

**CRACKING THE CODE:  
UNDERSTANDING RESEARCH IN EDUCATION AND SOCIAL POLICY**

**APSTAT-UE 21-001  
Course Syllabus – Spring 2017**

Professors:

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**Course description**

Aimed at students who expect to read and interpret, rather than conduct, statistical analyses, this course is designed to help students become better, and more critical, consumers of quantitative evidence. Using research studies discussed in the popular media and focused on currently debated questions in education and social policy, the course covers key concepts in quantitative reasoning, basic statistics, and research design. Research readings will focus on topical issues regarding early childhood and K-12 education and other social policy issues that affect children and youth.

While statistics and research results are commonly used as evidence in the discussion of critical social problems and interventions to address them, the quality of that evidence varies widely. In this environment, an ability to understand and critically assess quantitative evidence is an essential skill of an informed citizen. Further, the ability to read and make sense out of scientific research is important to those who want to make social change and advocate for improved social policy in their communities. This course will prepare you to make such assessments. While we will not focus on data analysis, students will be expected to learn the value and meaning of basic statistical procedures and become able to read study reports with a critical eye.

**NOTE:** This course cannot be taken if you have already taken FOOD: UE 1115: Cracking the Code: Understanding Research in Health and Development.

**Course objectives**

Upon completion of this course, students will be able to:

- Identify the critical aspects of scientific inquiry and assess scientific evidence as it pertains to the social sciences and policy debates in health and human development.

- Describe populations and phenomena with statistics, including measures of central tendency and dispersion. Students will understand why different measures are appropriate to different questions, and how the use of different measures may lead to different conclusions.
- Display data in graphs and tables and understand how such data displays may persuade or mislead users of these data.
- Assess the quality of samples used in reported research. Recognize different sampling techniques and be able to critically assess the generalizability of study result based on the study sample.
- Interpret the meaning of a confidence interval. Understand Type 1 and Type 2 errors and the trade-offs between them.
- Identify measures of association and correlation and know how to interpret them.
- Distinguish correlation from causation and assess threats to internal validity.
- Identify and describe key features of common research designs including polling, random assignment experiments, panel studies, natural experiments, and quasi-experimental designs used in evaluation research. Students will be able to describe the strengths and weaknesses of different approaches.
- Consider quantitative evidence in light of other empirical evidence and studies of a qualitative nature.
- Identify ethical issues in the study of social phenomenon and the people they affect.

### **Prerequisites**

There are no prerequisites for this course.

### **Course readings**

Two books are required and have been ordered by the NYU Bookstore.

Best, J. (2012). *Damned Lies and Statistics: Untangling Numbers from the Media, Politicians, and Activists*. Berkeley, CA: University of California Press.

Dane, F. C. (2011). *Evaluating research*. Thousand Oaks, CA: Sage Publications, Inc.

Additional articles and book chapters will be available on NYU Classes. These will be assigned throughout the semester and assignments are noted in the course schedule below.

As an additional resource, students may wish to use <http://stattrek.com/>. Sections of this site are assigned for two of our class sessions but this “teach yourself” statistics website may also be useful to students who want a more detailed understanding of statistical tests and underlying principles than provided in the course readings.

Students may find the following good sources for locating relevant and interesting articles for homework assignments:

“Education” section of the [NY Times](#)

For New York City related: <http://www.nytimes.com/schoolbook/>

NPR’s “Education” podcasts (<http://www.npr.org/sections/education/>)

Education Week ([www.edweek.org](http://www.edweek.org))  
Education Next ([www.educationnext.org/](http://www.educationnext.org/))

### **Course requirements**

Your grade will be determined as follows:

- Class attendance/participation 10%
- Weekly homework assignments 20%
- Brief paper 35%
- Final Exam 35%

### **Description of course assignments**

Class attendance/participation: Coming to class regularly and prepared is essential. In-class lectures, exercises, and discussions are intended to reinforce and extend concepts presented in the readings. Students should come to class having done the assigned readings for each week as listed in the course outline. Students should inform the professors via email of any expected absences. If a class is missed, students are expected to hand-in a 1-2 page summary of the readings for that missed class. That summary must be turned in no later than the next class session. The overall grade for class attendance and participation will be based on the consistency and quality of student engagement.

Weekly homework assignments: There are 10 brief homework assignments over the course of the semester. These assignments will help you learn how to find, read, and assess research articles and become more adept at critiquing the presentation of research in the popular press. All homework must be completed and submitted on time—Tuesday before the start of class.

They will be graded on a three point scale: 1 is below expectations; 2 is at expectations; and 3 is above expectations. Students who exceed expectations on more than half of their homework assignments, while meeting expectations on the remainder, will receive a grade of A for this portion of their final grade. Students who consistently meet expectations on their homework assignments will receive a grade of B+. Students who meet expectations on half of their homework assignments and perform below average on the remainder will receive a grade of B. Students who turn in all homework assignments but where the work is consistently below average can expect to receive a grade of C for this portion of their grade.

#### Brief Paper: Due March 9

We will demonstrate the use of data from the Early Childhood Longitudinal Survey-Kindergarten Cohort 1998 (ECLS-K) in class. Using the data provided in Excel, prepare a brief report (3-4 pages) about a child assessment score of your choosing (e.g. reading, math, general knowledge). You will need to ask two questions about your chosen child assessment score that, (1) describe how the chosen assessment score differs by a chosen child or family demographic characteristic and (2) describe how this assessment score changes from fall to spring in the Kindergarten year for everyone and for the chosen

demographic characteristic. Imagine you are writing this report for a child policy center. What would they need to know to use these data well? The report should include:

- A brief description of ECLS-K (what is ECLS-K? who is sampled? How are they sampled?),
- An overview of the kinds of questions that are asked in the ECLS-K,
- A summary of key findings about the two questions concerning the child assessment of your choosing,
- Point estimates and confidence intervals (and describe their meaning) for your questions,
- The results of t-tests for your two hypotheses, and
- Caveats or limitations that the reader should know about the ECLS-K.

Papers will be graded for accuracy, as well as the quality of organization and writing. Briefs that accurately answer all of the questions listed above, are clearly presented and well-organized will receive a grade of A. Students whose work is accurate but where writing is weak or poorly organized will receive a grade of B. Students whose work is consistently inaccurate or poorly written will receive a grade of C. Students whose work is consistently inaccurate and poorly written risk receiving a failing grade.

Final Exam: Immediately following the last class of the semester a popular press article with two relevant research articles will be uploaded to NYU Classes. Students should carefully read and review all of these materials prior to coming to the final exam and bring these materials with them to the exam, along with any notes of their own. (Other books, articles etc., will not be permitted) During the exam period, students will be asked to answer a series of factual and interpretative questions about the readings and to make comparisons and judgments. The exam is intended to allow the student to demonstrate a meaningful grasp of key concepts covered throughout the course of the semester and to use them in analyzing research studies. The grading schema for the exam (that is, points per question) will be clearly noted.

## **Other class information**

**Office Hours and Email:** Professors Weinstein and Ziol-Guest have each set aside 90 minutes each week to meet with students. Students are encouraged to come speak with either one or both about the course and their class performance, as well as about other matters related to their academic and career goals. Students who are unable to meet during office hours may email for an appointment at another mutually convenient time. Students can expect, in general, to receive a response to any email within 24 hours. Please note, we will not respond to your email over the weekend except in true emergencies.

**NYU Classes:** All materials pertaining to this course (lecture notes, additional readings, etc.) will be made available on NYU Classes. Enrollment in the course should automatically give you access to the site. Check frequently for new materials and announcements.

**Absences:** Please contact Professors Weinstein and Ziol-Guest immediately if you have any conflicts with the scheduled assignments, or anticipate being absent for any reason. Additionally, students should inform the professors, whenever possible, of expected lateness or the need to leave early. Because this class is being co-taught, we have included a schedule of which professor will be teaching each week for you to contact. Frequent problems with absence, lateness, or early departure can result in a lowered class participation grade.

**Class etiquette:** Please turn off and put away your cell phones and other electronic devices while in class. Students who wish to use their computers for notetaking should know that the use of their computers for any other purpose during class time will result in the loss of that privilege (that is, in-class use of their computer) for the remainder of the semester.

All students regardless of gender, age, class, race, religion, physical disability, sexual orientation, gender identity, or native language shall have equal opportunity without harassment in this course. Any problems with or questions about harassment can be discussed confidentially with the professors.

**Academic integrity:** NYU Steinhardt policies on academic integrity will be strictly enforced in this class. You can find the school's official statement on academic integrity here ([http://steinhardt.nyu.edu/policies/academic\\_integrity](http://steinhardt.nyu.edu/policies/academic_integrity)).

This means that all work submitted is the original work of the student whose name appears on it and that the work was prepared originally for this course. All notes and materials gathered for graded work, including homework, should be kept and must be made available to the professor upon request. All such material will be returned to you following the evaluation of papers and reports.

Academic dishonesty includes cheating, plagiarism, unauthorized collaboration, falsifying academic records, and any act designed to avoid participating honestly in the learning process. Academic dishonesty also includes, but is not limited to, providing false or misleading information to receive a postponement or an extension on a homework, paper,

or exam and submission of essentially the same written assignment or oral presentation for two courses without my prior permission.

By remaining enrolled in this course, you have agreed to these guidelines and must adhere to them. Academic dishonesty damages both your learning experience and readiness for the future demands of a work career. Academic dishonesty will not be condoned and will result in a failing grade for the assignment in question and an automatic report to the Dean's office. Academic dishonesty is also grounds for failure in the course and prosecution on academic dishonesty charges, which may result in suspension or expulsion from NYU. Students are expected to review and abide by the policy on academic honesty detailed in the [New York University Student Handbook](#); those with questions should consult the professors.

Withdrawal: If you wish to withdraw from the course, please do so formally with the University Registrar. If you withdraw without authorization, you are at risk for receiving a failing grade for the course.

Accommodations: Any student requiring an accommodation due to a chronic psychological, visual, mobility, or learning disability, or who is deaf or hard of hearing, should register with and consult with the Moses Center for Students with Disabilities at 212.998.4980, 726 Broadway, 2<sup>nd</sup> Floor ([www.nyu.edu/csd](http://www.nyu.edu/csd)).

**Course Schedule:  
Understanding Research in Education and Social Policy**

<b>WEEK 1</b>	What is research? Why do we conduct research? (MW)	
<b>WEEK 2</b>	The scientific approach (KMZ)	<i>Homework Exercise #1 due</i>
<b>WEEK 3</b>	Reading a research report (MW)	<i>Homework Exercise #2 due</i>
<b>WEEK 4</b>	Reading a research report (MW)	<i>Homework Exercise #3 due</i>
<b>WEEK 5</b>	Descriptive and predictive statistics (KMZ)	
<b>WEEK 6</b>	Descriptive and predictive statistics (KMZ)	<i>Homework Exercise #4 due</i>
<b>WEEK 7</b>	Sampling and sampling distributions (KMZ)	<i>Brief paper due</i>
<b>NO CLASS</b>	SPRING BREAK!!	
<b>WEEK 8</b>	Survey research (MW)	<i>Homework Exercise #5 due</i>
<b>WEEK 9</b>	Measurement (MW)	<i>Homework Exercise #6 due</i>
<b>WEEK 10</b>	Experimental research (KMZ)	<i>Homework Exercise #7 due</i>
<b>WEEK 11</b>	Quasi-experimental designs (MW)	<i>Homework Exercise #8 due</i>
<b>WEEK 12</b>	Evaluation research (MW)	<i>Homework Exercise #9 due</i>
<b>WEEK 13</b>	Qualitative and mixed methods (KMZ)	

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**WEEK 14**      Review, catch-up, and preparation for final exam (KMZ)      *Homework  
Exercise #10  
due*

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**WEEK 15**      **FINAL EXAM**

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*MW=Professor Weinstein will lead the lecture; KMZ=Professor Ziol-Guest will lead the lecture.*

*All assignments are due on Tuesday before class, except the brief paper which is due Thursday before class.*

## **Course Outline: Understanding Research in Education and Social Policy**

### **January 24: Course outline and expectations**

#### **January 26: What is research? Why do we conduct research?**

Competing philosophies of “knowing.” Using Research for Exploration, Description, Prediction, or Explanation. Contents of research articles and how to locate them.

Read: Dane, Chapter 1

*Homework Exercise #1 due on January 31: Dane, Chapter 1, Question 3*

#### **January 31: The scientific approach**

What is the scientific method and how does it differ from other ways of “knowing”? What qualifies as evidence? What are the ethical principles guiding scientific research? What does “social construction” mean in regard to social problems and scientific inquiry about them?

Read: Dane, Chapter 2

#### **February 2: The scientific approach, continued**

Read: Best, Chapters 1 and 2

*Homework Exercise #2 due February 7: Dane, Chapter 2, Questions 3 and 4*

#### **February 7: Reading a research report**

How does one locate and identify scientific reports?

Read: Dane, Chapter 3

#### **February 9: Reading a research report, continued**

Understanding the key components of a research report.

*Homework Exercise #3 due February 14: Dane, Chapter 3, Q. 2 and 4*

#### **February 14: Using the NYU Library**

Using the NYU Library. Using relevant databases (such as PubMed, Web of Science, ERIC).

#### **February 16: First Case Study: Math Anxiety**

Below is an empirical paper and a review of this paper in the NY Times examining differences in math anxiety among children depending on parental math anxiety.

<http://well.blogs.nytimes.com/2015/08/24/square-root-of-kids-math-anxiety-their-parents-help/>

Maloney, E.A., Ramirez, G., Gunderson, E.A., Levine, S. C., & Beilock, S.L. (2015). Intergenerational Effects of Parents' Math Anxiety on Children's Math Achievement Anxiety. *Psychological Science*, 26(9), 1480-1488.

*Homework Exercise #4 due February 21: Estimate the following information for one weekday and one weekend day—(1) the number of minutes spent on homework, (2) the number of minutes spent watching TV, movies, and/or streaming video, and (3) the number of hours of sleep. We will use these data in an Excel file in class to calculate basic statistical tests.*

### **February 21: Core concepts in basic statistical analysis: Descriptive statistics**

Measures of central tendency and their appropriate use. Measures of dispersion, measures of association, correlation, and prediction.

Read: <http://stattrek.com/tutorials/statistics-tutorial.aspx> - all sections on descriptive statistics, including subsections under quantitative measures, charts and graphs, and tabular displays

### **February 23: Descriptive statistics, continued and predictive statistics**

Design vs. analyses. How the purpose of a study drives the design. How the design shapes the statistical analyses. Review of measures of central tendency and their appropriate use. Review of measures of dispersion, measures of association, correlation, and prediction. Hypothesis testing.

Read: Dane, Chapter 4

*In class exercise to underscore basic approaches to and concepts in statistics using the data provided in Homework Exercise #4.*

### **February 28: Using the ECLS-K**

What is the ECLS-K? How do researchers use these data? How can the public make use of the data that is readily provided?

Read: review the data sites for the Early Childhood Longitudinal Survey-Kindergarten 1998 cohort

<http://nces.ed.gov/ecls/kindergarten.asp>

[http://nces.ed.gov/ecls/data/ECLSK\\_K8\\_Manual\\_part1.pdf](http://nces.ed.gov/ecls/data/ECLSK_K8_Manual_part1.pdf) (Sections 1-3)

### **March 2: Using the ECLS-K to demonstrate statistics concepts**

We will use data from the ECLS-K to demonstrate use of confidence intervals and t-tests.

**BRIEF PAPER DUE MARCH 9:** Using the ECLS-K, prepare a brief report (3 pages) about a child assessment score of your choosing (e.g. reading, math, general knowledge). See assignment specifics above under “course requirements.” Come to class on March 1 with any questions about papers; variables should be chosen and papers should, ideally, be outlined before class on March 1.

### **March 7: Sampling and Sampling Distributions**

The difference between populations and samples. Why we sample. Different methods for constructing a sample, key concepts in sampling including normal distributions. External reliability and generalizability. Sample size. Type 1 and Type 2 error and their tradeoffs. Confidence Intervals.

Read: Dane, Chapter 5 and Best, Chapter 3

### **March 9: Sampling and Sampling Distributions, continued**

Read: <http://stattrek.com/tutorials/statistics-tutorial.aspx> (section on survey sampling)  
<http://nces.ed.gov/ecls/data/ECLSK K8 Manual part1.pdf> (Section 4, Sample Design and Implementation and Section 5 Data Collection Methods and Response Rates--very challenging, but work through it to get a sense)

*In class exercises to underscore basic approaches to and concepts in statistics*

We will use your data from Homework Exercise #4 (the number of minutes spent on homework, the number of minutes spent watching TV, movies, and streaming, and the number of hours of sleep on two selected dates) to examine differences in populations and samples.

*Homework Exercise #5 due March 21: State three important aspects of the sample used in ECLS-K. These may include the type of sampling method, the sample size, the response rate, etc.*

### **March 21: Survey Research**

The role of survey research in collecting data on human behavior and beliefs. Method for gathering data by survey. Use of web-based technology. Polling as particular type of survey. Alternative sources of data. Ethics of survey data collection.

Read: Dane, Chapter 9

<http://www.people-press.org/methodology/collecting-survey-data/internet-surveys/>  
[http://steinhardt.nyu.edu/research\\_alliance/research/projects/nyc\\_school\\_survey](http://steinhardt.nyu.edu/research_alliance/research/projects/nyc_school_survey)  
[https://steinhardt.nyu.edu/scmsAdmin/media/users/sg158/PDFs/school\\_survey/StrengtheningAssessmentsOfSchoolClimate.pdf](https://steinhardt.nyu.edu/scmsAdmin/media/users/sg158/PDFs/school_survey/StrengtheningAssessmentsOfSchoolClimate.pdf)

*Homework Exercise #6 due March 28: Dane, Chapter 9, Question 1*

### **March 23: Second Case Study: KIPP Charter Schools and Scaling Up**

Below is the executive summary and a popular press piece about the scaling up of KIPP charter schools and its impact on student achievement. Questions to think about: What impact does scaling up have? Why might scaling up have an impact? Is the impact the same for all students and schools?

[https://www.washingtonpost.com/local/education/kipps-explosive-growth-came-with-slight-dip-in-performance-study-says/2015/09/16/c065cee0-5ca5-11e5-8e9e-dce8a2a2a679\\_story.html?utm\\_term=.2d3163baf822](https://www.washingtonpost.com/local/education/kipps-explosive-growth-came-with-slight-dip-in-performance-study-says/2015/09/16/c065cee0-5ca5-11e5-8e9e-dce8a2a2a679_story.html?utm_term=.2d3163baf822)

<https://www.mathematica-mpr.com/our-publications-and-findings/publications/executive-summary-understanding-the-effect-of-kipp-as-it-scales-volume-i-impacts-on-achievement>

### **March 28: Measurement**

Different types of measures: categorical, ordinal, continuous. Why choosing the right measures matters. Concept of reliability. Different types of reliability. Construct validity. Scales.

Read: Dane, Chapter 6 and Best, Chapter 4

### **March 30: Measurement, continued**

Using survey monkey software to construct surveys

Read: Review measures in ECLS-K

Create an account on survey monkey and browse through their data bank of questions (<https://surveymonkey.com/home/>)

*Homework Exercise #7 due April 4: Identify a topic that you would like to explore through a survey. Go to <https://www.surveymonkey.com/home/> and design a small survey of 3 questions (these questions may come from their question bank or other studies you have seen). Are these categorical, ordinal or continuous measures. Identify/create a different way that one of your constructs could have been measured using a different level of measurement.*

### **April 4: Experimental Research**

Moving from association to causation – what is needed and when is it appropriate? Concept of internal validity and threats of validity. Rival hypotheses. Random Assignment Experiments – their requirements, their value, and their limitations. Meta-Analyses.

Read: Dane, Chapter 7

### **April 6: Third Case Study: Does class size matter?**

Below are two empirical articles and a popular press piece about the role of class size and student achievement. Questions to think about: How difficult is it to isolate the effect of class size on student outcomes? Why might smaller class size benefit students? How does this work? For whom does this work?

<https://www.washingtonpost.com/news/answer-sheet/wp/2014/02/24/class-size-matters-a-lot-research-shows/>

Schanzenbach, D.W. (2014). *Does class size matter?* National Education Policy Center working paper.

Jepsen, C. (2015). Class size: Does it matter for student achievement? IZA World of Labor working paper.

*Homework Exercise #8 due April 11: Dane, Chapter 7, Questions 1 and 2*

### **April 11: Quasi-Experimental Designs**

Why use quasi-experimental designs? How do they control for threats to validity. Examples of key quasi-experimental designs including time series, regression discontinuity and comparison group designs.

Read: Dane, Chapter 8

### **April 13: Quasi-Experimental Designs, continued**

Below are two articles based on studies with quasi-experimental designs. Read both articles—they will be difficult to get through—and try to understand the specific design of both studies.

Steinberg, M.P. (2014). Does greater autonomy improve school performance? Evidence from a regression discontinuity analysis in Chicago. *Education Finance and Policy*, 9(1), 1-35.  
[http://www.mitpressjournals.org/doi/abs/10.1162/EDFP\\_a\\_00118#.WIY2p1UrJpg](http://www.mitpressjournals.org/doi/abs/10.1162/EDFP_a_00118#.WIY2p1UrJpg)

Dee, T.S. & Jacob, B. (2011). The impact of no Child Left Behind on student achievement. *Journal of Policy Analysis & Management*, 30(3), 418-446.  
Issue 3, p418-446, 47p; DOI: 10.1002/pam.20586  
<http://onlinelibrary.wiley.com/doi/10.1002/pam.20586/full>

*Homework exercise #9 due April 18: Describe three social problems or phenomenon that would be difficult to explore in a random assignment experiment. What is the source of the difficulty? For one of these problems, identify how a quasi-experimental design might instead be used?*

### **April 18: Evaluation Research**

Formative vs. summative evaluations. Use of experiments and quasi-experiments to assess impact of programs and policies. Natural Experiments. Role of research in policy debate.

Read: Dane, Chapter 12

Muschkin, C.G., Ladd, H.F., & Dodge, K.A. (2015). Impact of North Carolina's early childhood initiative on special education placements in third grade. *Educational Evaluation and Policy Analysis*, 37(4), 478-500.  
<http://journals.sagepub.com/doi/abs/10.3102/0162373714559096>

### **April 20: Fourth Case Study: Arts and Education**

Below is an article, press release and letter from the study authors about how the arts can contribute to student learning. Questions to think about: What kind of study did the authors conduct? What were their outcome measures? What were the findings?

Article: Educational Researcher, Vol. 43 No. 1, pp. 37 –44  
<http://journals.sagepub.com/doi/pdf/10.3102/0013189X13512675>

Letter to the editor  
<http://www.nytimes.com/2013/11/24/opinion/sunday/art-makes-you-smart.html?login=email&r=0>

Press release: 2/12/2016 January/February ER Publishes New Studies on the Arts and Critical Thinking, NCLB Waivers, and School-wide Consequences of Student Risk Factors  
<http://www.era.net/Newsroom/News-Releases-and-Statements/January-February-ER-Publishes-New-Studies-on-the-Arts-and-Critical-Thinking-NCLB-Waivers-and-School-wide-Consequences-of-Student-Risk-Factors>

#### **April 25: Qualitative and Mixed-Methods research**

Empirical research that is not quantitative. Systematic gathering of information in field. Participant Observation. Coding of field data. Use of archival data. Content Analysis.

Read: Dane, Chapters 10 and 11

#### **April 27: Qualitative and Mixed-Methods research, continued**

Mixed methods research in education

Read: Ponce, O. A., & Pagan-Maldonado. (2015). Mixed methods research in education: Capturing the complexity of the profession. *International Journal of Educational Excellence*, 1(1), 111-135.

Heineke, A. J., Mazza, B. S., & Tichnor-Wagner, A. (2014). After the two-year commitment: A quantitative and qualitative inquiry of Teach for America teacher retention and attrition. *Urban Education*, 49(7), 750-782.

*Homework Exercise #10 due May 2: Find one article that uses either participant observation/content analysis/action research as their primary method. Read the article and discuss, briefly, whether and why you are persuaded by their findings.*

#### **May 2: Review, Catch-Up, and Preparation for Final Exam**

#### **May 9: FINAL EXAM**