

Multiple Regression in Educational Research

EDUC 642 – 4 Credits – CRN 12118

University of Oregon – College of Education - Department of Educational Methodology, Policy, and Leadership

2017 FALL Term Syllabus

Meeting Days/Time: Tuesdays 16:00-19:50

Location: HEDCO 142

INSTRUCTOR	
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Office Hours:	Fridays 9:00-11:00am in Lokey Education 102K or by appointment (virtual/online meetings are also possible).

DESCRIPTION

The goal of the course is to learn how to apply and use multiple regression in educational research. Topics covered include a review of bivariate regression and extensive coverage of multiple regression with continuous and categorical independent variables, regression diagnostics, and interactions. Additional topics include orthogonal and nonorthogonal designs, selected post hoc analyses, and logistic regression. Computer analysis using SPSS for Windows, conceptual understanding, and applications to educational research are stressed.

OBJECTIVES

In this course, you will:

- Become knowledgeable about multiple regression.
- Learn to conduct and interpret multiple regression analyses.
- Become a critical consumer of approaches to multiple predictor analyses.
- Become acquainted with advanced topics in multiple regression.

COURSE PREREQUISITES

An intermediate course in statistics (e.g., EDUC 640) is required. Computer skills are necessary to conduct research efficiently and effectively. This course will use the **SPSS statistical software package**. If you are not familiar with SPSS or if you have a strong commitment to another statistical software package, please discuss with instructor immediately.

TEXTBOOKS & READING MATERIALS

TITLE	AUTHOR	Abbreviation	Required/Optional
<i>Multiple regression in behavioral research (3rd Ed.).</i>	Pedhazur, E. J.	P	Required
<i>Applied regression: An introduction.</i>	Lewis-Beck, M. S.	L-B	Optional
<i>Interaction effects in multiple regression (2nd Ed.).</i>	Jaccard, J., & Turrisi, R.	J&T	Optional
<i>Publication manual of the American Psychological Association (6th Ed.).</i>	APA		Optional

The Pedhazur book is **out-of-print** but it along with the other optional texts can be purchased online via any number of general and academic book resellers. In Pedhazur, we will cover Chapters 1-11 and 14 (excluding Chapters 4 and 6), and also topics in additional Chapters as time permits.

A good strategy for mastering the course material is to read the first three chapters right away and then a minimum of one chapter each week. You can then review and **reread** chapters as topics are discussed in class; generally speaking, most people need to read statistics texts more than once to understand them. *I also encourage you to complete the chapter exercises (labeled "Study Suggestions") at the end of each chapter if you want to fully master the material.*

The optional texts (Lewis-Beck; Jaccard & Turrisi) on regression are **highly recommended for students who find Pedhazur difficult to comprehend**. Students have generally found these texts more approachable; plus, it is always good to hear things explained another way. In addition, they are inexpensive and available as e-texts as well. Note that these texts **cannot be used as alternatives** to Pedhazur, but rather as **supplements** (or even pre-reading material).

Additional readings and handouts on multiple regression may be posted on the course website or provided via e-mail.

OTHER MULTIPLE REGRESSION REFERENCES AND RESOURCES:

- Afifi, A., Clark, V. A., & May, S. (2004). *Computer-aided multivariate analysis* (4th Ed.). Boca Raton, FL: Chapman & Hall. (This book also goes into more advanced topics.)
- Aiken, L. S., & West, S. G. (1991). *Multiple regression: Testing and interpreting interactions*. Newbury Park: Sage.
- Fox, J. (1991). *Regression diagnostics*. Thousand Oaks: Sage.
- Grimm, L. G., & Yarnold, P. R. (1995). *Reading and understanding multivariate statistics*. Washington, DC: APA. (This book also goes into more advanced topics.)
- Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. Guilford Press. (Note that a second edition is coming out in December; I highly recommend purchasing the new edition.)

COURSE WEBSITE

We will use Canvas as the main course website. You will go here for announcements, assignments, datasets, grades, etc.

COURSE STRUCTURE

EDUC 642 course meetings will consist of a combination of lectures, question and answer, group discussion, and in-class lab work. In-class lab work, take-home quizzes and exercises, and a final paper are required, as well as regular participation and discussion in class. Attendance at all classes is strongly encouraged! Students are responsible for content covered in any missed classes. If you require special arrangements for any class activities or assignments, please contact the instructor as soon as possible.

SCHEDULE OF TOPICS AND ASSIGNMENTS

WEEK	TOPIC	READ BEFORE CLASS	ASSIGNMENTS	
1	Introduction and overview; Review of simple linear regression and correlation concepts	P: Chs 1-3 (L-B: pp. 9-47)	<i>Correlations and Residuals Quiz Available</i>	
2	Dummy coding; ANOVA and simple and multiple regression	P: Ch 5 & 11 (L-B: pp. 47-54; 66-71)	<i>Coding Exercise Available</i>	Correlations and Residuals Quiz Due
3	Multiple regression with continuous variables	P: Ch 5 (L-B: pp. 47-54)	<i>MR w/ one continuous IV Quiz Available</i>	Coding Exercise Due
4	Regression diagnostics	P: Ch 3 (L-B: pp. 37-43)	<i>Diagnostics Exercise Available</i>	MR w/ one continuous IV Quiz Due
5	Statistical control: Partial and semipartial correlation; Prediction	P: Chs 7 & 8	<i>Semipartial correlations Quiz Available</i>	Diagnostics Exercise Due
6	Prediction; Variance Partitioning;	P: Chs 8 & 9 (L-B: pp. 56-66)	<i>Commonality vs. partitioning Exercise Available</i>	Semipartial correlations Quiz Due
7	Analysis of Effects	P: Chs 10	<i>Multicollinearity Quiz Available</i>	Commonality vs. partitioning Exercise Due
8	Interaction effects Guest lecture: Dr. Joe Stevens	P: pp. 425-430, Ch 14 (L-B: pp. 54-56; J&T: pp. 1-43) Draft brief on Canvas	<i>Interpreting interactions Exercise Available</i>	Multicollinearity Quiz Due
9	Interaction effects continued	P: Chs 14 (J&T: pp. 43-60)	<i>Interaction Paper Available</i>	Interpreting interactions Exercise Due
10	Logistic regression; Polynomial regression; Multilevel analysis; Structural equation models	P: Chs 13, 16, 17, 18		
11	EXAM WEEK			Interaction Paper Due 12/5 before midnight

Note: The pace at which we cover the material may be adapted as the class progresses. Office hours are held weekly on Friday from 9am to 11am in Lokey Education 102K, except for Weeks 2 and 9 when substitute hours will be held. Week 2 hours are 10/5, 2-5pm in 102K. Week 9 will be announced.

GRADING POLICY

Your final grade for this course will be determined based on the following course activities and assignments:

- ❑ In-Class Labs and Participation = 15%
- ❑ Quizzes = 20%
- ❑ Exercises = 40%
- ❑ Paper = 25%

Your final grade will be based on the weighted sum of the percentages earned for each course activity/assignment. Each component is described in greater detail below. Final letter grades for the course will be calculated as follows:

A+	97-100%	A	93-96.9%	A-	90-92.9%
B+	87-89.9%	B	83-86.9%	B-	80-82.9%
C+	77-79.9%	C	73-76.9%	C-	70-72.9%
D+	67-69.9%	D	63-66.9%	D-	60-62.9%
		F	< 59.9%		

Please note that if this class is taken P/NP, 80% or higher is required to pass the class.

Note that regular attendance is assumed and will be gauged via labs.

Any and all requests for review of a given grade must be taken up outside of class (i.e., not before, during, or after class); instead, make use of office hours and email.

Late work will be penalized a minimum of 10%. Work is due at the beginning of the class on the due date (whether or not you are present in class). Any instance of academic dishonesty (e.g., plagiarism, disallowed collaboration) will result in a score of zero for the assignment. Collaboration is allowed on labs, but all work on quizzes, exercises, and papers should be your own independent work.

IN-CLASS LAB WORK AND PARTICIPATION

Throughout the quarter, students are expected to work **individually or in groups** to practice assignments and techniques in running and interpreting analyses **using SPSS** (this will usually be during the last part of the class session). Therefore, one or more students in a group **must have a laptop equipped with SPSS**. This work will be guided by an assigned exercise and discussion questions. In addition, students are encouraged to **ask questions when they do not understand content**. There are **no bad questions**.

Lab groups are formed on Canvas on a weekly basis based on who sits together. Work must be turned in electronically on Canvas. **Lab work and participation** make up 15% of your grade and **are graded pass/fail only. Labs are due at the end of class**. Do not leave without ensuring your lab work has been uploaded to Canvas.

QUIZZES

The purpose of the quizzes is to provide you with practice in fundamental activities used in multiple regression analyses. There will be 4 quizzes during the quarter, and they alternate weekly with Exercises (described below). Each will be **available on Canvas one week before they are due**.

Quizzes:

- Should be completed independently;
- Are taken on Canvas;
- Are graded;
- Allow for up to two attempts;
- Have no time limit; and
- Are always **due at the beginning of class on the announced due date.**

Correct answers and feedback will be provided after the quiz due date and time have passed, so **quizzes cannot be made up nor can extensions be offered.** Each quiz is worth 5% of your grade, and together amount to a total of 20% of your grade.

NOTE: *It is generally a good idea to start working on each quiz early in the week so that you have adequate time to complete it. Quizzes are open-book and not intended to be tricky; if a question seems unduly confusing, check with the instructor.*

EXERCISES

The purpose of the exercises is to provide you with independent practice in fundamental activities used in multiple regression analyses. There will be 4 exercises during the quarter, and they alternate weekly with Quizzes (described above). Each will be **available on Canvas one week before they are due.**

Exercises should be completed **individually and not in collaboration with other students.** All exercises are always **due at the beginning of class on the announced due date.**

Exercises:

- Should be completed independently;
- Are turned in during class the day they are due;
- Are peer reviewed in class the same day they are due;
- Are graded pass/fail;
- Have no time limit; and
- Are always **due at the beginning of class on the announced due date.**

Model answers will be reviewed in class on the exercise due date, so **exercises cannot be made up nor can extensions be offered.** Each exercise is worth 10% of your grade, and together amount to a total of 40% of your grade.

You will receive *full credit for an earnest attempt at completing the exercise*, but sloppy or incomplete work will receive no credit. During the peer review, students will highlight and annotate a peer's assignment based on the model answers and then turn in the exercise. The annotated exercises will be returned to students at the following class.

NOTE: The exercises in this course may differ substantially from those you have completed for other courses. They require 1-3 hours and function as a support of your mastery of both the mechanics of statistical analyses and the concepts covered in class. *It is generally a good idea to start working on each exercise within 48 hours of class so that the requisite ideas are still fresh, and you have adequate time to complete the exercise.*

FINAL

The purpose of the final is to provide you with extended experience in using, reporting, and interpreting multiple regression. The final will build on one of the exercises you complete during the term. The final assignment will be **distributed two weeks before it is due**. Papers must be completed independently.

Additional requirements.

- It must be submitted in a Microsoft Word or similar format document on Canvas.
- *Where APA style is requested, you will also be scored on adherence to APA guidelines for the reporting and discussion of statistics.* (Students desiring to use a different style may do so if they alert the instructor of which style will be used at the beginning of the term.)
- It must also **include your SPSS output with syntax**. You may either copy and paste into the end of your document or supply the .spv file.

Up to two points of extra credit will be offered for those who produce *equations* using the word processing equation tool (*not* the symbol tool). Googling will reveal several handy resources for the most common tools.

The final is **due on Tuesday, December 5th before midnight and should be uploaded to Canvas**. The final is worth 25% of your grade.

The final is graded, and you will receive detailed, individualized feedback.

NOTE: The final in this course may differ substantially from those you have completed for other courses. **You are asked not only to conduct analyses and report results but to interpret them and provide rationale for your interpretations.** It is a good idea to start working on the final as soon as it is available so that you have adequate time to complete it.

EXTENSIONS

Our class is traditionally a large one. As such, granting individual extensions is a rare occurrence.

No extensions for quizzes or exercises are allowed, although in rare circumstances, students may be provided with an alternate activity. Alternates will be provided only in cases of unforeseeable and dire circumstances (e.g., severe illness, family emergency).

Extensions for the final will be granted in cases of unforeseeable and dire circumstances (e.g., severe illness, family emergency). Note that travel and poor time management are not considered dire circumstances. Late finals that have not been granted an extension *will* incur a minimum late penalty deduction of 10% of the maximum grade.

ATTENDANCE AND ABSENCE GUIDELINES

Attendance is required to succeed in this course and master the course material. If a student does miss class, it is the student's responsibility to get class notes, and handouts or other distributed materials. Students must contact the instructor in case of illness or emergencies that preclude 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. On a case-by-case basis, the instructor will determine whether the emergency qualifies as an excused absence.

OFFICE HOURS

Office hours are held weekly on Fridays from 9am to 11am in Lokey Education 102K, except for Weeks 2 and 9 when substitute hours will be held. Week 2 hours are 10/5, 2-5pm in 102K. Week 9 hours will be announced in the future, and additional hours in Week 10 and Exam Week are also likely to be scheduled.

Office hours are open drop-in times. Therefore, if you wish to meet with the instructor individually, set up a different time.

Attending office hours on a regular basis is strongly recommended. It is acceptable to bring work in progress to office hours and to work on assignments during office hours. Although answers will not be given, the instructor will give hands-on guidance and feedback. Students are also encouraged to practice analyses learned in class on data of their own (or their advisor's) during office hours.

EXPECTED CLASSROOM BEHAVIOR

Classroom expectations include:

- ☐ Participate actively in class activities.
- ☐ Respect the diversity of cultures, opinions, viewpoints in the classroom.
- ☐ Listen to fellow students, professors, and lecturers with respect.
- ☐ Arrive on time, prepared for class.
- ☐ Attend for the duration of class.
- ☐ Return from breaks in a timely manner.
- ☐ Do not read other materials, books, or newspapers.
- ☐ Do not use laptops for email, surfing, or other activities unrelated to class.
- ☐ Turn off cell phones and other electronic devices.
- ☐ Racist, homophobic, sexist, and other disrespectful comments will not be tolerated.

Eating during class is allowed, but please try to keep noise and mess to a minimum. Food waste should be disposed of **outside the classroom**. **If you open a window or door, it is your responsibility to close it when class is over.**

DIVERSITY, EQUITY AND INCLUSION

It is the policy of the University of Oregon to support and value equity and diversity and to provide inclusive learning environments for all students. 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.

In this course, class discussions, projects/activities and assignments will challenge students to think critically about and be sensitive to the influence, and intersections, of race, ethnicity, nationality, language, religion, gender, socioeconomic background, physical and cognitive ability, sexual orientation, and other cultural identities and experiences. Students will be encouraged to develop or expand their respect and understanding of such differences.

Maintaining an inclusive classroom environment where all students feel able to talk about their cultural identities and experiences, ideas, beliefs, and values will not only be my responsibility, but the responsibility of each class member as well. Behavior that disregards or diminishes another student will not be permitted for any reason. This means that no racist, ableist, transphobic, xenophobic, chauvinistic or otherwise derogatory comments will be allowed. It also means that students must pay attention and listen respectfully to each other's comments.

DOCUMENTED DISABILITY

Appropriate accommodations will be provided for students with documented disabilities. If you have a documented disability and require accommodation, arrange to meet with the course instructor within the first two weeks of the term. The documentation of your disability must come in writing from the Accessible Education Center in the Office of Academic Advising and Student Services. Disabilities may include (but are not limited to) neurological impairment, orthopedic impairment, traumatic brain injury, visual impairment, chronic medical conditions, emotional/psychological disabilities, hearing impairment, and learning disabilities. For more information on Accessible Education Center, please see <http://aec.uoregon.edu>.

MANDATORY REPORTING OF CHILD ABUSE

UO employees, including faculty, staff, and GEs, are mandatory reporters of child abuse. This statement is to advise you that that your disclosure of information about child abuse to a UO employee may trigger the UO employee's duty to report that information to the designated authorities. Please refer to the following links for detailed information about mandatory reporting:

<http://hr.uoregon.edu/policies-leaves/general-information/mandatory-reporting-child-abuse-and-neglect>

REPORTING TITLE IX EXPERIENCES

Any student who has experienced sexual assault, relationship violence, sex or gender-based bullying, stalking, and/or sexual harassment may seek resources and help at safe.uoregon.edu. To get help by phone, a student can also call either the UO's 24-hour hotline at 541-346-7244 [SAFE], or the non-confidential Title IX Coordinator at 541-346-8136. From the SAFE website, students may also connect to Callisto, a confidential, third-party reporting site that is not a part of the university.

Students experiencing any other form of prohibited discrimination or harassment can find information at respect.uoregon.edu or aaeo.uoregon.edu or contact the non-confidential AAEO office at 541-346-3123 or the Dean of Students Office at 541-346-3216 for help. As UO policy has different reporting requirements based on the nature of the reported harassment or discrimination, additional information about reporting requirements for discrimination or harassment unrelated to sexual assault, relationship violence, sex or gender based bullying, stalking, and/or sexual harassment is available at <http://aaeo.uoregon.edu/content/discrimination-harassment>

Specific details about confidentiality of information and reporting obligations of employees can be found at <https://titleix.uoregon.edu>.

The instructor of this class will direct students who disclose sexual harassment or sexual violence to resources that can help and has the responsibility to report the information shared

with them to the university administration. The instructor of this class is required to report all other forms of prohibited discrimination or harassment to the university administration.

ACADEMIC MISCONDUCT POLICY

All students are subject to the regulations stipulated in the UO Student Conduct Code (<http://conduct.uoregon.edu>). 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 witnessed 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 the Associate Dean for Academic Affairs and Equity (Krista Chronister, 346-2415, kmg@uoregon.edu). Outside the College, you can contact:

- UO Bias Response Team: 346-3216 <http://bias.uoregon.edu/whatbrt.htm>
- Conflict Resolution Services 346-3216 <http://studentlife.uoregon.edu/support>
- Affirmative Action and Equal Opportunity: 346-3123 <http://aaeo.uoregon.edu/>

GRIEVANCE POLICY

A student or group of students of the College of Education may appeal decisions or actions pertaining to admissions, programs, evaluation of performance and program retention and completion. Students who decide to file a grievance should follow the student grievance procedure, or alternative ways to file a grievance outlined in the Student Grievance Policy (<https://education.uoregon.edu/academics/student-grievance>) or enter search: student grievance.

IN CASE OF INCLEMENT WEATHER

In the event the University operates on a curtailed schedule or closes, UO media relations will notify the Eugene-Springfield area radio and television stations as quickly as possible. In addition, a notice regarding the university's schedule will be posted on the UO main home page (in the "News" section) at <http://www.uoregon.edu>. Additional information is available at <http://hr.uoregon.edu/policy/weather.html>.

If an individual class must be canceled due to inclement weather, illness, or other reason, a notice will be posted on Blackboard or via email. During periods of inclement weather, please check Blackboard and your email rather than contact department personnel. Due to unsafe travel conditions, departmental staff may be limited and unable to handle the volume of calls from you and others.

COURSE INCOMPLETE POLICY

Students are expected to be familiar with university policy regarding grades of "incomplete" and the time line for completion. For details on the policy and procedures regarding incompletes, please see: <https://education.uoregon.edu/academics/incompletes-courses>.