PSY 63100: Applied Regression
Spring 2024

Lecture: Tuesday & Thursday from 9:30 to 10:20
In-person: PSYC 3102
Zoom: https://purdue-edu.zoom.us/j/94340071886

Lab: Friday from 10:30 to 11:20 in Peirce 255

Instructor: Don Lynam, Ph.D
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TA: Dani Larranaga McGough
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Office hours: Tuesdays and Thursdays from 10:30 to 11:30 & by appointment
Location: PRCE 172

Textbook:
Cohen, J., Cohen, P., West, S.G., & Aiken, L.S. (2003). *Applied multiple regression/correlation analysis for the behavioral sciences (3rd Edition)*. Mahwah, NJ: LEA
Permalink:
https://purdue.primo.exlibrisgroup.com/permalink/01PURDUE_PUWL/ufs51j/alma9917062844480108 1

Additional Readings:
Hoyle, R. H., Lynam, D. R., Miller, J. D., & Pek, J. (2023). The questionable practice of partialing to refine scores on and inferences about measures of psychological constructs. *Annual Review of Clinical Psychology, 19*, 155-176.
MacKinnon, D.P., Krull, J.L., & Lockwood, C.M. (2000). Equivalence of the mediation, confounding, and suppression effect. *Prevention Science, 1*, 173-181.
Miller, G. A., & Chapman, J. P. (2001). Misunderstanding analysis of covariance. *Journal of Abnormal Psychology, 110*, 40-48.
Baranger, D.A.A., Finsaas, M.C., Goldstein, B.L., Vize, C.E., Lynam, D.R., Olino, T.M. (2023). Tutorial: Power Analyses for Interaction Effects in Cross-Sectional Regressions. *Advances in Methods and Practices in Psychological Science, 6*, 1-13. doi:10.1177/25152459231187531

Course Process:
This course will be taught primarily in person, but some lectures will be via Zoom. There are two parts to this course—lecture and lab. Lectures will be given on Tuesdays and Thursdays in person when possible and via zoom otherwise. Lab meets in person every Friday.

Course Website:

I will use BrightSpace to conduct some of the business of this course. All lectures, assignments, data, and written materials will be available on BrightSpace. I will also post my powerpoint slides, output files, and syntax files used in lectures. I will also post all of my lectures from the last time I taught the course—which was entirely on-line and asynchronous. You should check the course site regularly. Any changes in the schedule, course assignments, news, etc. will be posted at the site.

Course Description

The purpose of this course is to provide an in-depth examination of the underpinnings and use of multiple regression analysis in the behavioral sciences. This purpose will be achieved through instructor lectures, text readings, homework assignments, and hands-on analyses. By the end of the class, students should:

1. have a basic understanding of the General Linear Model, the data requirements for ordinary least squares regression analyses, and the computational details of simple, multiple, and hierarchical regression analyses;
2. be able to use multiple regression analysis as a general approach to research design and data analysis for studies with multiple predictors, sets, mediators, moderators, and within-subjects factors;
3. be able to interpret and critique results of correlation and multiple regression analyses appearing in the literature;
4. be able to apply multiple regression analyses to data of their own;
5. be able to write-up the results of multiple regression analyses.

Course Components

Readings: The readings for the course come from a text by Cohen, Cohen, West, and Aiken. It is one of the most widely used textbook on regression in the social sciences and can be found on the shelf of almost every social science researcher. This text is among the most straightforward statistical texts that you will ever encounter. This, however, does not mean that it is easy to understand. You should take the readings very seriously and spend a lot of time on them. You should work through derivations. You should highlight and reread the chapters. This should all be done before coming to class; to the extent that you can come to lectures with questions, you will get more out of the class. There are also several additional required readings dealing with specific issues in the use of regression.

Homework: You will complete 6 homework assignments throughout the semester. Assignments must be completed by the beginning of the lab session; your TA will note whether you have completed the assignment or not. Answers will be reviewed during the lab sessions. Homework counts for 10% of your final grade.

Computer: This is not a computer course, but the analyses will require the use of a computer. You will be provided with tutorials on good data management strategies and, using R on the PC. For homework assignments you will be given skeletal programs that require minimal editing to produce the output that will be discussed in class.

Exams: You will complete two exams. The first exam is quite conceptual, whereas the second is more applied. Each exam will count 30% towards your grade for the course.

Presentation: Because application increases understanding, you will give a 6 minute (and I mean only 6 minutes) presentation in which you describe and evaluate a published application of multiple regression analysis. You must choose an article published in a major journal in your field. The presentation will contribute 10% to your final grade. In the presentation, you must:

1. State the research question.
2. Describe how multiple regression analysis addressed the primary research question.
3. Critique the presentation of the results (tables, figures, details about the analyses)
4. Discuss whether or not multiple regression was the appropriate procedure to use in order to test the research question. Discuss additional analyses that might have been useful to conduct.

Research Report: Because learning will be even further facilitated by applying regression to your own data, you will do exactly that. The primary product of the course will be a written report of a multiple regression analysis you conduct on data of your choosing. Reports must include:

1. A brief statement of the research question and the hypotheses.
2. A detailed methods section.
3. A detailed results section.
4. A short conclusion section.

Two weeks before the write-ups are due, you will provide a copy of your draft write-up to two members of the class to review and receive two drafts of other write-ups to review. You will provide (and receive) two written reviews of the write-ups. The final report will count for 20% of your grade.

Final Grade: Your grade will be determined based on the average percentage of points obtained on the following course components:

Exam 1:	30%
Exam 2:	30%
Homework:	10%
Presentation:	10%
Research Report:	20%

I anticipate that final grades will be assigned according to the following scale:

A:		>	90%
B:	80%	-	89%
C:		<	80%

Academic Integrity Students are advised to familiarize themselves with the University's regulations regarding student conduct in academic endeavors. This information is located at the following website: http://www.purdue.edu/univregs/pages/stu_conduct/stu_regulations.html. Students who are suspected to be in violation of the University's regulations regarding academic dishonesty, including but not limited to plagiarism and cheating, will be dealt with in accordance with University policy. This may result in a referral to the Office of the Dean of Students and penalties for the assignment(s) in question.

Course Outline and Tentative Reading and Lecture Schedule (subject to change)

Course Date	**Topic and Readings**
Week of Jan. 8	**Lecture:** Ch 1; overview; GLM and OLS; NHST **Lab:** Intro to data set
Week of Jan. 15	**Lecture:** Ch 2.1-2.3; bivariate correlation; **Lab:** Intro to R and SPSS
	Lecture: Ch 2.simple regression, significance tests, Cis, power **Lab:** Homework 1
Week of Jan. 29	**Lecture:** Ch 3.1-3.5; multiple regression with multiple predictors **Lab:** running regressions in R and SPSS
Week of Feb. 5	**Lecture:** Ch 3.5-3.9; significance tests, coefficients, precision, power **Lab**: Homework 2
Week of Feb. 12 (**no class on Thurs)**	**Lecture:** Ch 4; data diagnostics, Ch 5.1-5.2 research questions answered by various coefficients **Lab:** graphical examinations
Week of Feb. 19	**Lecture:** Research questions continued… Miller & Chapman (2001); Lynam et al., (2006); MacKinnon et al. (2000) **Lab:** review/wrap up **EXAM 1 (Thursday)**
Week of Feb. 26 (**no class on Thurs**)	**Lecture:** Ch 5.3; introduction to hierarchical analysis **Lab:** review of exam
Week of Mar. 4	**Lecture:** Ch 5.4; analysis of sets **Lab:** Homework 3
Week of Mar, 11	**Spring Break**
Week of Mar. 18	**Lecture:** Ch 7.1- 7.3; interactions with continuous variables **Lab:** Homework 4 Vize et al. (2022)
Week of Mar. 25	**Lecture:** Ch 8 coding schemes **Lab:** working with sets

Week of Apr. 1	**Lecture:** Ch 9 interactions with nominal scales **Lab:** Homework 5
Week of Apr. 8	**Lecture:** Catch Up **Lab:** Homework 6 **Paper draft due**
Week of Apr. 15	**Lecture and Lab:** Presentations **EXAM 2 (Thursday)**
Week of Apr. 22	**Lecture:** Presentations **Lab:** review of exam
Wednesday, May. 1	**Papers due by 3 pm**