### PSY 400: Advanced Research Methods in Psychology

Grand Valley State University

Winter 2023

**Contact**

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Office Hours: schedule for virtual or in-person (Tuesday from 9-10 pm)

**Readings**

* **Research Methods in Psychology**: 4th edition by Rajiv S. Jhangiani; I-Chant A. Chiang; Carrie Cuttler; and Dana C. Leighton
* **Effective Data Visualization**: The Right Chart for the Right Data 2nd Edition by Stephanie Evergreen

**Description**

The course aims to provide students with a deeper understanding of the research process in psychology. The goal is to apply knowledge of research methods by conducting a research study. The course is designed to teach students how to conduct research by conceptualizing research questions, developing hypothesis statements, identifying theory, searching the literature, designing an empirical study, collecting and analyzing data, and writing and presenting results.

To achieve these goals, the course will cover empiricism and objectivity, experimental and non-experimental methods, reliability and validity, measurement, and data analysis. Students will work in small groups to complete an original research project or replicate and extend an existing experiment. Students will experience the entire research process in that they will design, carry out, analyze, write up in APA style, and orally present their study. The study must include a theoretically meaningful hypothesized interaction between independent variables and at least one independent variable must be manipulated experimentally. Students will gain experience working with statistical and data collection packages such as SPSS and Qualtrics.

**Topics**

* An introduction to research
* Research problems, hypothesis, and theory
* Research methods: Quantitative and qualitative
* Research designs: Experimental, correlational, survey, single-subject, validity and reliability
* Sampling and foundations of measurement
* Tools for statistics (e.g., Python, R, SPSS, SAS)
* Data analysis, interpretation, and reporting
* Data visualization

**Support**

* **Academic Support**:
  + **Writing**: If support for writing is needed, please contact the Fred Meijer Center for Writing and Michigan Authors (https://www.gvsu.edu/wc/)
  + **Statistics**: The Statistics Tutoring Center offers free tutoring with no appointment needed
    - https://www.gvsu.edu/tutoring/stats/
    - SPSS: Download at https:// www.gvsu.edu/it/softwarehardwareapps-69.htm
      * GVSU’s virtual computer lab
        + Windows: https://winlab.gvsu.edu
        + Mac: https://maclab.gvsu.edu

VPN required: https://www.gvsu.edu/it/downloading- installing-and-setting-up-pulse-secure-222.htm

* + - Qualtrics: Download at https:// www.gvsu.edu/it/softwarehardwareapps-69.htm
  + **Academic:** Support for developing strategies for better time management, writing, study, or examination skills, contact the Student Academic Success Center
    - http://www.gvsu.edu/sasc/academic-skills-services-105.htm
  + **Library**: Each department has a designated librarian to support your research needs
    - https://www.gvsu.edu/library/
  + **Learning**: For academic support, please contact me and Disability Support Services
    - https://www.gvsu.edu/dsr/
  + **Counseling**: Free counseling is available to any student
    - https://www.gvsu.edu/counsel/

**Evaluation**

Students will do original work as defined in the GVSU Student Code regarding academic Integrity [Section 223.01]. The following methods are commonly used to assess students’ comprehension of the course material (range of percentage of total grade):

* **Research project and paper (200 points, 50%)**
  + Literature review section (20 points)
  + Methods section (25 points)
  + Results section (25 points)
  + Discussion section (25 points)
  + References, table, and appendix sections (5 points)
* **Class posters and presentations (100 points, 25%)**
  + Application of evidence-based poster designs (20 points)
  + Application of evidence-based data visualization (40 points)
  + Presentation and communication of results (40 points)
* **Class engagement (100 points, 25%)**
  + Points are offered during class via individual and group activities (100 points)

**Schedule**

* Week 1 (January 10, Tuesday): **Introduction and overview**
  + Class discussion:
    - Introductions and overview of course
    - Research groups formed, research paper, and poster presentation
    - Anatomy of research articles
    - Sources of knowledge (articles 1-3)
    - Office hours: research topic support
* Week 2 (January 17): **The scientific method, research problem, hypothesis statement and theory**
  + Due before class:
    - Research topic identified (part 1 of 10 of research project)
    - *Research Methods in Psychology*, Chapter 2 *Overview of the Scientific Method*, pages 37 - 56
  + Class discussion:
    - Scientific method
    - Objectivity and reproducibility of psychological science
    - What is a theory?
    - Research questions, problems, and hypotheses
    - Office hours: statement of the problem support
* Week 3 (January 24): **Experimental research**
  + Due before class:
    - Introduction and statement of the problem section (part 2 of 10)
    - Chapter 5 *Experimental Research*, pages 113 – 140
  + Class discussion:
    - Experiments and experimental design
    - Internal and external validity
    - Sampling
    - *Funnel-shaped* introduction in literature reviews
    - Office hours: literature review support
* Week 4 (January 31): **Inferential statistics** 
  + Due before class:
    - Literature review section (part 3 of 10)
    - Chapter 13 *Inferential Statistics*, pages 333 – 338
  + Class discussion:
    - Methods section discussion
    - Null hypothesis testing
    - Statistical significance
    - Practical significance
    - Office hours: methods section support
* Week 5 (February 7): **Inferential statistics and data analysis** 
  + Due before class:
    - Methods section *draft* (part 4 of 10)
    - Chapter 13 *Inferential Statistics*, pages 339 – 361
  + Class discussion:
    - Errors in null hypothesis testing
    - Data analysis plans
    - Results write up
    - Office hours: methods section support
* Week 6 (February 14): **Descriptive statistics**
  + Due before class:
    - Methods section (part 5 of 8)
    - Chapter 12 *Descriptive Statistics*, pages 295 – 326
  + Class discussion:
    - Distribution
    - Measures of central tendency ad variability
    - Relationships
    - Presenting descriptive statistics
    - Results section discussion
    - Office hours: results section support
* Week 7 (February 21): **Non-experimental Research**
  + Due before class:
    - Chapter 6 *Non-Experimental Research*, pages 145 – 180
  + Class discussion:
    - Overview
    - Correlation (e.g., linear vs categorical)
    - Qualitative
    - Office hours: results section and statistical support
* Week 8 (February 28): **Survey research**
  + Due before class:
    - Results section *draft* (part 6 of 10 of research project)
    - Chapter 7 *Survey Research*, pages 185 – 203
  + Class discussion:
    - Overview of survey research
    - Construction of surveys
    - Designing quality survey questions
    - Sources of validity evidence
    - Office hours: results section and statistical support
* Week 9 (March 7, Spring Break): **No Class**
* Week 10 (March 14): **Single-subject Research**
  + Due before class:
    - Results section (part 7 of 10 of research project)
    - Chapter 10 *Single-Subject Research*, pages 239 – 257
  + Class discussion:
    - What is single-subject research?
    - Single-subject designs
    - Data analysis in single-subject research
    - Validity concerns
    - Discussion section discussion
    - Office hours: discussion section support
* Week 11 (March 21): **Data Communication and Visualization Overview**
  + Due before class:
    - *Effective Data Visualization*, Chapter 1 …*Why we Visualize*, pages 1 – 14
  + Class discussion:
    - Introduction to evidence-based poster designs
    - Introduction to evidence-based data visualization
    - Fundamentals
    - Four step process and understanding your audience
    - Office hours: discussion section support
* Week 12 (March 28): **Data Visualization: Mean, Frequency, and Variability**
  + Due before class:
    - Discussion section (part 8 of 10 of research project)
    - *Effective Data Visualization*, Chapter 2 …*Single Number*, pages 15 – 48
  + Class discussion:
    - Showing mean, frequency, and measures of variability
    - Practice single large number representation and bar chart
    - Chart selection and data viz checklist
    - References, table, and appendix sections discussion
    - Office hours: references etc. section support
* Week 13 (April 4): **Data Visualization: Comparisons**
  + Due before class:
    - Chapter 3 *…Visualizing Comparisons,* pages 49 - 88
  + Class discussion:
    - Comparing similarities and differences
    - Constructing new graph types
    - Office hours: poster support
* Week 14 (April 11): **Data Visualization: Qualitative Data**
  + Due before class:
    - References, table, and appendix sections (part 9 of 10 of research project)
    - Poster *draft* (part 1 of 2 of poster presentation)
    - Chapter 8 *…Visualizing Qualitative Data,* pages 207 - 255
  + Class discussion:
    - The importance of qualitative data
    - Start with why discussion
    - How to best visualize qualitative data
    - Office hours: poster and presentation support
* Week 15 (April 18): **Poster Presentation**
  + Due before class:
    - Poster (part 2 of 2 of poster presentation)
  + Class discussion:
    - Poster presentations and discussion
* Week 16 (April 25): **Exam Week**
  + Due before class:
    - Final research paper (part 10 of 10 of research project)

**Signature Assignment: Research Project**

**Primary Learning Outcomes**: Students will demonstrate the ability to a)Describe the characteristics of an appropriate research proposal; b) Distinguish (compare and contrast) between assumptions, limitations and hypotheses; c) understand the different sections of a research proposal; d) distinguish between a research question and a research hypothesis; and e) understand the limitations of their chosen research paradigm.

Students will do a research paper of between 8 and 10 pages (typed, double-spaced), not counting the title page, abstract, tables, or reference page. The paper should describe, in detail, a hypothetical experiment (not one from another source). The hypothesis should be controversial in the sense that one could reasonably predict more than one outcome on the basis of prior psychological theory/research (which you should describe in your paper). The paper should be in APA format (6th Ed). This includes citation format, use of headers, inclusion of an abstract, etc. It should include an Introduction, in which you describe your hypothesis and the psychological literature relevant to it, a Methods section, which describes your experimental procedures in detail, a Results section, in which you make up some expected results (simple statistics are desirable, but complicated ones are unnecessary), and a Discussion section in which you discuss the ramifications of your experiment. Put differently, you will include the following:

1. Introduction
2. Literature Review
3. Research Problems
4. Research Questions
5. Hypotheses
6. Method
   1. Participants
   2. Measures
   3. Data Collection
   4. Data Analysis
7. Results – must include a complete and formal presentation of the results
8. Discussion - of the results, the outcome of each of the hypotheses, and what action should be taken by counselors working at similar facilities for each of the stated hypotheses (recommended actions are ONLY based upon cited peer-reviewed journal articles)
   1. Limitations of the study
   2. How your study added to the knowledge about this problem
9. Conclusion
10. References

Papers containing 5 pages or less of material appropriate to the requirements of the assignment will receive a grade of 0. Papers must contain appropriate APA headings that match those listed in the outline below – papers without headings will receive a grade of 0.

This paper must include references from at least 10 PEER REVIEWED journal articles (no citing of books, newspapers, magazines, websites, etc.) that are from 2005-2015.

The paper is due to be uploaded (1) to the appropriately labeled class Elearning module dropbox AS WELL AS (2) TK20 by the date and time published on the Tentative Class Schedule at the end of this syllabus. The grade you receive on Elearning is the grade that will be awarded for your class grade.

PDFs will receive a grade of 0 on the assignment – turn in a document from a word processing program – such as Word. Papers must include all components in one Word document. You cannot, for example, make the title page or reference page a separate document from the rest of the text.

**Some helpful information to know for the paper**

1. The difference between research hypothesis, questions, and problems
   1. An important first step toward providing a sound conceptual foundation for your research project is the development of solid research questions, problems, and hypotheses. This process typically begins with a preliminary review of the existing literature for your topic.
2. What is a Research Problem?
   1. A research problem is an issue or concern that an investigator presents and justifies in a research study. Anything that a person finds unsatisfactory or unsettling, a difficulty of some sort, a state of affairs that need to be changed. A problem involves areas of concerns to researchers, for conditions they want to improve, difficulties they want to eliminate, questions for which they want to seek answers.
   2. To help identify your research problem, ask yourself such questions as: What was the issue/problem you want to study? What is the concern being addressed “behind” this study? Why do you want to undertake this study? Why is this study important to the scholarly community?
   3. A research question poses a relationship between two or more variables but phrases the relationship in terms of some question.
   4. A well-researched and thought out question will help focus your ideas and ensure you are collecting the appropriate data. This is a critical step in the research process. The research question determines what, where, when, and how the data are collected and is an important link between the conceptual and logistic aspects of your research plan.
   5. While reviewing the current literature and formulating your ideas, keep the following questions in mind:
      1. Why is this research important? What is it that we don’t know or fully understand?
      2. What have other researchers in my field done?
      3. What areas need further exploration?
      4. Can my study help fill in these gaps or lead to greater understanding?
3. Once your research questions are firmly established the next logical step is to develop a set of hypotheses based on the questions posed by your study. A hypothesis is a declarative statement that attempts to predict the relationship between two or more variables based on statistical consideration.
   1. Strong hypotheses:
      1. Give insight into the proposed research question;
      2. Are measurable and testable;
      3. Are developed directly from the experiences of the researcher;
      4. Should be concise, as a rule, no more than three hypotheses should be proposed for any given project;
      5. There should be a well-founded rationale for all proposed hypotheses.
         1. Why did you make these predictions?
         2. Why are they important?
         3. Provide alternative possibilities for the hypotheses that could be tested. o Why did you choose the ones you did over others?
4. What you mean by "measures?" Did you mean what we are measuring or what we are using to measure the data?
   1. Measures refer to what you used to take the measurement for the data that you have generated. If you were doing a study on depression and you used the Beck Depression Inventory (BDI) you would discuss the BDI in this section so that the reader could understand what was used to take the measurement for the study. You would discuss the instrument and how it was given.

**Additional Assignments**

**Annotated Bibliography:** Your bibliography should include 10-15 articles on a topic of your choice and it should be in APA format (6th edition). A bibliography is a list of sources (books, journals, websites, periodicals, etc.) one has used for researching a topic. A bibliography usually just includes the bibliographic information (i.e., the author, title, publisher, etc.). An annotation is a summary and/or evaluation. Therefore, an annotated bibliography includes a summary and/or evaluation of each of the sources. Please include your research question or hypotheses and an introductory paragraph with the annotated bibliography

* This website is helpful in guiding you through the APA format. <http://owl.english.purdue.edu/handouts/research/r_apa.html>

**Optional Extra Credit**

**Complete Human Subjects Research training:** <https://www.citiprogram.org/default.asp>

Each student is expected to understand the research process and ethical issues that are pertinent to conducting research with human subjects. Completion of the university's course in the protection of human research subjects will help to facilitate a greater understanding of these issues.