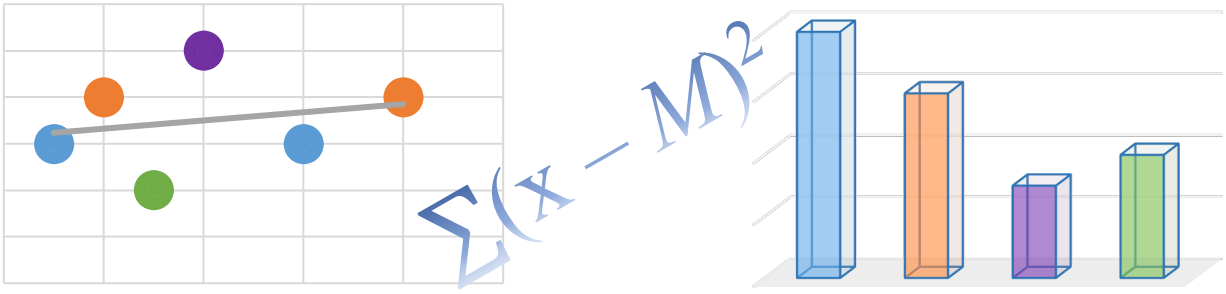
Statistics for Social Science
MEJO 704.001



Fall 2020 Semester Information

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Site URL: https://sakai.unc.edu/portal/site/mejo704f20

Course Summary

This course emphasizes the application of statistical test to address hypotheses and research questions typical of quantitative social science research designs. Lessons include the calculation and interpretation of descriptive statistics, *t*-tests, analyses of variance, simple and multiple linear regression, and internal reliability analyses. This course is rooted in practice with real data sets using SPSS as the statistical platform, although some hand calculations involving basic algebra will be required. By the end, students will understand how to match the appropriate statistical test with the types of variables available and research questions (or hypotheses) posed, and they will be prepared to expand their current knowledge in applied statistics.

Course Goals

The Hussman School of Journalism and Media follows the student learning outcomes derived by the professional values and competencies listed by the Accrediting Council on Education in Journalism and Mass Communications. Click here to learn more.

This course addresses the following values and competencies:

- Understand concepts and apply theories in the use and presentation of images and information.
- Conduct research and evaluate information by methods appropriate to the communications professions in which they work.
- Apply basic numerical and statistical concepts.

These above values and competencies are addressed through the specific student learning objectives of this course as follows:

Students will demonstrate an understanding of how the theoretical and probabilistic foundations of statistics limit how a test can be used to support a hypothesis or argument by:

(1) Using the appropriate language for indicating how statistical tests inform the researcher's study;
(2) Identifying connections between the theoretical foundations of statistical tests and the information provided in the statistics output;
(3) Interpreting and explaining test results based on the theoretical assumptions of the given test.

Students will demonstrate an understanding of p-values and statistical significance by:

(1) Interpreting and explaining the implications of a statistical result and differentiating between statistical significance, social significance, and magnitude of an effect;
(2) Illustrating the concept of p-values in graphical form;
(3) Demonstrating how a p-value can be altered based on choices made in conducting statistical analyses.

Students will understand the basic structure of the common statistical tests used in social sciences and how these tests connect by:

(1) Identifying and describing the basic components of different statistical tests;

(2) Identifying commonalities across tests, namely how certain concepts are represented in the equations of different statistical tests;
(3) Performing statistical tests by hand using a given equation.

Students will 'diagnose' research designs and 'prescribe' the most appropriate type of statistical test based on the research question(s) and types of variables used by:
(1) Identifying variables based on their unit of measurement;
(2) Identifying different statistical tests based on their treatment of variables;
(3) Demonstrating appropriate selection of a statistical test, given a research question (or hypothesis) and the variables involved.

Students will perform basic descriptive and inferential statistics, including:
(1) Describing data using:
    Frequencies
    Measures of central tendency: Mode, Median, Mean
    Measures of dispersion: Range, Variance, Standard Deviation
(2) Visualizing data using:
    Histograms
    Box plots
    Scatterplots
(3) Analyzing data using the following tests:
    Chi-square analyses
    Parametric *t*-tests
    One-way analyses of variance and common post-hoc tests
    Two-way (2X2 and 3X2) analyses of variance and common post-hoc tests
    Covariance and correlation
    Cronbach's alpha
    Simple linear regression
    Multiple linear regression.

Students will improve their ability to become a more self-directed learner of statistics by:
(1) Feeling more confident in their ability to understand how to interpret statistical equations.

Approaching the Course

Although this course is designed to be completed remotely, it is not a self-paced course. Statistics, like learning other forms of mathematics or other languages, builds off itself and requires constant practice to reinforce prior concepts or procedures in order to learn the next concept or procedure.

To succeed in this course, it is important to keep up, as much as possible, with viewing and reviewing slides and transcripts of each lesson module as scheduled (see course schedule at the end of this syllabus) and actively engage with the graded and ungraded activities intended to help you practice and internalize each lesson. The points that can be accumulated for the evaluation of course performance are designed with the idea of constant practice in mind.

As instructor, I also make a commitment to create an engaging, safe, and inclusive space to teach this course and provide ample feedback throughout the semester. To this end, I am available for one-on-one assistance, tutoring, or review and pledge to work with you to find the best ways of explaining each lesson in a way that resonates with you.

Evaluating Course Performance

Performance in this course is evaluated using grades based on assignments (quizzes and homework) and a final exam, as well as points accumulated through participation activities and completion-only assignments. Points allotted to each type of activity is presented below.

In all cases, the assignment, participation activity, or exam is expected to be completed by 11:59pm on the date it is due. Due dates are listed in the first column of the course schedule the follows.

Attendance

Because this course is designed as an online course, attendance at particular sessions is not recorded nor is it factored into the final grade. Rather, attendance is inferred through participation in activities, including interactive activities with fellow students, graded quizzes and homework, and quizzes and homework graded based on completion only.

Viewing of course lesson modules and/or review of the slides and/or transcripts are on your honor.

Late Assignments/Exams

All assignments, activities, and exams listed in the course schedule that follows are expected to be turned in by 11:59pm on the due date.

Assignments, activities, and exams will only be able to receive half of the possible points if turned in within 24 hours after the due date/time.

Assignments, activities, and exams turned in more than 24 hours after the original due date/time may still receive feedback but will receive 0 points (a grade of 0).

Graded Assignments (60%)

Quizzes and homework are shown under the “To Turn In” column in the course schedule (below) as either graded or “grade based on completion only.”

There are 21 graded assignments. These graded quizzes and homeworks are graded based on accuracy and thoroughness of completion. Percentage correct is the basis for these grades, with additional adjustments reflecting completion and thoroughness.

Each graded assignment is worth 3% of the total grade. Scores on each graded quiz or homework range from 0 (all answers incorrect or incomplete by the due date) to 3 (all answers complete and correct by the due date).

To receive full points, assignments must be turned in by 11:59pm on the date it is due.

The lowest of these grades will be removed in the calculation of the total graded assignment score. Therefore, 20 of the 21 graded assignments are given up to 3 points for a total possible 60 points (or 60%) of the final course grade.

As many of these assignments require use of the SPSS statistical package on a computer, you will need to either use classroom computers or use a laptop with SPSS access (e.g., your own SPSS program copy or

a wireless Internet connection to get to SPSS from Virtual Lab, https://virtuallab.unc.edu/).

Completion-Only Assignments (8%)

There are 8 assignments based solely on completion. Quizzes and homework based on completion only are given a score of "1" for complete and turned in by 11:59pm on the date it is due and a score of "0" for incomplete or not turned in by 11:59pm on the date it is due.

Each completion-only assignment is worth 1% of the total grade. Therefore, each of these 8 assignments are given up to 1 point for a total possible 8 points (or 8%) of the final course grade.

Participation (12%)

There are 12 participation activities designed to encourage interactions with fellow students and additional practice with the concepts taught in the course. These activities are listed under the "Participation Activities" column of the course schedule.

One of these activities is an ongoing building of a chart for identifying which statistical test is appropriate, given the types of variables available and research questions posed. Therefore, this activity appears multiple times in the course schedule.

I expect that each of you will contribute in a visible way through their postings on the designated forum or discussion space. Evidence of interaction or participation will consist of at least one post to the respective forum or discussion space that shows engagement with the material in one or more of the following ways:

- Posing one or more substantive questions about the concepts, equations, or use of a term or test;
- Providing a response of more than one sentence that demonstrates critical thinking or makes a substantive contribution to the definition, use, or understanding of concepts, tests, etc.;
- Completing the task as described.

Evidence of interaction or participation in each of the 12 activities as described above will earn the student 1 participation point for a total of 12 possible participation points (or 12%) of the final course grade.

Final Exam (Take-Home) (20%)

There is one comprehensive take-home final exam worth a total possible 20 points (20%) of the final course grade.

This exam and its supporting data set will be made available through the course Sakai site before the semester is over and will be due by 11:59pm on the date listed in the course schedule that follows.

The exam is a combination of data analysis, interpretation, and presentation of findings. Course module material, homeworks, and print and online sources may be used as reference.

You are strongly encouraged to ask the instructor for help or clarification for any questions you might have on the final take-home exam.

Final Course Grade

Final course grades in graduate-level courses are intended to offer feedback on your performance. Final course grades in this course are based on the qualitative descriptions below and are informed by the points accumulated from assignments, participation, and the final exam. Percentages indicated below are used as a general guide as follows:

F (fail) = Fail, similar to a 59% or below (an "F")

L (low pass) = Inadequate graduate work, similar to a 60-69% (a "D" grade)

P (pass) = Entirely satisfactory graduate work, similar to a 70-96% (an "A," "B" or "C")

H (high pass) = Inspiring as well as clear excellence, similar to a 97-100% (an "A+" grade)

Honor Code

It is expected that each student in this class will conduct him/herself within the guidelines of the Honor System (http://honor.unc.edu). All academic work should be done with the high level of honesty and integrity that this University demands. If you have any questions about your responsibility or your instructor's responsibility as a faculty member under the Honor Code, please feel able to see the course instructor, speak with the senior associate dean of undergraduate studies in this school, and/or speak with a representative of the Student Attorney Office or the Office of the Dean of Students.

Course Support

Seeking Help

If you need individual assistance, it is your responsibility to meet with the instructor. If you are serious about wanting to improve your performance in the course, the time to seek help is as soon as you are aware of the problem, whether the problem is difficulty with course material, a disability, or an illness. Please feel able to contact the course instructor as soon as you perceive any warning signs of things that might adversely affect your class performance or final grade.

Special Needs

The University of North Carolina – Chapel Hill facilitates the implementation of reasonable accommodations, including resources and services, for students with disabilities, chronic medical conditions, a temporary disability or pregnancy complications resulting in difficulties with accessing learning opportunities.

All accommodations are coordinated through the Accessibility Resources and Service (ARS) Office. In the first instance please visit their website at http://accessibility.unc.edu, call the office at 919-962-8300, or email accessibility@unc.edu. A student is welcome to initiate the registration process at any time. However, the process can take time. ARS is particularly busy in the run-up to Finals and during Finals. Students submitting Self-ID forms at that time are unlikely to have accommodations set until the following semester.

Please contact ARS as early in the semester as possible.

Suggested texts (there are no required textbooks):

Efforts are made to provide students with videos, slides, transcripts, supplemental texts, and examples for understanding the course material.

Students are also encouraged to share materials they find useful throughouth the course using forums or discussion spaces offered in the course.

In the spirit of sharing potentially helpful materials that may supplement the course modules, the following citations are offered for consideration:

Available online:

Stockburger, D. Introductory Statistics: Concepts, Models, and Applications. (comprehensive, contains SPSS examples, available free at http://www.psychstat.missouristate.edu/introbook/sbk00.htm)

StatSoft Electronic Textbook (a bit advanced, available free at http://www.statsoft.com/textbook/)

HyperStat Online (simpler, goes through ANOVA and Chi-Square, available free at http://davidmlane.com/hyperstat/)

Sign up for free at Code School to learn free statistics program R at http://www.codeschool.com/courses

Textbooks (some are available as online texts for purchase):

Hayes, A. F. (2005). Statistical methods for communication science. Mahwah, NJ: Erlbaum. (goes more into depth with mathematics)

Weber, R., & Fuller, R. (2013). Statistical Methods for Communication Researchers and Professionals. First Edition. Dubuque, IA: Kendall Hunt.

Kranzler, J.H. (2007). Statistics for the terrified, 4th edition. Upper Saddle River, NJ: Pearson Education, Inc. (great introductory primer in paperback, with SPSS examples)

Course Etiquette and Expectations

Diversity

The University's policy on Prohibiting Harassment and Discrimination is outlined in the 2011-2012 Undergraduate Bulletin at http://www.unc.edu/ugradbulletin/. UNC is committed to providing an inclusive and welcoming environment for all members of our community and does not discriminate in offering access to its educational programs and activities on the basis of age, gender, race, color, national origin, religion, creed, disability, veteran's status, sexual orientation, gender identity, or gender expression.

In this course, you are encouraged to represent diverse populations, diverse viewpoints, and diversity of perspective in your own work. You are also asked to be sensitive to the various backgrounds, perspectives, origins, and situations represented by the students in the course, the students, faculty, and staff at this university, and the residents of this state.

Online Conduct

In efforts to encourage an engaging, safe, and inclusive online environment for this course, please observe the following guidelines for participating in our discussion spaces and other online areas:

1. Using ALL CAPS suggests yelling and possibly anger. Please use *asterisks* around words that you wish to emphasize. This convention suggests the word is in *bold* and tells others that you are emphasizing this word.
2. Sarcasm is difficult to detect with the written word and might not be appropriate for class discussion, especially because sarcastic comments might be misinterpreted by other readers. Please avoid using sarcasm in your online course participation.
3. Please also be mindful of politeness and strive to deliver feedback in a polite and professional manner. To this end, please remember that when providing critiques, criticisms and praises should be directed toward the work and not the person.
4. Discussion spaces in this class are intended for enhancing learning of the course material. Please use these spaces for relevant comments and contributions and avoid using these spaces for personal communications.

5. Please also be aware that, as with most online environments, messages and materials sent through our online channels are capable of being shared publicly. However, it is not appropriate to do so. Please be respectful of our privacy and intellectual property and refrain from posting or sharing course materials and communications publicly.
6. Finally, because online communications can exist forever, please be mindful of what you intend to communication before you post any messages and review what you have typed for grammar and professionalism before you send the message. For anything you type and send, you should feel comfortable saying the same message aloud publicly in a classroom.

Together, we can create an effective learning environment that shows **respect** for each other, shows that we **value** each other's experiences, contributions, and strengths, and shows that we each conduct ourselves with **integrity** and expect the same conduct from one another.

Weekly Schedule

Dates provided in the leftmost column are dates by which all activities in that row (e.g., watching the lesson module and/or reviewing the slides and transcript) should be completed.

Activities that below with the respective lesson module are given the same background color to help identify which participation and homework activities go with each lesson module.

Scheduled class times are reserved for office hours and one-on-one tutoring. Supplemental lessons (in grey) are optional.

For homework written on paper, you may take photos of the pages, save the photos as a .pdf files, and turn in the .pdf files. Or you may embed photos of the pages into a Word document and turn in the Word document.

DATE	LESSON MODULE	TOPICS COVERED	PARTICIPATION ACTIVITIES	TO TURN IN
11 Aug	Getting Started (For all lesson modules, watch and/or review by the date on the left)	Course introduction, Expectations with SPSS	(participation and turn-in activites for the Getting Started module are due by the next class date)	
13 Aug	Understanding Variables	Parametric and non-parametric variables (Statistics are based on assumptions of data, type of variable)	Download practice data sets and practice accessing SPSS through UNC's Virtual Lab (virtuallab.unc.edu) or purchase SPSS (*not considered a participation activity*)	Take the introductory feeling thermometer (grade based on completion only)
18 Aug	Descriptive Statistics	Mode, Median, Mean, Range, Variance, Standard Deviation	Collective brainstorming on different variables for measuring exposure	Multiple choice graded quiz: identifying variables as parametric or non-parametric

20 Aug	Visualizing Descriptive Statistics	Histograms, box plots, Normal distribution	Collective exercise on selecting the most useful central tendency and dispersion measures for given variables	Graded homework: Calculating descriptives by hand and in SPSS
25 Aug	Foundations of Parametric Statistics	Statistics grouped by parametric and non-parametric tests, Statistics and probability, Central Limit Theorem	In plain language to your fellow students, explain what a histogram or box plot (randomly assigned) is telling someone	Homework: Produce graphs of given variables (grade based on completion only)
Recommend after 25 Aug	SUPPLEMENT 1	Probability and z-scores		
27 Aug	Statistical Significance	p-values, statistical significance, and the idea of critical values and degrees of freedom, difference from definition of effect sizes	Collaborative chart building - Highlight where we are in Statistical Test Selection flow chart	Graded homework: Using the Central Limit Theorem to interpret different samples and their fit with a population
1 Sept	Pearson Chi-Square (Nonparametric) Test	Pearson chi-square test by hand and in SPSS, questions addressed	In plain language with review by your fellow students, explain what statistical significance is to a fifth grader – share and discuss	Graded homework: Multiple choice and graphing p-values on a normal curve
3 Sept	Introduction to Parametric t-tests	t-tests, t-values, assumptions of normality, questions addressed	Collaborative chart building - Highlight where we are in Statistical Test Selection flow chart Collective activity - Generate hypotheses that could be addressed by this analysis	Graded homework: Calculating and intepreting the test by hand and in SPSS, completing a write-up from a results template

8 Sept	Calculating Independent Samples t-tests	Independent samples t-tests by hand	Collective activity - Generate hypotheses that could be addressed by this analysis	Homework: Identifying assumptions of the test (grade based on completion only)
10 Sept	Independent Samples t-tests in SPSS	Independent samples t-tests in SPSS, pooled standard deviation, Levene's test, adjusted t-values	(none)	Graded homework: Calculating and intepreting the test by hand, completing a write-up from a results template
15 Sept	Cohen's D	Effect sizes, Cohen's D	Collaborative chart building - Highlight where we are in Statistical Test Selection flow chart	Graded homework: Calculating and intepreting the test by hand and in SPSS, completing a write-up from a results template
Recommend after 15 Sept	SUPPLEMENT 2	Paired samples t-tests, one-sample t-test, Mann-Whitney U		
17 Sept	Introduction to ANOVAs	ANOVAs and F-values, assumptions, questions addressed	(none)	(none)
22 Sept	Calculating One-Way ANOVAs	One-way ANOVA by hand	Collective activity - Generate hypotheses that could be addressed by this analysis	Homework: Identifying assumptions of the test (grade based on completion only)
24 Sept	One-Way ANOVAs in SPSS	One-way ANOVA in SPSS	(none)	Graded homework: Calculating and intepreting the test by hand

29 Sept	Post-Hoc Pairwise Comparisons	Post-hoc pairwise comparisons in SPSS	(none)	Graded homework: Calculating and intepreting the test by hand and in SPSS
1 Oct	2x2 ANOVAs in SPSS	2X2 ANOVA in SPSS	(none)	Graded homework: Calculating and intepreting the test in SPSS, completing a write-up from a results template
6 Oct	Post-Hoc Tests fo 2x2 ANOVAs	Simple effects post-hoc tests in a 2X2 ANOVA	(none)	Graded homework: Calculating and intepreting the test in SPSS
8 Oct	3x2 ANOVAs in SPSS	3X2 ANOVA in SPSS	(none)	Graded homework: Calculating and intepreting the test in SPSS, completing a write-up from a results template
13 Oct	Post-Hoc Tests for 3X2 ANOVAs	Simple effect post-hoc test and post-hoc pairwise comparison in 3X2 ANOVA	Collaborative chart building - Highlight where we are in Statistical Test Selection flow chart	Graded homework: Calculating and intepreting the test in SPSS
15 Oct	Eta^2 and Partial Eta^2	Effect sizes, eta-squared and partial eta-squared	(none)	Graded homework: Calculating and intepreting the test in SPSS, completing a write-up from a results template
20 Oct	Introduction to Correlational Tests	Relational tests, scatterplots, assumptions,	In plain language to your fellow students, explain the difference between statistical	Graded homework: calculate and intepret a 2x2

		questions addressed	significance and an effect size	and a 3x2 ANOVA with post-hoc comparison in SPSS and calculate Eta^2 by hand, complete write-up from results template
22 Oct	Calculating Covariance	Covariance by hand	(none)	Homework: Identifying assumptions of the test (grade based on completion only)
27 Oct	Calculating Pearson Correlations	Pearson correlation by hand and in SPSS	(none)	Graded homework: Calculating the test by hand
Recommend after 27 Oct	SUPPLEMENT 3	Spearman's Rho		
29 Oct	R^2	Effect sizes, R^2	Game - Generate a correlation and scatterplot, post the scatterplot, and have others guess the correlation	Graded homework: Calculating and intepreting the test by hand and in SPSS, completing a write-up from a results template
3 Nov	Internal Consistency	Reliability (vs validity), Average inter-item correlation, Cronbach's alpha	(none)	Multiple choice graded quiz: Understanding r and r^2
5 Nov	Introduction to Linear Regression	Linear Regressions, F-values, R^2 values, assumptions, questions addressed	Game – With the course data set, generate the largest Cronbach's alpha you can and post your results (with items used)	Graded homework: Completing a measures section with descriptives, Cronbach's alpha, and correlations

				between measures from template
10 Nov	Simple Linear Regression in SPSS	Simple Linear Regression in SPSS	Collective activity - Generate hypotheses that could be addressed by this analysis	Homework: Identifying assumptions of the test (grade based on completion only)
12 Nov	Multiple Linear Regression in SPSS	Multiple Linear Regression in SPSS	(none)	Graded homework: Calculating and intepreting the test in SPSS, completing a write-up from a results template, sketching a regression line
Recommend after 12 Nov	SUPPLEMENT 4	Hierarchical Linear Regressions		
17 Nov	Course Review	Review of tests and their functions	Collaborative chart building - Highlight where we are in Statistical Test Selection flow chart	Graded homework: Calculating and intepreting the test in SPSS, completing a write-up from a results template
By 18 Nov			(none)	Take the exit feeling thermometer (grade based on completion only) Multiple choice quiz: Identifying the appropriate test (grade based on completion only)
By 23 Nov	Turn in final exam			