

CHAPTER 2: RESEARCH METHODS IN I/O PSYCHOLOGY

Learning Objectives

Some students may have already had a course in, or an introduction to, research methodology before taking the I/O course. However, it is important that students become familiar with the contents of this chapter because:

- a) Quantitative methods are central to I/O psychology;
- b) Understanding research methods is a difficult subject for most students;
- c) Research methods are often quickly forgotten;
- d) Several topics relevant to I/O psychology may not have been covered in previous courses.

After studying the material in this chapter the student should be able to:

1. Understand and describe the characteristics of a good research question.
2. Explain each of the major concepts of research design including: variables, setting, generalizability, control, confounding, random assignment, and random selection.
3. Explain what a research design is; Describe different types of research designs as well as list their advantages and disadvantages.
4. Define the basic concepts of measurement.
5. List and describe the types of reliability.
6. Discuss the different ways of assessing validity.
7. Define basic concepts of descriptive statistics.
8. Explain the difference between descriptive statistics and inferential statistics.
9. Explain basic concepts in inferential statistics, especially statistical significance.
10. Report the nature and purpose of meta-analysis.
11. Explain what mediator and moderator variables are; explain the complex relationships they assess.
12. Understand the major principles of research ethics.

TESTBANK

Multiple Choice Questions

1. The foundation of both the science and practice sides of I/O psychology is
- Generalizability.
 - Research.
 - Training.
 - Statistics.

Answer: b

Learning Objective: 1

Page: 23-24

2. Which of the following is NOT one of the four major aspects of a research study?
- How to obtain funding for research
 - Types of research designs
 - Principles of measurement
 - Use of statistics to draw conclusions from data

Answer: a

Learning Objective: 1

Page: 24

3. A hypothesis is
- the researcher's best guess about what the results of a study will be.
 - a statement of the results that the researcher expects to find.
 - a prediction, not a question.
 - all of the above are correct

Answer: d

Learning Objective: 1

Page: 25

4. The most critical aspects of a research study are
- the variables and their generalizability.
 - the research setting and the research design.
 - the research question and the research design.
 - the research question and the hypothesis.

Answer: d

Learning Objective: 1

Page: 25

5. An attribute or characteristic of people or things that can take on different values is called:

- a variable
- a hypothesis
- a statistic
- an experiment

Answer: a

Learning Objective: 2

Page: 27

6. Assume you study effects of pay (high vs. low) and leadership style (democratic vs. autocratic) on performance. Which of the following is an independent variable?
- pay
 - leadership style
 - performance
 - Both pay and leadership style are independent variables.

Answer: d

Learning Objective: 2

Page: 26

7. Assume you study effects of pay (high vs. low) on the performance of men and women. Which of the following is a dependent variable?
- pay
 - subject sex (men vs. women)
 - performance
 - Both pay and subject sex are dependent variables.

Answer: c

Learning Objective: 2

Page: 26

8. In experimental studies the _____ variable is assumed to be the cause of the change in the _____ variable.
- dependent; independent
 - confounding; independent
 - independent; dependent
 - independent; confounding

Answer: c

Learning Objective: 2

Page: 26

9. Which of the following research projects is performed in a field setting?
- You go into a classroom and give students a questionnaire to study the effects of management style on employee motivation.
 - You go into a fast food restaurant and give employees a questionnaire to study the effects of pay on job performance.
 - You design a special room to simulate the work conditions in a factory and manipulate lighting conditions to study the effect of light on performance.
 - Both "a" and "c" are examples of research in field settings.

Answer: b

Learning Objective: 2

Page: 26

10. Which of the following research projects is performed in a laboratory setting?
- You go into a factory and give employees a questionnaire to study the effects of management style on employee motivation.
 - You go into a fast food restaurant and give employees a questionnaire to study the effects of pay on job performance.
 - You design a special room to simulate the work conditions in a factory and manipulate lighting conditions to study the effect of light on performance.
 - Both "a" and "c" are examples of research in lab settings.

Answer: c

Learning Objective: 2

Page: 26

11. The same physical location can be the setting for either a field or a laboratory study. The phenomenon being studied is what differentiates the two.
- true
 - false

Answer: a

Learning Objective: 2

Page: 26

12. Approximately what percentage of I/O studies published in major journals was performed in laboratory settings?

- a. 10%
- b. 30%
- c. 50%
- d. 70%

Answer: b

Learning Objective: 2

Page: 26

13. When I/O psychologists conduct research in organizational settings they are said to be conducting _____ research.

- a. experimental
- b. laboratory
- c. field
- d. cross-sectional

Answer: c

Learning Objective: 2

Page: 26

14. Generalizability of results refers to the concept that the conclusions of a study can be extended to other

- a. groups of people.
- b. organizations.
- c. settings.
- d. all of the above are correct

Answer: d

Learning Objective: 2

Page: 26

15. Which of the following is true?

- a. Generalizability is a concern with both laboratory and field research.
- b. Generalizability is a concern with laboratory research but not with field research.
- c. Generalizability is a concern with field research but not with laboratory research.
- d. Generalizability is not a concern with either laboratory or field research.

Answer: a

Learning Objective: 2

Page: 26-27

16. Procedures that allow researchers to rule out certain explanations for results other than the hypotheses they wish to test are referred to as _____ procedures.

- a. generalization
- b. control
- c. confounding
- d. exclusion

Answer: b

Learning Objective: 2

Page: 27

17. To study the effects of pay on performance you pay some people \$10/hour and others \$20/hour. You use both male and female employees, but all of them have high ability. Which of the following is a control variable?

- a. pay
- b. performance
- c. employee gender
- d. ability

Answer: d

Learning Objective: 2

Page: 27

18. Which of the following is NOT one of the ways that control is achieved in research studies?
- a. control groups.
 - b. holding certain variables constant.
 - c. systematically varying selected variables.
 - d. quasi-experimental design

Answer: d

Learning Objective: 2

Page: 27-28

19. As a research psychologist you conduct a study that examines the effect of offering a benefits package on job satisfaction. In this study a group of new employees is offered a benefits package; another group is not. Which is the control group?
- a. There is no control group.
 - b. The group receiving the benefits package is the control group.
 - c. The group not receiving the benefits package is the control group.
 - d. The group having their job satisfaction measured is the control group.

Answer: c

Learning Objective: 3

Page: 27-28

20. You want to study the effects of training on performance. Because you must get permission to train people, you ask for volunteers. You train the volunteers, and then measure the performance of both volunteers (trained) and non-volunteers (non-trained). You have used
- a. both random assignment and random selection.
 - b. random assignment but not random selection.
 - c. random selection but not random assignment.
 - d. neither random assignment nor random selection.

Answer: d

Learning Objective: 2

Page: 28-29

21. You want to study the effects of training on performance. Because you must get permission to train people, you ask for volunteers. You train half the volunteers, and then measure the performance of both trained and untrained volunteers. You have used
- a. both random assignment and random selection.
 - b. random assignment but not random selection.
 - c. random selection but not random assignment.
 - d. neither random assignment nor random selection.

Answer: b

Learning Objective: 2

Page: 28-29

22. The term _____ refers to the placement of people in different treatment conditions in a nonsystematic way.
- a. random sampling
 - b. random selection
 - c. random assignment
 - d. random placement

Answer: c

Learning Objective: 2

Page: 28

23. As an I/O research psychologist you chose the subjects of your investigation through a nonsystematic method; you have used which of the following methods?
- a. randomized sampling
 - b. random assignment
 - c. nonsystematic sampling
 - d. random selection

Answer: d

Learning Objective: 2

Page: 28

24. Random assignment enhances the generalizability of a study.
- a. true
 - b. false

Answer: b

Learning Objective: 2

Page: 29

25. When two or more variables are intertwined in such a way that conclusions cannot be drawn about either one a researcher would say that _____ has occurred.
- a. confounding
 - b. covariation
 - c. control
 - d. random assignment

Answer: a

Learning Objective: 2

Page: 29

26. In a study that examines the effect of job tenure on job satisfaction, the added variable of the age of the research subject is intertwined with the variable of job tenure. When variables are intertwined in this way such that clear conclusions cannot be drawn, researchers say that a _____ has occurred.
- a. covariation
 - b. confounding
 - c. cross-sectional design
 - d. correlation

Answer: b

Learning Objective: 2

Page: 29

27. Procedures that allow researchers to rule out certain explanations for results other than the hypotheses they wish to test are referred to as _____ procedures.
- a. generalization
 - b. control
 - c. confounding
 - d. exclusion

Answer: b

Learning Objective: 2

Page: 29

28. To draw causal conclusions about a research question, one should use:
- a. experimental research designs
 - b. survey research designs
 - c. observational research designs
 - d. a variety of research designs

Answer: a

Learning Objective: 3

Page: 30-31

29. The major advantage of the experiment is the ability to
- draw causal conclusions.
 - measure multiple variables.
 - use laboratory settings.
 - control variables.

Answer: a

Learning Objective: 3

Page: 30-31

30. To study the effectiveness of employee training you train 20 volunteers and compare their post-training performance to that of 20 non-volunteers. What type of research design have you used?
- observational
 - quasi-experimental
 - experiment
 - survey

Answer: b

Learning Objective: 3

Page: 30

31. You are interested in learning about work factors that cause employee stress, so you watch employees in their organizational setting perform their jobs for a few days. The employees are not aware that they are being studied. What type of research design have you used?
- laboratory design
 - experimental design
 - cross-sectional design
 - unobtrusive observational design

Answer: d

Learning Objective: 3

Page: 33

32. You want to know if part-time employees become more or less happy with their employment over time. Thus, you give a questionnaire to 100 new hires and four months later give the same questionnaire to the same employees. What type of research design have you used?
- longitudinal design
 - quasi-experimental design
 - cross-sectional design
 - obtrusive methods observational design

Answer: a

Learning Objective: 3

Page: 31

33. In which of the following research designs would it be MOST difficult to draw causal conclusions?
- laboratory experiment
 - field experiment (true experiment, not quasi-experiment)
 - longitudinal survey design
 - cross-sectional survey design

Answer: d

Learning Objective: 3

Page: 30-32

34. An advantage of survey designs is:
- they allow causal conclusions to be drawn about the relationships between variables

- b. employees are always good (unbiased) sources of information about variables of interest
- c. the results are more generalizable than those from experiments
- d. they are expensive and time consuming to run

Answer: d

Learning Objective: 3

Page: 31-32

35. When conducting survey research psychologists use the term _____ to refer to the percentage of those surveyed who agree to participate.
- a. answer rate
 - b. participation rate
 - c. response rate
 - d. reverse-refusal rate

Answer: c

Learning Objective: 3

Page: 32

36. When I/O psychologists perform job analyses they often take notes on the employees' actions by observing employees without the subjects being aware of the researchers. This is an example of a(n)
- a. obtrusive observational design .
 - b. unobtrusive observational design.
 - c. unobtrusive survey design.
 - d. obtrusive survey design.

Answer: b

Learning Objective: 3

Page: 32

37. You have been hired by an organization to conduct an analysis of the productivity of the production department and the number of coffee breaks the employees take. You collect your data by observing the employees while pretending to be a new hire in the department. This type of observation is called a(n)
- a. unobtrusive survey design.
 - b. obtrusive survey design.
 - c. unobtrusive observational design.
 - d. obtrusive observational design.

Answer: c

Learning Objective: 3

Page: 32

38. Case studies, participant observation, and interviews are all forms of:
- a. survey methods
 - b. experimental methods
 - c. quantitative methods
 - d. longitudinal survey methods

Answer: c

Learning Objective: 3

Page: 34

39. In your study of motivation and performance you record each respondent's gender, and assign the number "1" to males and "2" to females. This type of measurement is referred to as
- a. sex typing.

- b. categorical measurement.
- c. continuous measurement.
- d. classical measurement.

Answer: b

Learning Objective: 4

Page: 33

40. With categorical measurement the numbers represent the amount of the characteristic in question.

- a. true
- b. false

Answer: b

Learning Objective: 4

Page: 33-34

41. In your study of motivation and performance you count the number of computer chips assembled by each worker. This type of measurement is called

- a. discrete measurement.
- b. categorical measurement.
- c. continuous measurement.
- d. classical measurement.

Answer: c

Learning Objective: 4

Page: 33

42. According to classical measurement theory, every observation of a variable can be divided into two components. They are

- a. true score and error .
- b. categorical and continuous measurement.
- c. observed score and error.
- d. qualitative and quantitative measurement.

Answer: a

Learning Objective: 4

Page: 34

43. When a researcher is interested in measuring the consistency of measurement across repeated observations of a variable on the same subject s/he is said to be measuring the _____ of the measurements.

- a. accuracy
- b. reliability
- c. repeatedness
- d. observational consistency

Answer: b

Learning Objective: 5

Page: 35

44. At Qzork each applicant is interviewed by two different managers who then rate each job candidate on a series of competencies. If you compare how well these two managers agree on their ratings of each applicant you are measuring

- a. inter-rater reliability.
- b. test-retest reliability.
- c. internal consistency reliability.
- d. validity.

Answer: a

Learning Objective: 5

Page: 36

45. The fewer items in a test, the better the test's internal consistency.

- a. true
- b. false

Answer: b

Learning Objective: 5

Page: 36

46. The consistency of measurement over time is assessed by

- a. internal consistency reliability.
- b. inter-rater reliability.
- c. test-retest reliability.
- d. the temporal stability index.

Answer: c

Learning Objective: 5

Page: 36

47. _____ refers to the inferences that are made about what an observed score measures or represents.

- a. Reliability
- b. Generalizability
- c. Central tendency
- d. Validity

Answer: a

Learning Objective: 6

Page: 38

48. If in your English class you were given a test that contained 85% mathematics questions and only 15% vocabulary questions, you would say the test lacked

- a. internal consistency reliability.
- b. content validity.
- c. criterion-related validity.
- d. test-retest reliability.

Answer: b

Learning Objective: 6

Page: 36-37

49. While evaluating tests for selecting sales staff, Pat finds that a measure of extraversion is related to sales performance. This test has:

- a. face validity.
- b. content validity.
- c. criterion-related validity.
- d. construct validity.

Answer: c

Learning Objective: 6

Page: 36-37

50. Your boss tells a friend that he is sure all of his employees love their jobs because every time he sees them they are smiling and they always tell him how much they like their jobs. As an I/O psychologist you would say that your boss' measures of employee satisfaction have high

- a. criterion related validity.
- b. content reliability.
- c. face reliability.
- d. face validity.

Answer: d

Learning Objective: 6

Page: 37-38

51. Evidence of construct validity is demonstrated by
- criteria related validity.
 - content validity.
 - face validity.
 - all of the above

Answer: d

Learning Objective: 6

Page: 36-38

52. Descriptive statistics summarize the results of a study with summary statistics such as means and standard deviations.
- true
 - false

Answer: a

Learning Objective: 7

Page: 38

53. What is the mean of the following set of numbers: 1, 2, 6, 8, 5, 3, 4, 3?
- 1
 - 2
 - 3
 - 4

Answer: d

Learning Objective: 7

Page: 38

54. Which of the following statistics is a measure of central tendency?
- standard deviation
 - mean
 - variance
 - correlation

Answer: b

Learning Objective: 7

Page: 38

55. The variance statistic is a measure of _____.
- dispersion
 - central tendency
 - correlation
 - validity

Answer: a

Learning Objective: 7

Page: 40

56. Assume that students with high college GPAs tend to earn more money in starting salary than students with low college GPAs, but this relation is far from perfect. Which of the following is a likely correlation between GPA and starting salary?
- 0.90
 - 0.00
 - + 0.40
 - + 0.90

Answer: c

Learning Objective: 7

Page: 39-42

57. Which of the following shows the strongest correlation between variables X and Y?

- a. - 0.90
- b. -0.65
- c. + 0.43
- d. + 0.55

Answer: a

Learning Objective: 7

Page: 40-42

58. If pay and performance were graphed, and employees who have low pay have high performance and employees who have high pay have low performance, this would represent a
- a. zero correlation.
 - b. positive correlation.
 - c. negative correlation.
 - d. spurious correlation.

Answer: c

Learning Objective: 7

Page: 40-42

59. You are interested in determining whether or not you can predict the amount of your expected pay increase from your job performance rating. What type of analysis provides you with a mathematical formula that allows the prediction of one variable from another?
- a. meta-analysis equation
 - b. correlation equation
 - c. Pearson product-moment equation
 - d. regression equation

Answer: d

Learning Objective: 7

Page: 42-43

60. You use applicant scores on two tests (intelligence and mechanical aptitude) to predict their performance, and then hire the applicants with the highest predicted performance. You have used the _____ technique.
- a. multiple regression
 - b. inferential
 - c. meta-analytic
 - d. correlational

Answer: a

Learning Objective: 7

Page: 42-43

61. Which branch of statistics allows us to draw conclusions that generalize from the subjects we have studied to all the people of interest by allowing us to make inferences based on probabilities?
- a. Descriptive statistics
 - b. Inferential statistics
 - c. Meta-analytic statistics
 - d. Multivariate statistics

Answer: b

Learning Objective: 8

Page: 43

62. You want to know whether the trained and untrained employees at your organization differ in their job performance. The variability in performance observed among the trained employees is called

- a. incremental variance.
- b. squared variance.
- c. inferential variance.
- d. error variance.

Answer: d

Learning Objective: 9

Page: 43

63. When the outcome of an inferential statistical test is said to have *statistical significance* we would conclude that the observed results are most likely due to

- a. error.
- b. chance.
- c. the treatment.
- d. probability.

Answer: c

Learning Objective: 9

Page: 44

64. When the probability is less than 1 in 20 that the result of a research study is due to chance, the results of the study are said to be non-significant.

- a. true
- b. false

Answer: b

Learning Objective: 9

Page: 44

65. You conduct a study to determine if employee attitudes differ as a function of gender (male vs. female) and company size (small vs. large). What statistical technique should you use to analyze these data?

- a. independent group t-test
- b. meta-analysis
- c. factorial ANOVA
- d. t-test for correlation

Answer: c

Learning Objective: 9

Page: 45

66. You want to know whether group size influences the success of employee training. Rather than do a new study you find 20 previous studies on this question and statistically combine their results. What is this analysis called?

- a. analysis of variance
- b. multiple regression
- c. factorial analysis
- d. meta-analysis

Answer: d

Learning Objective: 10

Page: 46

67. A quantitative method of combining the results of a number of research studies is called

- a. multiple regression.
- b. meta analysis.
- c. analysis of variance.
- d. factorial analysis.

Answer: b

Learning Objective: 10

Page: 46

68. When a variable explains the relationship between two other variables it is referred to as a
- moderator variable.
 - mediator variable.
 - factor.
 - extraneous variable.

Answer: b

Learning Objective: 11

Page: 46

69. When I/O psychologists conduct research they are obligated to abide by ethical principles. In which of the following is the researcher NOT acting ethically?
- The researcher obtains informed consent from all subjects in the study.
 - The researcher reveals the identity of those subjects who responded to the survey to the manager of the company as part of the outcome report.
 - The researcher discloses the purpose and goals of the research to the subjects prior to testing them.
 - The researcher conducts an anonymous survey of the employees and reports the results to management.

Answer: b

Learning Objective: 12

Page: 46-47

70. An I/O psychologist must protect the well being of subjects in research, but not in practice.
- true
 - false

Answer: b

Learning Objective: 12

Page: 46-47

71. An ethical principle dictates that subjects of studies should be told about the nature and purpose of a study before they participate. This can be accomplished through the use of:
- face validity
 - qualitative methods
 - observational designs
 - informed consent forms

Answer: d

Learning Objective: 12

Page: 48

Essay Questions

1. What is the first step of every research study? (Page 24)
2. Give examples of a general and a specific research question, and explain why specific questions are more useful than general questions. (Page 24-25)
3. Define what a variable is. (Page 26)
4. Differentiate between independent and dependent variables. (Page 26)

5. List and explain two strengths and two weaknesses of laboratory research in comparison to field research. (Page 26, 30-32)
6. What is generalizability and why is it important to I/O psychologists? (Page 26-27)
7. Define the difference between random assignment and random selection. (Page 28)
8. Assume you are interested in studying the effectiveness of a management training program given to 100 new Microsoft employees. You are very concerned with whether your results will apply to the other Microsoft employees. Which of the following would be most applicable to your concern: generalization, random assignment or random selection? Explain why. (Page 26-28)
9. You want to study the effects of leadership style on group performance, but you are afraid your results might be affected by leader gender (male vs. female). Explain how you could control for the effects of leader gender in this research. (Page 27-28)
10. What are the two distinguishing features of an experiment? (Page 30)
11. Explain how quasi-experiments differ from true experiments. How does the use of quasi-experiments impact the type of conclusions that can be drawn from the research? (Page 30)
12. What are the major advantages and disadvantages of using survey research designs? How do these advantages and disadvantages differ for cross-sectional and longitudinal designs? (Page 31-32)
13. State the difference between a cross-sectional and longitudinal design. (Page 31)
14. How do obtrusive and unobtrusive observation methods differ? What are some advantages and disadvantages to the use of each? (Page 32-33)
15. According to classical measurement theory, what are the two components of an observation? (Page 34)
16. Define measurement and explain the difference between categorical and continuous measurement. (Page 34-35)
17. Explain how the use of multiple items to measure a concept tends to give a more accurate measurement than does the use of a single item. (Page 35-36)
18. Explain the differences between internal consistency reliability, inter-rater reliability, and test-retest reliability. (Page 35-36)

19. You study performance of employees each month during the first year of their employment. Should you use internal consistency reliability or test-retest reliability to assess the quality of your performance measure? Why? (Page 35-36)
20. The Acme Widget Company selects employees on the basis of their WAT scores. If they want to maximize performance, which measure of validity is of greatest concern? Explain your answer. (Page 37-38)
21. Explain the difference between descriptive and inferential statistics. (Page 38, 43-44)
22. How do measures of central tendency and measures of dispersion differ?(Page 39-40)
23. Assume you measure motivation and performance and find that they are correlated + 0.70. Can you conclude that motivation causes performance? Why or why not? (Page 40-42)
24. Which statistic indicates the degree of relation between two variables? (Page 39-40)
25. In a fictitious correlational study examining the relationship between level of pay and job performance, a researcher notes a positive correlation between the variables; that is, pay was positively correlated with job performance. As a result, the researchers concluded that higher pay causes increased job performance. Are the researchers justified in their conclusions? Why or why not? (Page 40-42)
26. Which branch of statistics allows us to draw conclusions that generalize beyond the data at hand? (Page 43-44)
27. Describe the purpose of a meta-analysis. (Page 46)
28. What is the difference between a moderator variable and a mediator variable? (Page 47-48)
29. Describe the overriding ethical consideration of researchers and how informed consent contributes to research ethics. (Page 46-47)
30. What is the purpose of an informed consent form in research? (Page 48)

Key Terms

- Hypothesis
- Variable

- Independent variable
- Dependent variable
- Field setting
- Laboratory setting
- Generalizability
- Control
- Control group
- Random assignment
- Random selection
- Research design
- Confounding
- Experiment
- Field experiment
- Quasi-experimental design
- Survey design
- Questionnaire
- Cross-sectional design
- Longitudinal design
- Response rate
- Observational design
- Obtrusive methods
- Unobtrusive methods
- Qualitative methods
- Measurement
- Categorical measurement
- Continuous measurement
- Classical measurement theory
- Reliability
- Internal consistency reliability
- Inter-rater reliability
- Test-retest reliability
- Validity
- Construct validity
- Face validity
- Content validity
- Criterion-related validity
- Descriptive statistics
- Arithmetic mean
- Median
- Variance
- Standard deviation
- Correlation
- Pearson product-moment correlation coefficient
- Regression equation
- Predictor
- Criterion

- Multiple regression
- Inferential statistics
- Error variance
- Statistical significance
- Factorial design
- Factorial ANOVA
- Meta-analysis
- Mediator
- Moderator
- Informed consent form