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. Explain the major concepts of research design.
2. Describe the major types of research designs and list their advantages and limitations.
3. Discuss the types of reliability and validity.
4. Explain how inferential statistics can be used to draw conclusions about data.
5. State the major principles of research ethics.

Suggested Lecture Outline

1) Introduction (Slide 3)
   a) Quantitative methods are essential to practice and research in I/O psychology. They are how we know what we know. Research is the foundation of both science and practice. The study is designed around our research question to rule out other explanations, such as the Hawthorne Effect.

2) Research Question (Slide 4)
   a) Every study begins with a research question, which defines the purpose of the study. The study is designed around the research question. The more specific the research question, the easier it is to operationalize and thus to answer. For example, "What causes people to like or dislike their jobs?" is vague- there are too many factors to address. "Does level of pay affect how much people like their jobs?" is better.
   b) A **hypothesis** provides additional specificity to the research question and is the researcher's best guess about what the results of a study will be. It is phrased as a statement of the results the researcher expects to find. Example: "People who are well paid will like their jobs better than people who are not."
   c) Research studies are conducted to confirm a hypothesis.
   d) Most hypotheses and research questions come from prior research and theory in order to allow science to advance, as new research is built on the foundation of previous work.
   e) The hypothesis provides a goal, and allows researchers to appropriately design a study and choose measurement techniques.

3) Important Research Design Concepts
   a) Variables (Slide 5)
      i) **Variables** are the basic building blocks of a research design. A variable is an attribute or characteristic of people or things that can vary or take on different values.

Variables in I/O research commonly include abilities (e.g., intelligence), attitudes (e.g., job satisfaction), behaviors (e.g., absence from work), and performance. Variables are quantified, or converted to numbers, so that they can be analyzed with statistical methods.

ii) In experimental design there are two different types of variables: Independent and dependent. **Independent variables** are those manipulated by the researcher. Thus an independent variable must have at least two levels. **Dependent variables** are those assessed, or measured, and are assumed to be influenced by the independent variable(s). In other words, the independent variables are often assumed to be the cause of any measured change in the dependent variable(s). (e.g., higher pay causes people to like their jobs better).

b) Research setting

i) Research settings used in I/O psychology are classified as either field or laboratory. A **field setting** is one in which the phenomenon of interest naturally occurs. For I/O psychologists this is usually an organization. **Laboratory settings** are artificial environments in which the phenomenon of interest doesn't normally occur, and is created by the researcher.

ii) About 29% of studies published in top journals are laboratory studies; thus, most I/O research takes place in field settings.

c) Generalizability

i) **Generalizability** of results refers to what extent the conclusions of a study can be applied to other groups of people, organizations, settings, or situations. The more dissimilar the study is to the setting, situation, etc., the less confidence there is that the results will be similar. For this reason, many lab studies should be replicated in the filed to have confidence in the generalizability. But generalizability is not always found in field settings. Thus, a study of the effects of salary using nurses in a hospital may not accurately show the results of level of pay more generally; perhaps nurses and physicians respond differently. Also, people may be different across different nations. Likewise, because of the Hawthorne Effect, perhaps people act differently in the study than in real life.

d) Control

i) **Control** refers to procedures that allow researchers to rule out certain explanations for results other than the hypotheses they wish to test. In every study, there are several possible explanations for why the results occurred.

ii) For example, let's say we ask people how much they get paid and how much they like their jobs and find the higher the salary, the greater the liking. However, other variables might be responsible. Maybe better-paid people have better jobs (e.g., professional athletes versus sales clerks).

iii) Control can be achieved through a number of procedures. One way is by holding a specific variable constant while varying other variables (e.g., only survey sales clerks). Another way is to systematically vary the levels of one or more of the variables (e.g., only survey groups of athletes that have high- and low-paid people).

iv) In experiments, control may be achieved by the use of a **control group**, a collection of people who receive a condition or manipulation different from the one of interest. For example, in a training study, the control group does not receive training or receives bogus training. This reduces nonspecific or Hawthorne effects. Persons in the control group should be treated like the experimental group in every way possible except for the treatment.

v) I/O often uses lab studies because they provide strongest control over many variables. So although they may be difficult to generalize, lab studies offer a more controlled approach, and a researcher might choose to replicate the study in the field.

e) Random assignment and random selection (Slide 6)

i) Random refers to a process that eliminates systematic influences on how subjects are treated in a study. (When presenting these topics, the use of the term "randomization" when referring to random assignment often confuses student and makes it difficult for them to distinguish random assignment and random selection.)

ii) **Random assignment** occurs when people are assigned to treatment conditions or levels of an independent variable in a nonsystematic way so that every subject of a study has an equal chance of being assigned to every condition. This controls subject variables not of interest in the study. After random assignment, each group of subjects should be more or less equivalent in their characteristics. In a training study, this could equate the groups in ability, age, motivation, and tenure. The advantage of random assignment is the powerful control of extraneous variables.

iii) **Random selection** means that we choose individuals for our study in a nonsystematic way. Each member of the population has an equal chance of being asked to participate. Random selection is important if we wish to draw accurate conclusions about the entire group of interest. With random selection, the individuals in the study are more likely to be representative of the group as a whole, rather than distinctly different in some way (e.g., people who volunteer to be in a study might be different in terms of prosocial personality). Thus, random selection enhances generalizability.

f) Confounding

i) **Confounds** occurs when two or more variables are intertwined in such a way that conclusions cannot be drawn about either one. Common I/O examples are age and job tenure, or salary and performance on a job that pays commission.

ii) Control procedures may be used to unconfound variables. For example: Examine the effects of age on performance in a fixed length of job tenure; eliminate jobs that pay commission from a study. Statistical procedures are also used to control for confounding; however, these are sophisticated enough to be beyond the scope of this book.

iii) Much of the research in I/O psychology is concerned with examining the confounding effects of variables, because this allows us to understand *why* two variables are related.

4) Research Designs (Slide 7)

a) A **research design** is the basic structure of a scientific study. Designs can be classified along a continuum from those that actively manipulate conditions (experimental) to those that passively observe people. Each design has strengths and weaknesses. Use of more than one is generally required to answer a research question with confidence.

i) Experiments

(1) An **experiment** is a design in which there are one or more independent variables and one or more dependent variables. For example, you could study the effects of

level of pay and of length of shift on performance and on frequency of absence from work. Experiments are distinguished from other designs in that

(a) Subjects are randomly assigned to conditions that represent the levels of the independent variable(s).

(b) Levels of the independent variable(s) are usually created by the researcher.

(2) Most experiments in I/O psychology occur in lab settings. When I/O experiments are conducted in a more naturalistic setting (e.g., within an organization) they are called **field experiments**. Most field experiments are not true experiments, but quasi-experiments.

(a) In a **quasi-experiment,** conditions of a true experiment have been violated. For example, there may be no random assignment of subjects to levels of the independent variable.

(3) A major advantage of true experiments is the ability to draw causal conclusions. That is, to conclude that variation in the independent variable was the *cause* of observed variation in the dependent variable. For example, you might conclude that increasing pay decreases absenteeism. But such conclusions require that the design was effective in eliminating alternative explanations for the results.

(4) A weakness of the laboratory experiment is that its results may not generalize to field settings. Generalizability is more likely in field experiments.

(5) Unfortunately, even if an experiment is done properly, this does not mean that there cannot be other explanations for the observed effect. Often the independent variable may be confounded with another variable or variables, and several experiments may be required to reach a clear conclusion.

ii) Survey designs (Slide 8)

(1) A **survey design** is the simplest and easiest design to conduct. It uses a series of questions (a **questionnaire**) to study one or more variables of interest. These questions are asked of a sample of respondents. Most survey studies are conducted as paper and pencil questionnaires; but, face-to-face interviews, phone interviews, or even the Internet or e-mail can be used. Usually all data is collected from the respondents; however, sometimes additional information is gathered from others, e.g., coworkers or supervisors.

(2) Most surveys are **cross-sectional**--all data are collected at a single point in time. Some are **longitudinal**-- in this case data is collected on more than one occasion. For example, survey data from one measurement of job satisfaction may be related to other data later on (whether they've quit six months later).

(3) For studying organizational phenomena, surveys have two advantages:

(a) Surveys are a quick and relatively inexpensive way to find out how employees feel about the job.

(b) Because employees are asked about their own jobs, generalizability not a big problem.

(4) There are also disadvantages.

(a) Employees are not always good sources of information. For example, some tend to inflate ratings of their own performance.

(b) When data is collected at a single point in time (cross-sectional), no causal conclusions can be drawn about relationships between variables. For example, does salary level determine job satisfaction, or does level of performance determine both these variables?

(c) The biggest problem with survey research is with **response rate**, or the percentage of those surveyed who agree to participate. (To help increase response rates in organizational settings anonymous questionnaires may be passed out with return envelopes.) If response rate is too low, those participating may not be typical and thus the generalizability of the results is questionable.

b) Observational designs

i) In an **observational design**, the researcher observes employees in their organizational settings.

(1) With **obtrusive methods**, the employees are aware they are being studied. The observer might record worker behaviors such as breaks or trips to get supplies, or rate the worker's relationships with other members of the work group.

(2) With **unobtrusive methods**, employees are unaware they are being studied, though they might know the researcher is present. Usually the person or object recording the data has some other apparent purpose. Thus a security guard might record time spent out of the building, or a security camera might be used to study tardiness.

(3) Weaknesses:

(a) A disadvantage of obtrusive studies is that the presence of the researcher might affect the phenomenon being studied.

(b) Unobtrusive methods are sometimes unethical, because psychologists are not supposed to study people without their informed consent. This is a problem especially when subjects are identified.

c) Qualitative studies

i) Qualitative methods are non-quantitative methods to study organizational phenomenon including case studies, participant observation, and interviews.

(1) Purely narrative data (e.g., observations) is useful for generating hypotheses and theories

(2) Coding qualitative data (e.g., going through your observations to see what behaviors happened most often, then grouping them into categories) is called a content analysis.

5) Measurement (Slide 9)

a) **Measurement** is the process of assigning numbers to characteristics of people or things.

i) In **categorical measurement**, the values of the variable represent discrete categories and not the amount of the characteristic of interest. Numbers are assigned to categories arbitrarily. Independent variables are often categorically measured in experiments (e.g., type of training: book, computer, lecture, videotape).

ii) In **continuous measurement**, the numbers assigned represent the amount of the characteristic. Higher numbers mean more of the characteristic is present (a 7 on extraversion means you are more extraverted than a 1 on extraversion). Dependent variables are usually continuous; this allows more sophisticated data analysis.

iii) Deciding how to measure variables is a critical step in planning a study. It determines what sort of data analysis can be done.

b) Classical measurement theory
   i) According to **classical measurement theory**, every observation of a variable can be divided into two components, a true score and error.
      (1) The **true score** represents the variable of interest.
      (2) The **error** is made up of random influences on the observed score that are independent of the true score.
   ii) CTT assumes errors are random; therefore error is as likely to increase the observed score as to decrease it. This means that if the same thing is measured many times and an average taken, the errors should cancel out. Psychological tests use multiple items to average out error and thus increase the accuracy of measurement.
   iii) Just because you have eliminated error with the use of multiple measures does not ensure that you have measured what you intended to measure. Other factors can affect the observed score besides the intended variable and error. For example, someone filling out a rating scale could be affected by mood, personality, or other factors.

c) Reliability
   i) **Reliability** is the consistency of measurement across repeated observations of a variable on the same individual. Reliability reflects the relative size of error to the true score in the observed score. When error is small, observed scores do not vary much and the measure is said to be reliable.
      (1) **Internal consistency reliability** refers to how well multiple measures on the same subject agree. For example, a psychological test will combine multiple items into a score on a variable such as self-esteem. The items must be interrelated (measure the same thing) for the test to have internal consistency reliability. Usually, the more items there are on the test, the better its internal consistency will be.
         (a) A special case of internal consistency is **inter-rater reliability**. Sometimes we measure a variable, for example job performance, by having two or more people evaluate it on a rating scale. The extent to which they agree is inter-rater reliability.
      (2) **Test-retest reliability** refers to the consistency of measurement over time. If you give the same test on different occasions, a person should get the same score each time unless the true score changes. The appropriate interval between tests depends on how stable the variable is. For example, intelligence should be quite stable over time, but motivation could vary quickly.
      (3) The first required property of a measure is reliability. If it has too much error, it is useless. Both internal consistency and test-retest reliability are necessary. But reliability is not sufficient, because it doesn't mean you are measuring what you want to measure.

d) Validity
   i) **Validity** refers to our interpretation of what an observed score on a measure represents. It is an inference about what it measures. A measure is valid if it measures what it is supposed to measure.
      (1) **Construct validity** means that we have confidence in our interpretation of what the measure represents and can draw inferences from scores on the measure.

Three other types of validity provide evidence for construct validity (Table 2.1, Slide 10).

(a) **Face validity** means that a measure appears to assess what it was designed to assess. In other words, it looks right. Thus, in a measure of job satisfaction would ask whether you like your job. Face validity does not provide strong evidence for construct validity.

(b) **Content validity** means that a multiple item measure does an adequate job of covering the whole domain of the variable. This is commonly judged by experts in the area. A job satisfaction measure that only measures if you are with your pay but does not measure attitudes toward your boss and coworkers might not be content valid.

(c) **Criterion-related validity** means that scores relate to other measures they should relate to in theory. For example, how well you do on a job or school application (e.g., the SAT) should relate to how well you do at work or in school (e.g., GPA).

6) Statistics

a) Descriptive Statistics (Slide 11)

i) **Descriptive** statistics summarize the results of a study, reducing the data to summary statistics such as means and variances. These are easier to interpret than raw data. Often, these are measures of central tendency and dispersion.

(1) **Central tendency**. Several statistics measure the center of a group of scores.

(a) The **arithmetic mean** is the sum of the observations divided by the number of observations.

(b) The **median** is the middle number when the observations are ranked and ordered from lowest to highest.

(2) **Dispersion**. Measures of dispersion indicate the degree to which the observations differ from one another.

(a) The **variance** is a dispersion measure that is the arithmetic mean of the squared differences between each observation and the arithmetic mean of the same observations.

(b) The **standard deviation** is the square root of the variance and measures the average distance from the mean. It is used frequently in I/O psychology to report measures of dispersion.

(3) Correlation is a statistic that indicates the degree to which two continuous variables are related, and the direction of the relation. The most commonly used correlation is the **Pearson product-moment correlation coefficient.** This can be calculated whenever we have a sample in which each subject provided scores for two different variables.

(a) The direction of the relationship is indicated by the sign of the correlation coefficient. When there is a **positive** relationship, or correlation, low scores on the first variable appear with low scores on the second variable, and high scores for the two occur together. When there is a **negative** association or correlation, low scores on one variable appear with high scores on the other, and vice versa (Figure 2.1)

(b) The degree or magnitude to which the variables are related is indicated by the numerical value of the coefficient. The stronger the association, the larger the correlation, up to a value of 1.0. When there is little association, there is no pattern, and the correlation is close to zero. In I/O psychology, correlations tend not to be very large, rarely exceeding 0.50 (Figure 2.2, Slide 12, this is a good time to point out that r=.50 does not mean a perfect relationship by pointing out people who scored low on one variable and high on another)

b) Regression
   i) The information from a correlation can be used to predict one variable with another.
      (1) The **regression equation** provides a mathematical formula for predicting one variable from another precisely. The value of one variable, the **predictor**, is entered into the equation, and the equation yields a value for the other variable, the **criterion**. Prediction will be more accurate the larger the correlation between the variables, regardless of sign. Even imperfect predictions can be helpful.
      (2) **Multiple regression** uses multiple predictor variables (e.g., SAT, high school GPA, number of extracurricular activities) to predict a criterion variable (e.g., college GPA).
      (3) Inferential statistics

c) Inferential statistics (Slide 13)
   i) Descriptive statistics summarize the results for our sample, but don't allow us to infer anything about other people. **Inferential** statistics allow us to draw conclusions that generalize from the subjects we have studied (the sample) to all the people of interest (the population).
   ii) Subjects who receive the same treatment will not all have the same score on the dependent variable (e.g., not everyone who takes a class gets the same grade on the final). Variability among subjects in the same condition is called **error variance,** and prevents the straightforward interpretation of group means. Interpreting the results of a study means using inferential statistics (i.e., statistical tests) to decide if observed results are meaningful or due to error variance.
      (1) If the probability of finding a group difference by chance is small, for example, less than 1 out of 20 (.05, or 5%), the results are said to be **statistically significant**. That is, we conclude that the differences between conditions were due to the treatment, not chance.
      (2) A variety of statistical tests, each used in a different situation, all calculate the probability that the observed results were not due to error variance.
         (a) Independent group t-test is used to determine if two groups of subjects differ on a dependent variable.
         (b) **Analysis of variance (ANOVA)** is used to determine if two or more groups of subjects differ on a dependent variable.
         (c) A **factorial design** has two or more IVs. **Factorial ANOVA** is used to determine the significance of effects of two or more independent variables on a dependent variable. For example, did the training program (an independent variable) work for men and women (another IV) to predict job performance (DV)?

(d) A correlation between two variables can be tested to see if it is significantly different from zero using a special t-test. This means that the independent variable predicts the dependent variable better than chance.

d) Meta-analysis
   i) A single study is never considered enough to offer a definite answer to a research question. Thus, to have confidence in our conclusions about a phenomenon, we need to conduct several studies. But these studies will not be perfectly consistent. To make sense of conflicting results, I/O psychologists use meta-analysis. A **meta-analysis** is a quantitative way of combining results of studies. A descriptive meta-analysis might average the correlation between two variables over a set of ten studies, but more sophisticated procedures exist to answer more complex questions.

7) Mediator and Moderator Variables
   a) Some relationships are not straightforward. We might wonder why SAT predicts GPA, or if SAT predicts GPA equally for all people.
      i) A **mediator** is a variable that is part of the intervening process between two other variables; it explains why two variables are related. Maybe SAT predicts GPA because people who score high on the SAT gain confidence in their abilities. So, high SAT → confidence → better GPA. Confidence is the mediator.
      ii) A **moderator** is a variable that affects the relationship between two other variables; a moderator changes the relationship between two variables. Participants at one level of the moderator have a different correlation (relationship between two variables) than other participants. If SAT scores predicted GPA for men but not women, gender would be a moderator. The relationship between SAT and GPA would be different, depending on which level of the moderator you belong to.

8) Ethics of Research (Slide 14)
   a) I/O psychology ethics apply both to research and practice.
      i) The overriding ethical principle is that the researcher must protect the well-being of subjects. The researcher cannot cause harm; he or she must protect subjects' privacy by concealing their identities.
      ii) Ethical dilemmas still arise. For example, a psychologist could have conflicting responsibilities to the organization s/he works for and to research participants. In general, it is a good idea to try to foresee any ethical dilemmas and avoid them.
      iii) Another principle is that subjects should be informed about the nature and purpose of a study before participating, so that they understand possible risks (and can withdraw). If there are even small or potential drawbacks to participating, participants should read and sign an **informed consent form**, which describes the nature of the study and what is expected of the subject and explains that the person may withdraw from the experiment at any time. This is not typically required when employees are asked to do things that are part of their jobs, rather than for research itself (e.g., job performance).

Classroom Activity Suggestions for Active Learning

1. **Small Group Activities.** We are all aware that current research suggests that an active approach to instruction often increases student motivation, learning, and retention. Most activities can be adapted to fit any time block and class size. Below are a few cooperative learning exercises appropriate for the material in this chapter.
   - **a. Jig Saw groups.** Give each small group a copy of a journal research article. Have each group identify the type of design, the independent and dependent variables, and the type of statistical analysis conducted. Each member of this group should then report to a larger group on their study. Journals that might contain appropriate articles for use are:
     1. International Journal of Selection and Assessment
     2. Journal of Applied Psychology
     3. Journal of Business and Psychology
     4. Journal of Occupational and Organizational Psychology
     5. Personnel Psychology
2. **Discussion Questions**. Raise discussion questions on various topics. (See section below for ideas on various issues appropriate for discussion on material from this chapter.) Issues that involve conflicts among various constituencies are good to stimulate debate/discussion.
3. **Popular Press Articles**. Bring in a journal article (or something from the Internet) for discussion. This can be part of lecture or used to stimulate discussion.
   - a. You can make copies and give the class a few minutes to read. Be sure it doesn't take more than approximately 5 minutes to read. Prepare some discussion questions in advance; these can be related to the research methodology used. Have the class identify the variables, research setting, generalizability, and any controls used. Discuss the ethical issues raised by the study. How can future research improve upon this?
4. **Internet Resources**. If the classroom is wired to the Internet, you can log onto a site that has something relevant to show the class. This can be part of lecture or the basis for in class discussion. With access to a lab, students can be given an exercise to do.
   - a. Paul Spector's site at http://chuma.cas.usf.edu/~spector/iobook/ioprojpage.html has some Internet exercises, at least one per chapter. They require that students visit one or more sites to collect information. Then they can either write a report, or give a verbal report in class. This can also serve as the basis for class discussion/debate.
   - b. W. Trochim's site at http://trochim.human.cornell.edu/kb/ is a web-based textbook for topics covered in a typical undergraduate or graduate course in social science research methods.
5. **Practice Exams**. Having the students take a practice exam the class before a real exam can be a good device for reviewing the material and stimulating student questions, as often they do not realize what they do not understand. Students can find a practice exam (and answers) for each chapter of the text at http://chuma.cas.usf.edu/~spector/iobook/ioexampage.html.
6. **Student Reports**. Have students, individually or in groups, choose a research topic, design a study, and report to the class**.** Each group should identify the research question, how the research variables will be operationalized, which research design will be used, the research setting, and the statistical analysis plan. Examples of research questions include:
   1. Is there a relationship between job satisfaction and tenure?

    2. Is there a relationship between type of physical work environment and job satisfaction?
    3. Does a specific training program affect productivity on the job?
    4. Is there a relationship between amount of work experience and job performance?
    5. Do higher levels of pay lead to increased job satisfaction?
    6. Is there a relationship between management style and job satisfaction?
7. **Guest Speakers**. Students often like to hear from researching I/O psychologists about what they really do and many welcome the opportunity to talk to a class.

Discussion Topics

1. How has technology affected survey research in organizations?

2. What types of organizational phenomena could an experimental design be used to assess? What types of organizational phenomena would be inappropriately assessed via experimental design?

3. Describe some strategies an I/O psychologist could use to maximize response rate during survey research while protecting the well being of employees.

4. Does the emphasis on random assignment versus random selection vary with the research question (e.g., applied vs. basic), the research location (laboratory vs. field), and with whether the researcher is more interested in drawing causal conclusions or generalizing results?

5. Demographic variables such as gender and race only have certain discrete values, and are typically treated as independent variables in statistical analyses. How does interpretation of results differ for demographic variables and manipulated variables? What (if anything) does it mean to say "sex caused the observed difference"?

6. Restaurants and other organizations frequently ask customers to report their satisfaction with a product or service. How meaningful are the results of such a survey? Who tends to respond? Employees might be motivated to guarantee positive customer reports; how might this affect their behavior?

7. Why might researchers use unobtrusive observational designs? What ethical problems does this raise? Do these ethical problems depend on the research question? Do they depend on what the researcher will do with the data (e.g., publish vs. report to company to stimulate a change in employment conditions)?

8. Organizations hire I/O psychologists to do research to solve problems or increase efficiency. Typically, management expects all relevant employees to participate. What are the ethical implications for the I/O psychologist? How can researchers avoid these ethical dilemmas? What new problems might be created?

9. Sometimes predictors with excellent criterion-related validity lack face validity. What problems might this raise? What might influence a company's decision to use measure A (high criterion-related validity and low face validity) or measure B (low criterion-related validity and high face validity)?

10. Discuss the temptation to draw causal conclusions from correlational data. How frequently is this an issue in organizational research?

11. One problem with survey research surrounds the sample and whether results are generalizable. Can you think of other potential problems with the use of survey research? What about bias in the construction of the questionnaire? Could the way a question is worded affect the response? Could the issues addressed by the survey affect the motivation of the subjects to respond?

12. If, as an employee of a company, you volunteer to participate in some psychological research for that company, what kinds of concerns might you have? Do current ethical guidelines address these concerns?

Suggested Readings

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Key Terms

- Hypothesis
- Variable
- Independent variable
- Dependent variable
- Field setting
- Laboratory setting
- Generalizability
- Control
- Control group
- Random assignment
- Random selection
- Confounding
- Research design
- 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