QUANTITATIVE RESEARCH: A HANDS-ON PREPARATION

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Fall 2016
Prof. Nuria Sagarra, nuria.sagarra@gmail.com
Mondays 11:30-2:30, Academic Building 5190, CAC
Office hrs: Academic Building 5177: M 7:30-8am, 9:30-9:50, 11:10-11:30, 12:50-1:10, 2:30-3, and by appt.

COURSE DESCRIPTION:

Quantitative research uses measurable data to formulate facts and uncover patterns in research, and is the standard in most scientific disciplines. Content courses help students generate research ideas, but do not teach them how to convert ideas into actual experiments. This course offers students the unique opportunity to gain hands-on experience on how to design, conduct, and analyze quantitative experiments. Beyond quantitative data analysis, this course deals with issues related to research methods. This is because statistics and research methods are intimately associated. How do I create stimuli? How do I collect data? What statistical analyses should I run? How do I run them? To cover these and other useful topics, the course combines applied lectures with real data collection (e.g., students will learn to use an eye-tracker), and hands-on statistical laboratory sessions, and will include professional talks, guest speakers, and guided tours to laboratories employing cutting-edge methodologies in cognitive science.

This course is aimed at undergraduate students with interests in cognitive psychology, linguistics, or language acquisition, but students from any sciences relying on quantitative data, including social and behavioral sciences, are welcome. Previous knowledge in math, statistics, or programming is not required.

Upon the completion of this course, students should:

- Understand the logic of scientific explanation, including the relationship between theory and research.
- Understand the fundamental concepts of quantitative research design and statistics.
- Be able to use parametric statistical analyses to answer research questions related to social and behavioral sciences.
    - To learn how to enter, explore, modify and manage parametric data.
    - To understand and confidently apply the appropriate statistical tests.
    - Be able to perform data analysis on SPSS and to interpret the results.
- Be a better consumer of statistics and social and behavioral science research.
    - Be able to critically assess statistically-based arguments by sources ranging from scientific journals to mass media outlets.

SPSS ACCESS:
Throughout the semester we will be using Statistical Package for the Social Sciences (SPSS) software (version 23). Fortunately, Rutgers students have a number of ways to get SPSS. Students can access SPSS remotely (see http://libguides.rutgers.edu/c.php?g=336179&p=2265198, https://its.rutgers.edu/content/how-do-i-setup-remote-desktop-my-home-compter). Alternatively, computer labs have SPSS software loaded. We will try to use the remote access in class, so make sure to bring your laptop and to have remote access to SPSS by September 19th.

COURSE MATERIALS:
Students do not need to purchase any book. Class materials will be made available through Sakai.

COMMUNICATION:
Both the teacher and the students are responsible for checking email every 48 hrs, except on the weekends and during holidays. IMPORTANT: Do not email me using the Sakai Mailtool. I do not check that email. Instead, email me at nuria.sagarra@gmail.com

COURSE REQUIREMENTS:

Participation and homework:
Active participation is essential in this course, and depends on involvement during classroom discussions, attendance, and completion of homework. To derive the utmost benefit from the course, regular attendance is essential. Failure to attend class results in missed opportunities to participate in classroom discussions. A student whose irregular attendance causes him or her, in the judgment of the instructor, to become deficient scholastically, may run the risk of receiving a lower grade than the student might have secured had the student been in regular attendance. Students who miss a class (whether justified or not) are responsible for contacting other classmates to obtain any missed information, and for reporting the absence online at https://sims.rutgers.edu/ssra/ indicating the date and the reason of the absence. Non-justified absences will result in 0 participation points. Texting and the use of cell phones, tablets, or computers for non-academic purposes is not permitted and will also result in 0 participation points. Personal cell phones must be turned off or on silent during class time. Finally, students with disabilities requesting accommodations must follow the procedures outlined at http://disabilityservices.rutgers.edu/request.html.

Instructions for the CITI certificate:
1. Log Into https://www.citiprogram.org/
2. Register with CITI. Instructions: http://rbhs.rutgers.edu/hsp/education/index.html
3. Affiliate with *"Rutgers-The State University of New Jersey (All Campuses)"*
4. Successfully Complete All of Your CITI Training Modules
5. Save a eletronic copy of your Completion Report for future IRB Submissions

Tests:
The course has 2 non-cumulative tests. Students will receive a study guide two weeks prior to each test. All students are expected to take the tests on the scheduled date. If you have a legitimate excuse, you must notify me **before the test**. Anyone missing a test without prior notification or proper documentation will receive a zero for that test.

Attendance and summary of two professional talks:
Students will attend 2 talks and will turn in a 100-150-word summary, a list of independent and dependent variables, and a 100-150-word proposal of an original follow-up study in relation to the talk. Turn in a paper copy of your summary on the date indicated in the syllabus.

Conference abstract:
Students will turn in a 300-word abstract of their research project, for an imaginary professional conference. Follow APA guidelines both for content and for format.

Research Project using Prezi:
Students will think of an original empirical study related to the topics covered in class, and will give an oral presentation of their project in class, using *Prezi* (other software like *PowerPoint* is not accepted). Also, posters are not allowed. Please note the project must be original (students cannot reuse old projects or projects used for other classes). Students will need to collect data for the project. The presentations will mimic a 20-minute professional conference presentation and will have an additional part:

(1) Introduction, background, research questions, hypotheses (5 minutes)
(2) Materials and procedure (10 minutes)
(3) Additional part: your classmates will give you feedback about your experimental design, materials and procedure and will "guess" the most appropriate statistical analysis that corresponds to your proposed experiment (5 min)
(4) Your classmates will run statistics in class based on the data set you will have saved in Sakai (10 minutes)
(5) Results and discussion: you will report the results and you will discuss the findings (5 minutes)
(6) Questions: your classmates will ask you questions about the project (5 min)

Grade Components	
Participation and homework	15%
Test 1	25%
Test 2	25%
Summary of two talks	10%
Conference abstract	5%
Research project using Prezi	20%

Grading scale	
92-100%	A
87-91%	B+
82-86%	B
77-85%	C+
70-84%	C
60-69%	D
0-59%	F

ACADEMIC INTEGRITY POLICY:

A summary of the policy at Rutgers and what constitutes a violation can be found at http://academicintegrity.rutgers.edu/academic-integrity-at-rutgers and at http://academicintegrity.rutgers.edu/files/documents/AI_Policy_9_01_2011.pdf. Violations include: cheating, fabrication, plagiarism, denying others access to information or material, and facilitating violations of academic integrity. Please take this 20-minute interactive tutorial on Plagiarism and Academic Integrity: *http://www.scc.rutgers.edu/douglass/sal/plagiarism/intro.html* and consult *Don't Plagiarize: Document your research!* For tips about how to take notes so that you don't plagiarize by accident: *http://www.libraries.rutgers.edu/avoid_plagiarism*. Cheating on tests or plagiarizing materials in your papers deprives you of the educational benefits of preparing these materials appropriately. It is personally dishonest to cheat on a test or to hand in a paper based on unacknowledged words or ideas that someone else originated. It is also unfair, since it gives you an undeserved advantage over your fellow students who are graded on the basis of their own work. In this class, we will take cheating very seriously. All suspected cases of cheating and plagiarism will be automatically referred to the Office of Judicial Affairs, and we will recommend penalties appropriate to the gravity of the infraction.

Since what counts as plagiarism is not always clear, I quote the definition given in Rutgers' policy:

Plagiarism is the use of another person's words, ideas, or results without giving that person appropriate credit. To avoid plagiarism, every direct quotation must be identified by quotation marks or appropriate indentation and both direct quotation and paraphrasing must be cited properly according to the accepted format for the particular discipline or as required by the instructor in a course. Some common examples of plagiarism are:

- Copying word for word (i.e. quoting directly) from an oral, printed, or electronic source without proper attribution.
- Paraphrasing without proper attribution, i.e., presenting in one's own words another person's written words or ideas as if they were one's own.
- Submitting a purchased or downloaded term paper or other materials to satisfy a course requirement.
- Incorporating into one's work graphs, drawings, photographs, diagrams, tables, spreadsheets, computer programs, or other nontextual material from other sources without proper attribution.[1]

A SPECIAL NOTE: Students often assume that because information is available on the Web, it is public information, does not need to be formally referenced, and can be used without attribution. This is a mistake. ***All*** information and ideas that you derive from other sources, whether written, spoken, or electronic, must be attributed to their original source. Such sources include not just written or electronic materials, but people with whom you may discuss your ideas, such as your roommates, friends, or family members. They deserve credit for their contributions too!

OTHER LINKS:

1. Department of Spanish and Portuguese
   http://span-port.rutgers.edu/
   2.Academic integrity
   http://academicintegrity.rutgers.edu/academic-integrity-policy/
   3. CAPS http://rhscaps.rutgers.edu/

[1] http://academicintegrity.rutgers.edu/files/documents/AI_Policy_9_01_2011.pdf Updated with the University's current language on July 13, 2012. S. Lawrence

Day	Topic	SPSS lab	Research Methods	Homework
9/12	1. Defining research questions 2. Describing variables	1. Define and enter variables	Eyetracking I	
9/19	3.Constructing research designs 4. Writing a research proposal 5. Coding frequency data	2.1. Conduct descriptive statistics	Eyetracking II	CITI certificate Getting access to SPSS Attending Eyetracking tour
9/26	6. Describing interval and ordinal values. **Study guide for Test 1.**	2.2. Correlations and scatterplots 3. Frequency distributions	Eyetracking in translation. Guest speaker: Prof. S. Doherty, Univ of New South Wales, Australia	Run 2 eyetracking subjects
10/3	Practice for Test 1.	4. z/t-scores, divide variables	Moving windows	Study for Test 1 Turn in 3 ideas for project
10/10	**TEST 1** and talk to Nuria about final idea for project			
10/17	Results of Test 1. 7. Locating scores and finding scales in a distribution 8. Probability and hypothesis testing procedures 9.1. One-sample *t*-test	5. Graphs	Title: TBA. Guest speaker: Prof. J. Casillas, Dept. Spanish, Rutgers	Turn in summary two talks Work on Prezi: background
10/24	9. Comparing 2 groups (between) 10. Comparing 2 groups (within)	6. *t*-test for independent samples 7. *t*-test for dependent samples	ERPs	Attending ERP tour Work on Prezi: participants, methods, procedure, scoring
10/31	11. Comparing 3+ groups (between) 12, 13. Comparing 3+ groups (within)	8. One-way ANOVA 9. GLM 10. ANCOVA	fMRI	Work on Prezi: run stats
11/7	14. GLMM **Study guide for Test 2.**	11. GLMM		
11/14	Practice for Test 2.			Work on Prezi: results, discussion
11/21	**Test 2**			
11/28	Results of Test 2. 5 Prezis			Prezi.
12/5	6 Prezis			Prezi. Abstract for conference.
12/12	6 Prezis			Prezi.