

EASTERN ARIZONA COLLEGE

Experimental Psychology

Course Design
2019-2020

Course Information

Division Social Sciences
Course Number PSY 270 (SUN# PSY 2290)
Title Experimental Psychology
Credits 4
Developed by Dr. Nan Pennington
Lecture/Lab Ratio 3 Lecture/2 Lab

Transfer Status

ASU	NAU	UA
PSY 290, Literacy & Critical Inquiry (L), Natural Science - General (SG)	PSY Departmental Elective; Social and Political Worlds [SPW]	PSY 297A --and-- PSY 290A

Activity Course No
CIP Code 42.0101
Assessment Mode Pre/Post Test (100 Questions/100 Points)
Semester Taught Spring
GE Category Social Sciences
Separate Lab Yes
Awareness Course No
Intensive Writing Course Yes
Diversity and Inclusion Course Yes

Prerequisites

ENG 102 with a grade of “C” or higher, and PSY 101 with a grade of “C” or higher, and prior or concurrent enrollment in PSY 220 or MAT 160 with a grade of “C” or higher

Educational Value

This course is designed to introduce students to the scientific method as it is applied to the study of human behavior and mental processes. This course will be taught by an instructor with a graduate degree well prepared in intensive writing/critical inquiry skills. The instructional content of the course will include at least one formal writing assignment of not less than 1,500 words and a minimum of four additional writing assignments totaling 1,000 words or more. The instructor will provide students with feedback on selected writing assignments, addressing issues including but not limited to, development, style, grammar, sentence and organizational structure, use of empirical resources, and logical consistency. The assignments must be designed to include feedback from peers, professionals, or the EAC Writing Center. The class is required for all students who major in psychology, and would be valuable for sociology majors and helpful for persons planning careers in other behavioral or social sciences. Experimental Psychology is an advanced psychology course. Meets Diversity and Inclusion (DI) requirement.

Description

This course is an introduction to the experimental and quantitative methods used by psychologists to generate new psychological knowledge, and to determine the generality, validity, and reliability of research data. Laboratory will offer demonstrations as well as direct experience with research methods and techniques, and with methods for the analysis, description, and reporting of research results. Students will design and conduct an experiment as approved by the instructor.

Supplies

None

Competencies and Performance Standards

1. Examine the role and the application of scientific method and theoretical underpinnings in experimental psychology.

Learning objectives

What you will learn as you master the competency:

- a. Examine the historical and current role of research and scientific methods in psychology.
- b. Define basic terms including research, theory, and hypothesis.
- c. Interpret (8) characteristics of high-quality research.
- d. Explain the difference between experimental and nonexperimental research.
- e. Distinguish between cause and effect relationship.
- f. Describe in basic terms the three (3) different types of research designs that are categorized as nonexperimental.
- g. Identify the two (2) types of research designs classified as experimental research.
- h. Distinguish between basic research and applied research.
- i. Explain why a strong scientific method of inquiry will lead to valuable information regardless of significant or nonsignificant findings.
- j. Differentiate between science, scientific method, and theories in psychology.
- k. Compare and contrast early research in psychology to current practices in scientific research.
- l. Design appropriate research topics in Psychology.
- m. Explain the roll of the Institutional Review Board as it relates to historical and current research methodologies.

Performance Standards

Competence will be demonstrated:

- o by objective examinations
- o through in-class application projects
- o student development of a research topic (150 word research topic document)

Criteria - Performance will be satisfactory when:

- o learner can identify and distinguish each step of the scientific method
- o learner can defend contemporary scientific methodologies based on historical knowledge of scientific inquiry
- o learner can explain the role of the Institutional Review Board
- o learner will justify the features of the basic and applied experimental processes
- o learner can distinguish between folk science and scientific method

2. Examine the research process.

Learning objectives

What you will learn as you master the competency:

- a. Examine the research process from formulating questions to seeking and finding solutions when assessing psychological behaviors.
- b. Compare and contrast dependent and independent variables.
- c. Identify other types of variables that may interfere with the research process.
- d. Define a hypothesis and describe how it works.
- e. Discuss the value of the null hypothesis.
- f. Describe the difference between a null hypothesis and a research hypothesis.
- g. List the characteristics of a good hypothesis.
- h. Explain the difference between a sample and the population.
- i. Define statistical significance and explain its importance.
- j. Describe key concepts, principles, and overarching themes in psychology research.
- k. Analyze sociocultural factors in scientific inquiry.

Performance Standards

Competence will be demonstrated:

- o by objective examinations
- o through in-class activities
- o through research project writing assignment #1; topic, research question(s), and hypothesis (250+ word count)

Criteria - Performance will be satisfactory when:

- o learner can compare and contrast a hypothesis and null hypothesis
- o learner designs appropriate research questions for different types of research
- o learner differentiates between the different types of variables in a research question and study
- o learner can distinguish between a population, the variety of population samples, and how they are used in scientific research
- o learner can choose and apply statistical significance

3. Develop a research problem and review various types of research.

Learning objectives

What you will learn as you master the competency:

- a. Demonstrate the process of searching for empirical research information.
- b. Demonstrate how a research topic becomes a research question.
- c. Define the three types of empirical research sources typically consulted when conducting a literature review (i.e. general, primary, secondary).
- d. Justify how and when to use general, primary, and secondary research sources.
- e. Define terms related to a literature review.
- f. Describe how scholarly journals are incorporated into a research project and manuscript.
- g. Examine the criteria for judging empirical research articles and research studies.
- h. Demonstrate the use of electronic research tools available via the World Wide Web.
- i. Discuss how to use a bibliographic database program.

- j. Construct a literature review.
- k. Use scientific reasoning to interpret psychological phenomena.
- l. Exhibit psychological information literacy.
- m. Demonstrate project and teamwork management skills.
- n. Create a psychological research project investigating individual and sociocultural, cognition, developmental, and social sciences.

Performance Standards

Competence will be demonstrated:

- o through a research topic being defined, refined, and peer reviewed
- o in application of traditional and online research
- o by analysis of empirical literature

Criteria - Performance will be satisfactory when:

- o learner demonstrates knowledge of online and library resources and their suitability for their research project
- o learner selects appropriate research topic for student research project
- o learner can develop hypothesis and identify all variables within the research topic and question
- o learner begins developing a reference list for their literature review

4. Defend ethics in research.

Learning objectives

What you will learn as you master the competency:

- a. Summarize the importance in practicing ethical guidelines when developing a research project.
- b. Utilize the basic principles of ethical research in developing a research project.
- c. Distinguish between ethical and unethical research practices.
- d. Analyze early unethical research and the implications for the history of psychology becoming a recognized science.
- e. Summarize the role of professional organizations in providing ethical guidelines.
- f. Apply ethical standards in the evaluation of early psychological research practices.
- g. Organize demographic data that includes culture, ethnic, gender, social interactions, contemporary issues, religious practices and beliefs, age, socioeconomic status, and others depending on the needs of the research study.

Performance Standards

Competence will be demonstrated:

- o through in-class lab application activities
- o by developing an informed consent agreement acquired for student participants as applicable
- o in beginning to develop literature review from reference list

Criteria - Performance will be satisfactory when:

- o learner explains the IRB process, the need for the IRB in creating safe and ethical research projects
- o learner demonstrates appropriate methods of research protocol when processing gathered data

- o learner has completed and refined topic statements, research questions, and hypothesis based on peer and instructor feedback
- o learner can summarize the role of professional organizations in providing ethical guidelines

5. Explain the terms measurement, reliability, and validity.

Learning objectives

What you will learn as you master the competency:

- a. Explain why measurement is important to the research process.
- b. Discuss the four levels of measurement and provide an example of each.
- c. Explain the concept of reliability in terms of observed score, true score, and error.
- d. Describe the two elements that can make up an error score.
- e. List methods for increasing reliability.
- f. Discuss four ways to examine reliability.
- g. Provide a conceptual definition of validity.
- h. List the three traditional types of validity.
- i. Explain the relationship between reliability and validity.

Performance Standards

Competence will be demonstrated:

- o through in-class lab measurement, reliability and validity and statistical application activities
- o through peer reviewed literature review

Criteria - Performance will be satisfactory when:

- o learner can assess the ratio level of measurement considered the most precise
- o learner demonstrates knowledge of the difference between reliability and validity
- o learner can interpret why repeated scores on most variables always differ from one another
- o learner can name four ways to increase reliability
- o learner can discriminate the difference between continuous and discrete variables

6. Consider methods of measuring behavior.

Learning objectives

What you will learn as you master the competency:

- a. Explain the usefulness of tests in measuring behaviors.
- b. Evaluate the various types of tests and how they are used.
- c. Conduct an item analysis identifying the discrimination and difficulty indices for each item in a test.
- d. Explain the difference between discrimination index and difficulty index.
- e. List the various techniques used to record behavior.
- f. Explain the differences between Thurstone and Likert scales.
- g. List the factors to consider in making questionnaires successful for research projects.

Performance Standards

Competence will be demonstrated:

- through in-class lab testing and survey application activities
- by literature review extended into method section and design of their study; explaining measurements, reliability, validity of measurement to be used in their own research, independent and dependent variables, participant demographics (700+ words)
- in designing a study survey and complete a factor analysis
- by writing questions using a Thurstone scale and Likert scales

Criteria - Performance will be satisfactory when:

- learner will illustrate the use of testing methods
- learner will compare and contrast the advantages and disadvantages to using Likert scale
- learner will describe the basic procedure involved in setting up and conducting an item analysis
- learner will illustrate the importance of being unobtrusive when observing behavior
- learner will appraise the five basic assumptions when using a questionnaire
- learner will compare and contrast research questionnaires
- learner will explain the characteristics of a good cover letter and justify why it is helpful to have one

7. Explain data collection and descriptive statistics.

Learning objectives

What you will learn as you master the competency:

- a. Explain the steps in the data collection process.
- b. Construct a data collection form and code data collected.
- c. Identify 10 "commandments" of data collection.
- d. Define the difference between inferential and descriptive statistics.
- e. Compute the different measures of central tendency from a set of scores.
- f. Explain measures of central tendency and when each one should be used.
- g. Compute the range, standard deviation, and variance from a set of scores.
- h. Explain measures of variability and when each one should be used.
- i. Discuss why the normal curve is important to the research process.
- j. Compute a z-score from a set of scores.
- k. Explain what a z-score means.

Performance Standards

Competence will be demonstrated:

- by in-class lab statistical application activities
- through design and implementation of study data collection process
- in design research spreadsheet and code expected data variables
- through research part four section; Literature review, method section describing data collection process, type of data analysis (1,500+ words)

Criteria - Performance will be satisfactory when:

- learner can identify and distinguish between measures of central tendency

- learner will differentiate between variability and variance
- learner will identify, analyze, z-scores and t-tests
- learner will identify the statistical analysis used for factorial designs

8. Develop inferences about the population.

Learning objectives

What you will learn as you master the competency:

- a. Categorize the difference between descriptive and inferential statistics.
- b. Explain demographic variables and their importance to a study.
- c. Describe participant population, sociocultural norms and heritage, ethnicity, gender, political beliefs, economic status, class, age.
- d. Define the central limit theorem and explain why it is important to the world of inferential statistics.
- e. Distinguish between personality, context, physical, and social variables.
- f. List the steps in completing a test of statistical significance.
- g. Discuss the basic types of statistical tests and how they are used.
- h. Explain Type I and Type II error in null hypothesis testing.
- i. Discuss the distinction between statistical significance and meaningful significance.

Performance Standards

Competence will be demonstrated:

- through in-class lab demographic application activities
- in reviewing the previously designed coding system for research study
- by designing a research spreadsheet and code expected data variables
- through research part five section describing population variables
- by literature instruction, peer review and feedback of method section describing data collection process, demographics type of data analysis, participants characteristics and development, style, grammar, sentence and organizational structure, use of sources, and logical consistency (1700+ words)

Criteria - Performance will be satisfactory when:

- learner will clarify the difference between descriptive and inferential statistics
- learner will describe the steps involved in testing a hypothesis
- learner will distinguish amongst one-way between subject analysis of variance and one-way repeated measures of ANOVA
- learner will determine the factors that decrease the likelihood of making a Type II error
- learner will compare and contrast the difference between statistical significance and meaningfulness
- learner will differentiate between subject variability
- learner will evaluate a meta-analytic study

9. Apply descriptive and correlational non-experimental research methods.

Learning objectives

What you will learn as you master the competency:

- a. Explain the purpose and use of descriptive and correlational studies.

- b. Analyze surveys and interview questions used in non-experimental research.
- c. Utilize the different types of tools used in survey research.
- d. List the Ten Commandments of interviewing.
- e. Summarize how to conduct survey research.
- f. Predict how to verify the validity of survey research.
- g. Compare and contrast the advantages and disadvantages of survey research.
- h. Define correlational research and discuss how correlational studies are used in empirical research.
- i. Interpret a scattergram including a Pearson product moment correlation, and what the correlation coefficient means.
- j. Given two variables, compute the Pearson correlation coefficient using the raw score method and explain what it means.
- k. Explain the difference between a coefficient of determination and a coefficient of alienation.

Performance Standards

Competence will be demonstrated:

- o through in-class lab case study review
- o by an objective exam
- o in designing an interview protocol for interview
- o with teams work on statistical analysis of data collected

Criteria - Performance will be satisfactory when:

- o learner will apply closed-ended and open-ended questions
- o learner will define the Ten Commandments of interviewing and use them in their interview question design
- o learner will compare and contrast the advantages of survey research
- o learner will determine “*r*” the correlation coefficient between one variable and another
- o learner will differentiate between the coefficient of determination and the coefficient of alienation

10. Review and discuss information necessary to conduct experiments.

Learning objectives

What you will learn as you master the competency:

- a. Explain the difference between qualitative and quantitative research.
- b. Discuss the different types of research sources regularly used in qualitative research.
- c. List advantages and disadvantages of the case study method.
- d. List four ways ethnographies differ from case studies.
- e. List six steps involved in historical research.
- f. Discuss primary and secondary sources.
- g. Given a historical data source, identify whether the source is primary or secondary.
- h. Explain why authenticity and accuracy are important to historical research.
- i. Discuss internal and external criticisms of historical research.

Performance Standards

Competence will be demonstrated:

- with lab-data collection
- through instructor review and feedback of completed method section incorporating AP formatting, style, grammar, sentence and organizational structure, use of sources, and logical consistency
- by designing an interview protocol for interview

Criteria - Performance will be satisfactory when:

- learner can describe the difference between direct and participant observation
- learner will appraise questions used in interviews
- learner can interpret the differences between primary and secondary sources
- learner will examine the limitations of historical research in nonexperimental research

11. Apply qualitative nonexperimental research methods.

Learning objectives

What you will learn as you master the competency:

- a. Explain why experimental designs are so important.
- b. Identify and summarize examples of pre-experimental and true experimental designs.
- c. Discuss the major difference between pre-experimental and true experimental designs and how this impacts the ability of each type of experiment to determine causality.
- d. Discuss the importance of randomization to the experimental design.
- e. Define a priori comparison.
- f. Distinguish between internal and external validity in research design.
- g. List and provide examples of the threats to internal validity.
- h. List and explain threats to external validity.
- i. Discuss how researchers control for extraneous variables.
- j. Develop relationship with fellow students, working together in the analysis of each learner's data analysis.

Performance Standards

Competence will be demonstrated:

- by lab-data Analysis
- in peer review of Method and Discussion section of research project

Criteria - Performance will be satisfactory when:

- learner can apply evaluative criteria to research results
- learner can define external and internal validity
- learner can analyze results with multiple groups and factorial experiments
- learner can differentiate between one way and two analysis of variance
- learner can identify and apply statistical tests appropriate for repeated measures and mixed factorial designs
- learner can differentiate between sources of validity
- learner can distinguish between group validity
- learner will explain the Hawthorne effect
- learner will critique the characteristics of pre-experimental designs and why it is difficult

- o to establish cause and effect relationships
- o learner will identify the three methods you can use to control extraneous variables

12. Develop a plan to write a research manuscript.

Learning objectives

What you will learn as you master the competency:

- a. Identify the components/sections of a typical research manuscript.
- b. Apply the criteria for judging a research study.
- c. Demonstrate how to list activities and estimate the time involved in each when writing the final research manuscript.
- d. Discuss considerations in selecting a sample.
- e. Identify the essential components of a typical manuscript and summarize the purpose of each.
- f. Apply findings of research project to provide new empirical information about social awareness, ethics, gender, ethnicity, current events, historical background literature review, and sociocultural trends.
- g. Discuss why the abstract is such an important part of the manuscript.
- h. Apply the basic “rules of thumb” for formatting manuscripts using APA style.

Performance Standards

Competence will be demonstrated:

- o through instructor and peer review of final research manuscript combining all sections (3,000+ words) in finished document

Criteria - Performance will be satisfactory when:

- o learner can apply evaluative criteria to research results
- o learner will evaluate the hypothesis of their research manuscript
- o learner will examine the method section of their research manuscript
- o learner will develop a timeline for completion of research manuscript

Types of Instruction

Lecture

Lab

Discussion

Grading Information

Grading Rationale

Students will be evaluated as follows in accord with the weights assigned to course requirements:

1. Pre Test - Weight: 0%
2. Course Examinations - Weight: 30%
3. Assignments and Lab work – Weight: 35%
4. Final research report - Weight: 15%
5. Participation (including lab) – Weight 10%
6. Post Test: - Weight: 10%

Grading Scale

A	90% - 100%
B	80% - 89%
C	70% - 79%
D	60% - 69%
F	Below 60 %