Field Experiments in Education Research
ED PSYCH 711-003 – Spring 2025

Lecture	Tues/Thur 1:00 – 2:15 pm
Room	Education Sciences 218
Credits	3 credits[1]
Instruction	Face-to-face
Website	https://canvas.wisc.edu/courses/435031

Instructor	Dr. James E. Pustejovsky (pronounced "PUHS-tea-UV-ski" or "Pusto" for short)
Pronouns	he/him/his
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Office hours	Wednesdays 11:00 – 12:00, Thursdays 11:00 – 12:00

Course Description

How effective is tutoring for improving the mathematics performance of students from economically disadvantaged backgrounds? Does participating in mindfulness training during school improve the mental health and wellbeing of adolescents? Does peer observation of teaching have beneficial effects on student learning? What are the benefits and costs of reducing class sizes in the elementary grades? Such questions focus on understanding the causal effects of an intervention (program, practice, or policy) on educational outcomes, and are often of central interest to educational leaders and policy-makers, program developers, and researchers. Randomized experiments are one way to investigate questions about causal impacts, and indeed, are often accorded a special status due to their potential for clearly identifying causal relationships. Although once rare in education research, randomized experiments conducted in naturalistic educational settings have grown increasingly common and prominent over the past two decades. Planning and conducting such studies involve a unique set of challenges, and their findings have a distinctive profile of advantages and limitations.

This course will cover the design, analysis, and interpretation of randomized field experiments in education research. We will examine the theoretical, statistical, and pragmatic considerations

[1] This class meets for two, 75-minute class periods each week over the Spring semester and carries the expectation that students will work on course learning activities (reading, writing, problem sets, studying, etc) for about 3 hours out of the classroom for every class period.

involved in such studies, from articulating a theory of change and selecting outcome measurements, to choosing an experimental design and analytic strategy, to addressing questions of generalizability. Our focus will be on designs most commonly used in educational settings, such as block-randomized or cluster-randomized experiments, and the implementation challenges that arise in such settings, such as non-compliance, attrition, and interference. By the end of the course, students should be able to contribute to the design and planning of a randomized experiment in a realistic field setting, to critically assess reported findings from field experiments, and to make informed judgments about the role of randomized field experiments within education research.

Pre-requisites

- Prior training in regression analysis (such as ED PSYCH 763)
- Prior training in design and analysis of experiments (such as ED PSYCH 762)
- Experience with writing scripts/programming with at least one software platform for data management and analysis (e.g., R, SAS, Stata).

Course Learning Outcomes

After completing this course, students should be able to:

- Identify circumstances conductive to using randomized field experiments to investigate questions about causal impacts and write effective rationales for conducting such studies.
- Identify the benefits and limitations of different experimental designs (i.e., block randomization, cluster randomization).
- Conduct and interpret power calculations for different experimental designs, for purposes of informing the planning of field experiments.
- Describe, justify, and conduct approaches for quantitative analysis of data from field experiments, including methods dealing with complexities such as non-compliance and non-response.
- Collaboratively develop a plan for a randomized experiment conducted in a realistic field setting.
- Critically assess reported findings from field experiments.
- Make informed judgements about the role of randomized experiments within educational research.

Course activities

This course involves regular and substantive interaction between the instructor and the students of the following forms:

- Regularly scheduled course meetings including lecture, demonstration, and direct instruction.
- Small-group discussions and activities, designed and moderated by the instructor.
- Individualized feedback on assignments and course work.

Required Readings

- Gerber & Green (2012). *Field Experiments: Design, Analysis, and Interpretation*. W. W. Norton.
- Additional readings posted on Canvas.

Computing

In-class software demonstrations will use the R environment for statistical computing. In principle, you are welcome to complete the problem sets and exam using your choice of software. However, I am unable to provide examples, debugging help, or technical support for any software not demonstrated in class.

There are many freely available resources for learning R. Here are some:

- R: https://www.r-project.org/
- RStudio: https://www.rstudio.com/
- TryR code school: http://tryr.codeschool.com
- YaRrr! The Pirate's Guide to R: http://nathanieldphillips.com/thepiratesguidetor/
- Princeton R tutorials: http://data.princeton.edu/R/
- D-Lab R training: https://github.com/dlab-berkeley/R-for-Data-Science

Tentative Schedule of Topics

Dates	Topic	Assignments
1/21	Course introduction	
1/23	A validity typology	
1/28	Examples of field experiments	Assignment 1: Construct analysis
1/30	Institute of Education Sciences applications	
2/4	Theories of change	
2/6	Outcome measurement	
2/11	Implementation, fidelity, and adaptation	
2/13	Implementation (continued)	Assignment 2: Logic Model
2/18	Research design and statistical inference	
2/20	Individual-level random assignment	
2/25	Balance and covariate adjustment	

2/27	More on balance and covariate adjustment	
3/4	Block randomization	Assignment 3: Data analysis
3/6	Block randomization: inference models	
3/11	Introduction to power analysis	
3/13	More on power analysis	
3/18	Cluster randomization	
3/20	Cluster randomization (continued)	
3/25	Spring Break (no class)	Assignment 4: Block randomization
3/27	Spring Break (no class)	
4/1	More power analysis	
4/3	Non-compliance	
4/8	Non-compliance (continued)	Assignment 5: Power analysis and cluster randomization
4/10	Attrition	
4/15	Attrition (continued)	
4/17	Generalizability	
4/22	Generalizability (continued)	Assignment 6: Proposal Draft
4/29	The role of field experiments	
5/1	Conclusions and reflections	Assignment 7: Proposal review

Evaluation

- Assignments/Problem sets (55%). Students will complete approximately seven written assignments, involving responding to short writing prompts or conducting and interpreting analysis of real or simulated data. These assignments provide opportunities to practice and reinforce concepts discussed during class.
- Class participation and written reflections (20%). Students will respond to prompts regarding the readings assigned for upcoming classes and reflections on in-class discussions.
- Course project (25%). See below.

A tentative rubric for assignment of final grades is listed below. ***The instructor reserves the right to modify this rubric.*** Square brackets correspond to ≤ or ≥; rounded parentheses to < or >.

A	[90, 100]	C+	[74, 77)
A-	[87, 90)	C	[70, 74)
B+	[84, 87)	C-	[67, 70)
B	[80, 84)	D	[60, 67)
B-	[77, 80)	F	[0, 60)

Course project (Two options)

Option 1: Field experiment proposal

Write a proposal to conduct a randomized field experiment in an educational setting. The proposal should include the following elements:

- Significance. The proposal should clearly describe:
    - Research questions
    - The intervention to be evaluated
    - The theory of change informing the design of the intervention
    - A compelling rationale evaluating the impacts of the intervention in the manner proposed.
- Research plan
    - Define the sample to be selected, along with justification for any exclusion/inclusion criteria.
    - Describe and justify the condition (i.e., control or counter-factual) to which the intervention will be compared.
    - Describe and justify the proposed experimental design.
    - Describe the data analysis procedures used to address each research question.
    - Justify the proposed sample size, taking into account the experimental design and analytic approach.
    - Explain how implementation of the intervention will be assessed.

- Describe and carefully justify the selection of outcome measures. Provide information about reliability and validation evidence for the proposed measures.

The proposal should be no more than 15 pages (double spaced, standard font, not counting references). For this option, you make work in groups of up to three students. Students working in groups will be asked to provide a statement explaining the main contributions of each individual in the group.

Option 2: Methodological study proposal

Write a proposal for a methodological simulation study that examines a data analysis strategy relevant to interpretation of findings from field experiments. The proposal should include the following elements:

- Significance. The proposal should clearly describe:
  - Research questions
  - The model(s) and/or method(s) being examined (e.g., statistical estimation strategies)
  - The specific problem that the methods address and the target parameter(s) of interest.
  - The relevance of the methods to analysis of data from randomized field experiments.
  - Any alternative methods currently in use for addressing the same problem.
- Research plan
  - Describe and justify the data-generating process used in the simulation, giving special attention to potential mis-specification relative to the analytic model.
  - Describe and justify the specific population parameter values that will be used in implementing the data-generating process.
  - Describe and justify the study design parameters (e.g., sample size, treatment allocation ratio) that will be used in implementing the data-generating process.
  - Provide precise details about how the model/method(s) of interest will be implemented (i.e., exact estimating equations used, software packages used, handling of non-convergent cases).
  - Describe and justify the performance measures on which the model/method(s) will be assessed.
  - Explain how results of the simulation study will be analyzed or examined.

Attendance

Students are responsible for all of the material presented during class meetings. Students are expected to attend in-person class meetings. Screen recordings may also be available through the Canvas page for accommodation purposes only.

Respectful Learning Environment

Courses in Educational Psychology are venues for the free, open, and respectful exchange of ideas. Class members are expected to respect others and to contribute to a healthy learning environment in all course activities. Concerns in this regard should be brought to the attention of the course instructor.

Diversity & Inclusion Statement

Diversity is a source of strength, creativity, and innovation for UW-Madison. We value the contributions of each person and respect the profound ways their identity, culture, background, experience, status, abilities, and opinion enrich the university community. We commit ourselves to the pursuit of excellence in teaching, research, outreach, and diversity as inextricably linked goals. The University of Wisconsin-Madison fulfills its public mission by creating a welcoming and inclusive community for people from every background – people who as students, faculty, and staff serve Wisconsin and the world.

The School of Education recognizes that our desire to be an anti-racist, unbiased, and inclusive academic community is ongoing and involves shared commitment, responsibility, action, and accountability. We believe that diversity, equity, inclusion, and inclusive excellence, the four essential pillars of our approach to generating positive and lasting change, build upon our scholarship and the School's reputation as a leading educational institution. Read the full statement for values and commitments supporting the School's efforts.

Academic Integrity Statement

By virtue of enrollment, each student agrees to uphold the high academic standards of the University of Wisconsin-Madison. Students are expected to maintain absolute integrity and a high standard of individual honor in scholastic work. Assignments and projects must be completed with the utmost honesty, which includes acknowledging the contributions of other sources to your scholastic efforts; avoiding plagiarism; and completing assignments independently unless expressly authorized otherwise. ***Homework assignments or projects containing any plagiarized material will not be accepted.*** Cheating, fabrication, plagiarism, unauthorized collaboration, and helping others commit these previously listed acts are examples of academic misconduct, which may result in disciplinary action. Examples of disciplinary action include, but are not limited to, failure on the assignment/course, written reprimand, disciplinary probation, suspension, or expulsion.

Accommodations for Students with Disabilities Statement

The University of Wisconsin-Madison supports the right of all enrolled students to a full and equal educational opportunity. The Americans with Disabilities Act (ADA), Wisconsin State

Statute (36.12), and UW-Madison policy (Faculty Document 1071) require that students with disabilities be reasonably accommodated in instruction and campus life. Reasonable accommodations for students with disabilities is a shared faculty and student responsibility. Students are expected to inform faculty [me] of their need for instructional accommodations by the end of the third week of the semester, or as soon as possible after a disability has been incurred or recognized. Faculty [I], will work either directly with the student [you] or in coordination with the McBurney Center to identify and provide reasonable instructional accommodations. Disability information, including instructional accommodations as part of a student's educational record, is confidential and protected under FERPA. (See: McBurney Disability Resource Center)

Privacy of Student Information & Digital Tools: Teaching & Learning Analytics & Proctoring Statement

The privacy and security of faculty, staff and students' personal information is a top priority for UW-Madison. The university carefully reviews and vets all campus-supported digital tools used to support teaching and learning, to help support success through learning analytics, and to enable proctoring capabilities. UW-Madison takes necessary steps to ensure that the providers of such tools prioritize proper handling of sensitive data in alignment with FERPA, industry standards and best practices.

Under the Family Educational Rights and Privacy Act (FERPA which protects the privacy of student education records), student consent is not required for the university to share with school officials those student education records necessary for carrying out those university functions in which they have legitimate educationl interest. 34 CFR 99.31(a)(1)(i)(B). FERPA specifically allows universities to designate vendors such as digital tool providers as school officials, and accordingly to share with them personally identifiable information from student education records if they perform appropriate services for the university and are subject to all applicable requirements governing the use, disclosure and protection of student data.

Privacy of Student Records & the Use of Audio Recorded Lectures

See information about privacy of student records and the usage of audio-recorded lectures.

Lecture materials and recordings for this course are protected intellectual property at UW-Madison. Students in this course may use the materials and recordings for their personal use related to participation in this class. Students may also take notes solely for their personal use. If a lecture is not already recorded, you are not authorized to record my lectures without my permission unless you are considered by the university to be a qualified student with a disability requiring accommodation. [Regent Policy Document 4-1] Students may not copy or have lecture materials and recordings outside of class, including posting on internet sites or selling to commercial entities. Students are also prohibited from providing or selling their personal notes to anyone else or being paid for taking notes by any person or commercial firm without the instructor's express written permission. Unauthorized use of these copyrighted lecture materials and recordings constitutes copyright infringement and may be addressed under the university's policies, UWS Chapters 14 and 17, governing student academic and non-academic misconduct.

Course Evaluations

Students will be provided with an opportunity to evaluate this course and your learning experience. Student participation is an integral component of this course, and your confidential feedback is important to me. I strongly encourage you to participate in the course evaluation.

UW-Madison now uses an online course evaluation survey tool, AEFIS. In most instances, you will receive an official email two weeks prior to the end of the semester when your course evaluation is available. You will receive a link to log into the course evaluation with your NetID where you can complete the evaluation and submit it, anonymously.

Quarantine or Isolation Due to Communicable Disease

Student should continually monitor themselves for symptoms of COVID-19 and other resperatory illnesses and get tested if they have symptoms or have been in close contact with someone who is ill. Student should reach out to instructors as soon as possible if they become ill or need to isolate or quarantine, in order to make alternate plans for how to proceed with the course. Students are strongly encouraged to communicate with their Instructor concerning their illness and the anticipated extent of their absence from the course (either in-person or remote). The instructor will work with the student to provide alternative ways to complete the course work.

Academic Calendar & Religious Observances

See: https://secfac.wisc.edu/academic-calendar/#religious-observances