tuesday– April 4	Individual Growth Curves – II **Phase III Due**	• Singer/Willett (2003, Ch. 4) • Singer/Willett (2003, Ch. 5)
Tuesday– April 11	Guest Lecture – Pat McKnight, Ph.D. The Bigger Growth Curve Modeling Picture: From Theories to Models to Analysis Options	• Raudenbush (2001) • Singer/Willett (2003, Ch. 8) • Figuerido et al. (2000)
Tuesday– April 18	Survival Analysis - I	• Taris (2000, Ch. 6) • Singer/Willett (2003, Ch. 9) • Singer/Willett (2003, Ch. 10)
Tuesday– April 25	Survival Analysis - II	• Singer/Willett (2003, Ch. 11) • Singer/Willett (2003, Ch. 12)

Tuesday– May 2	Introduction to Other Techniques for Analyzing Longitudinal Data
	  - Time Series Models, Sequential Analysis
	  - Correspondence Analysis, Log Linear Models
	  - Latent Class/Transition Analysis
	  - Configural frequency analysis
		• Taris (2000, Ch. 7)
		• Von Eye & Niedermeir (1999)
		• Collins et al. (2000)
		• Von Eye (2002)
		
		Phase IV Due 5/5 5:00pm

Tuesday- May 16	Final Activity – TBA (1:30-4:15?)	**Oral Presentations/Activity**

The Honor Code

Students in this course are expected to behave at all times in a manner consistent with the GMU Honor Code. The Honor Code (http://www.gmu.edu/departments/unilife/honorcode.html) provides good definitions of lying, stealing, cheating, and plagiarism. For purposes of clarity, the following guidelines for plagiarism will be used in this course for the writing of the paper:

Plagiarism =
- Copying, word for word, greater than about 25% of a sentence from someone else's work and having the words appear to be your own words. [Note: This is regardless of 1) the type of other person's work (whether or not it was published) and 2) whether or not you have given the person a citation after the text or a reference in the bibliography].
- Using greater than 25% of the words in someone else's sentence by switching around the order of words or phrases and having the words appear to be your own words (same notes apply, as above).
- Paraphrasing someone else's ideas or findings or sentences without giving them a citation and reference.
- Using the same paper for this course which has been (or will be) turned in for another course.

Students are encouraged to collaborate and study together as much as possible throughout the course. For collaborative papers, both students must contribute equally to the project, including relatively equal contributions to the actual writing. Violations of the Honor Code will not be tolerated in this course and will be immediately reported according to GMU procedures.

Accommodation for Students with Disabilities

It is the policy of the University and this instructor to make reasonable accommodations for qualified individuals with disabilities. Students who may have special needs because of a physical or learning disability are encouraged to contact the Disability Resource Center ASAP (222 Student Union I) 993-2474 http://www.gmu.edu/student/drc/ Students with disabilities who are in need of accommodation relative to class attendance/arrival, course requirements, or related aspects of course performance and who have already processed the necessary paperwork with Disability Support Services must initiate such a request in writing immediately, and prior to any anticipated need, to the instructor. Such requests will be accommodated within the reasonable constraints of fairness and timeliness with regard to the instructor and the other students enrolled in the course.

Reading List (Required)

Week 2 – Probabilistic Epigenesis, Overlapping Wave, and Life Span Perspectives on Development

1) Siegler, R.S. (1996a). Emerging minds: The process of change in children's thinking. New York: Oxford University Press. (Chapter 1 - "Whose children are we talking about?")

2) Siegler, R.S. (1996c). Emerging minds: The process of change in children's thinking. New York: Oxford University Press. (Chapter 4 - "Strategic Development: Trudging up the Staircase or Swimming with the Tide?").

3) Baltes, P.B., Lindenberger, U., & Staudinger (1998). Life-span theory in developmental psychology. In W. Damon (Ed.). R.L. Lerner (Vol. Ed.), Handbook of child psychology - 5th Edition - Volume 1: Theoretical models of human development (pp. 1029-1144). New York: Wiley & Sons. (Just pp. 1029-1059)

4)   Gottlieb, G. (1998). Normally occurring environmental and behavioral influences on gene activity: From central dogma to probabilistic epigenesis. <u>Psychological Review, 105</u>, 792-802.

Week 3 – Transactional Systems, Risk, Resilience, and Development

5)   Kazdin, A.E., Kraemer, H.C., Kessler, R.C., Kupfer, D.J., & Offord, D.R. (1997). Contributions of risk-factor research to developmental psychopathology. <u>Clinical Psychology Review, 17</u>, 375-406.

6)   Cicchetti, D. (1994). Integrating developmental risk factors: Perspectives from developmental psychopathology. In C.A. Nelson (Ed.), <u>Threats to optimal development: Integrating biological, psychological, and social risk factors</u> (pp. 285-325). Hillsdale, NJ: Lawrence Erlbaum Associates.

7)   Sameroff, A. J. (2000). Developmental systems and psychopathology. <u>Development and Psychopathology, 12</u>, 297-312.

8)   Lewis, M. D. (2000). The promise of dynamic systems approaches for an integrated account of human development. <u>Child Development, 71,</u> 36-43.

Week 4 - Variable-Based vs. Person-Oriented Analyses and Person-Environment Interactions

9)   Richters, J.E. (1997). The Hubble hypothesis and the developmentalist's dilemma. <u>Development and Psychopathology, 9,</u> 193-229.

10)   Bergman, L.R., & Magnusson, D. (1997). A person-oriented approach in research on developmental psychopathology. <u>Development and Psychopathology, 9</u>, 291-319.

11)   Rutter, M., & Pickles, A. (1991). Person-environment interactions: Concepts, mechanisms, and implications for data analysis. In D. Wachs & R. Plomin (Eds.), <u>Conceptualization and measurement of organism-environment interaction</u> (pp. 105- 141). Washington, DC: APA.

12)   Rutter, M. L. (1997). Nature-nurture integration: The example of antisocial behavior. <u>American Psychologist, 52</u>, 390-398.

Week 5 – Longitudinal and Microgenetic Designs – Dealing with Time

13)   Taris (2000). Chapter 1 – "Longitudinal Data and Longitudinal designs"

14)   Siegler, R.S. (1996d). <u>Emerging minds: The process of change in children's thinking</u>. New York: Oxford University Press. (Chapter 7 - "How children generate new ways of thinking").

15)   Lavelli, M., Pantoja, A.P.F., Hsu, H, Messinger, D., & Fogel, A. (2005). Using microgenetic designs to study change processes. In D.M. Teti, (Ed.), <u>Handbook of research methods in developmental science</u> (pp. 40-65). Malden, MA: Blackwell.

16)   Mitchell, T.R., & James, L.R. (2001). Building better theory: Time and the specification of when things happen. <u>Academy of Management Review, 26</u>, 530-547.

Week 6 - Conceptualizing and Measuring Stability and Change

17)   Taris (2000). Chapter 3 – Measuring Concepts Across Time: Issues of Stability and Meaning"

18)   Collins, L. (1991). Measurement in longitudinal research. In L.M. Collins & J.L. Horn (Eds.). <u>Best methods for the analysis of change</u> (pp. 137-148). Washington, DC: American Psychological Association.

19)   Patterson, G.R. (1995). Orderly change in a stable world: The antisocial trait as a chimera. In J.M. Gottman (Ed.), <u>The analysis of change</u> (pp. 83-101). Mahwah, NJ: Lawrence Erlbaum Associates.

20)   Rogosa, D. (1995). Myths and methods: "Myths about longitudinal research" plus supplemental questions. In J.M. Gottman (Ed.), <u>The analysis of change</u> (pp. 3-66). Mahwah, NJ: Erlbaum.

Week 7 - Developmental Research Designs - Methodological Challenges

21)   Taris (2000). Chapter 4 – "Issues in Discrete Time Panel Analysis"

22)   Kraemer, H. C. (1994). Special methodological problems of childhood developmental follow-up studies: Focus on planning. In S.L. Friedman & H.C. Haywood (Eds.), Developmental follow-up: Concepts, domains, and methods (pp. 259-276). San Diego, CA: Academic Press.

23)   Taris (2000). Chapter 2 – "Nonresponse in Longitudinal Research"

24)   van Geert, P., & van Dijk, M. (2002). Focus on variability: New tools to study intra-individual variability in developmental data. Infant Behavior & Development, 25, 340-374.

Week 8 – Exploratory Data (and Classic) Analysis of Longitudinal Data – Repeated-Measures (M)ANOVA

25)   Tabachnick, B.G., & Fidell, L.S. (1996). Chapter 4 - Cleaning up your act: Screening data prior to analysis. In B.G. & Tabachnick & L.S., Fidell, Using multivariate statistics (pp. 57-125). New York: Harper Collins.

26)   Winsler, A. (2006) The big data analysis picture. Unpublished document. George Mason University

27)   van der Kloot W. (1998). Univariate and multivariate analysis of variance of longitudinal data. In C.C.J.H. Bijleveld & L.J. Van der Kamp (Eds.), Longitudinal data analysis: Designs, models, & methods (pp. 155-206). Thousand Oaks, CA: Sage Publications.

Week 9 - Individual Growth Curves I

28)   Singer & Willett (2003). Chapter 1 – "A Framework for Investigating Change Over Time"

29)   Singer & Willett (2003). Chapter 2 – "Exploring Longitudinal Data on Change"

30)   Singer & Willett (2003). Chapter 3 – Introducing the Multilevel Model For Change"

Week 10 - Individual Growth Curves II

31)   Singer & Willett (2003). Chapter 4 – "Doing Data Analysis with the Multilevel Model For Change"

32)   Singer & Willett (2003). Chapter 5 – "Treating TIME More Flexibly"

Week 11 - Individual Growth Curves II

33)   Raudenbush, S.W. (2001). Toward a coherent framework for comparing trajectories of individual change. In L.M. Collins & A.G. Sayer (Eds.), New methods for the analysis of change (pp 35-64). Washington, DC: American Psychological Association.

34)   Singer & Willett (2003). Chapter 8 – Modeling Change Using Covariance Structure Analysis"

35)   Figuerido, A.J., Brooks, A.J., Leff, H.S. & Sechrest, L. (2000). A meta-analytic approach to growth curve analysis. Psychological Reports, 87, 441-465.

Week 12 - Survival Analysis I

36)   Taris (2000). Chapter 6 – "Analyzing Durations"

37)   Singer & Willett (2003). Chapter 9 – "A Framework for Investigating Event Occurrence"

38)   Singer & Willett (2003). Chapter 10 "Describing Discrete-Time Event Occurrence Data"

Week 13 - Survival Analysis II

39)   Singer & Willett (2003). Chapter11 – "Fitting Basic Discrete-Time Hazard Models"

40)   Singer & Willett (2003). Chapter 12 – "Extending the Discrete-Time Hazard Model"

Week 14 - Other Techniques for Analyzing Longitudinal Data (Configural Frequency Analysis, Correspondence Analysis, Sequential Analysis, Loglinear Models)

41)   Taris (2000, Ch. 7) "Analyzing sequences"

42)   Von Eye, A., & Niedermeir, K.E. (1999). <u>Statistical analysis of longitudinal categorical data in the social and behavioral sciences</u>. Mahwah, NJ: Erlbaum. (Ch. 1 – "Describing Categorical Variables," Ch. 2 – "Log-linear Modeling," & Ch. 3 – Log-linear Models for Repeated Observations")

43)   Collins, L.M., Hyatt, S.L., & Graham, J.W. (2000). Latent transition analysis as a way of testing models of stage-sequential change in longitudinal data. In T.D. Little, K.U. Schnabel, & J. Baumert (Eds.), <u>Modeling longitudinal and multilevel data</u> (pp. 147-161). Mahwah, NJ: Erlbaum.

44)   Von Eye, A. (2002). <u>Configural frequency analysis: Methods, Models, and applications</u>. Mahwah, NJ: Erlbaum. (Chapter 1- "Introduction: The goals and steps of configural frequency analysis")

PSYC 646 – Spring 2006 - Student Information

Name   _____

G#   _____

Major/Program/Year   _____

Phone Number(s)   _____

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Email Address(es)   _____

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