

CHAPTER 2

Conducting Health Research

Lecture Outline

I. The Placebo in Treatment and Research

A **placebo** is an inactive substance or condition that can cause people to improve or change their behavior. Both expectancy and learning contribute to this effect.

A. Treatment and the Placebo

The placebo effect is an advantage for treatment, boosting its effectiveness. This effect may be responsible for about 35% of improvements, but some treatments (such as antidepressant drugs) have higher placebo effects than others (such as treatment for broken bones). Placebos can also produce negative effects, called the nocebo effect. Both placebo and nocebo effects are real and produce symptoms and relief that are indistinguishable from the effects obtained from drug and other physical treatments.

B. Research and the Placebo

The placebo effect presents problems for research because they prevent a clear interpretation of treatment effectiveness. Researchers try to control for placebo effects by designing **single-blind** and **double-blind designs**, arranging for participants and even researchers to be unaware of which participants receive a placebo and which get active treatment.

II. Research Methods in Psychology

For research to contribute to knowledge about health, scientists should be familiar with one another's work, use controlled methods, try to keep personal biases from contaminating results, make claims cautiously, and replicate their studies. To understand behaviors related to health and disease, researchers use a variety of methods, including correlational studies, cross-sectional and longitudinal studies, experimental designs, and ex post facto designs.

A. Correlational Studies

Correlational studies indicate the degree of relationship between two variables, such as the number of stressful life events and the risk of heart attack. This approach is one type of **descriptive research**. In correlational studies, the relationship between two variables is expressed in terms of **correlation coefficients**. Coefficients range from -1.00 to +1.00, with numbers closer to ± 1.00 indicating stronger relationships. Attributions of cause and effect are not possible from correlational studies.

B. Cross-Sectional and Longitudinal Studies

Cross-sectional studies are conducted at one point in time and compare people of different ages, whereas **longitudinal studies** follow participants over an extended period of time. Cross-sectional studies can show differences between groups, but longitudinal studies can reveal developmental trends. This characteristic is an advantage of longitudinal studies, but they have the disadvantage of taking a long time and being expensive.

C. Experimental Designs

Experimental designs can determine cause and effect relationships by manipulating an **independent variable** and observing the effect on a **dependent variable**, for example, comparing an experimental group on a low-fat diet (treatment group) to participants who maintain their regular diet (control group) and then measuring the development of

cardiovascular disease (the dependent variable) in the two groups. Well-controlled experimental designs give scientists their best method to determine causation.

D. Ex Post Facto Designs

Ex post facto designs are similar to experimental designs in that both use contrasting groups, but these designs do not include manipulation of independent variables. Instead, groups of participants differing on some **subject variable** (or *participant variable*) are contrasted to determine differences in the dependent variable. For example, contrasting people with varying levels of obesity to determine in food choices is an ex post facto study. The finding that heavier individuals express food preferences that differ from those of less obese individuals does not demonstrate that obesity is causally related to food preferences because ex post facto studies do not manipulate an independent variable or control for other factors.

III. Research Methods in Epidemiology

Epidemiology is a branch of medicine that investigates factors contributing to the occurrence of a disease in a particular population. Epidemiology evolved into a scientific discipline during the 19th century and played an important role in the fight against infectious diseases. Today, epidemiologists also study factors associated with chronic illness, including its prevalence and incidence. **Prevalence** is the proportion of the population affected by a particular disease at a particular time, whereas **incidence** is the number of new cases of a disease during a particular time, usually one year. Research methods used in epidemiology are similar to those employed by psychologists. Epidemiology research falls into three broad areas: observational methods, natural experiments, and experimental investigations.

A. Observational Methods

Observational methods parallel correlation studies in psychology. The two types of observational methods are **retrospective** and **prospective**. Prospective studies are longitudinal designs that follow the forward development of a group of people starting an experience together. Retrospective studies begin with a group of people already experiencing a disease and then look for characteristics of these people that are different from those of people who do not have that disease. Retrospective studies are also called **case-control studies** because cases (people with a disease) are compared with controls (people not affected).

B. Randomized, Controlled Trials

Randomized, controlled trials are equivalent to experiments in psychology. **Clinical trials** are randomized, controlled trials designed to test the effectiveness of a drug or treatment. Researchers assign participants to groups randomly to control for **self-selection**. Randomized, placebo-controlled double-blind designs are often considered the zenith of research design.

C. Natural Experiments

Natural experiments are similar to ex post facto studies in psychology; both involve the selection rather than the manipulation of a variable. Natural experiments can be conducted when two similar groups of people naturally divide themselves into those exposed and those not exposed to a pathogen.

D. Meta-analysis

The statistical technique of **meta-analysis** allows researchers to evaluate many research studies on the same topic, even if the research methods differed. In addition, meta-analysis provides an index of the size of the effect, which allows researchers to gauge the importance of the effect.

E. An Example of Epidemiological Research: The Alameda County Study

Epidemiology provides techniques for taking a first look at a health-related problem. An important example is the Alameda County Study, which began in 1965 in an effort to identify certain health practices that relate to subsequent mortality and morbidity. Alameda County researchers found that people who practiced six or seven basic health-related behaviors were less likely to die than those who practiced zero to three of these behaviors. These health practices included (1) getting seven or eight hours of sleep daily, (2) eating breakfast almost every day, (3) rarely eating between meals, (4) drinking alcohol in moderation or not at all, (5) not smoking, (6) exercising regularly, and (7) maintaining weight near the prescribed ideal.

IV. Determining Causation

Most epidemiological studies do not prove causation, rather, they point to specific risk factors that are associated with a particular disease or disorder.

A. The Risk Factor Approach

A **risk factor** is any characteristic or condition that occurs with greater frequency in people with a disease than it does in people free from that disease. Although they do not determine causation, risk factors can be used to estimate the probability of developing a disease. Scientists using the risk factor approach must distinguish relative risk from absolute risk. **Relative risk** is the ratio between the number of people in an exposed group with a disease and the number in an unexposed group with the disease. **Absolute risk** refers to a person's chance of developing a disease independent of the risk for other people.

B. Cigarettes and Disease: Is There a Causal Relationship?

Epidemiologists have gradually uncovered evidence linking cigarette smoking to lung cancer and heart disease. Although scientists have no evidence from experimental designs proving that cigarette smoking causes heart disease and lung cancer in humans, the accumulation and consistency of other evidence has led researchers to conclude that cigarette smoking causes both heart disease and lung cancer. This evidence is based on seven conditions for determining causation from nonexperimental research and shows that (1) a **dose-response relationship** exists between smoking and the disease; that is, the more cigarettes a person smokes, the greater the risk for heart disease and lung cancer; (2) the prevalence and incidence of heart disease declines when people stop smoking; (3) cigarette smoking *precedes* heart disease and lung cancer; (4) the relationship between cigarette smoking and disease is consistent with other data and makes sense from a biological viewpoint; (5) research in this area yields a consistent pattern of results—a pattern that has been established through meta-analysis, a statistical technique that allows the combination of information from several studies into one analysis; (6) the size of the relative risk is large—about 23.0 for lung cancer; and (7) the evidence is based on a number of well-designed studies. A combination of these criteria can allow epidemiologists to determine causality from nonexperimental designs.

V. Research Tools

Theories and psychometric methods are tools that researchers use to determine areas of inquiry and to measure variables essential to their research.

A. The Role of Theory in Research

A **theory** can be defined as a set of related assumptions that allow scientists to use logical deductive reasoning to formulate testable hypotheses. Theories are not idle speculations but are useful tools in any scientific discipline. Theory-based **models** allow researchers to (1) organize data, (2) render them meaningful, (3) generate descriptive research, (4) test a variety of hypotheses, and (5) follow a guideline for working through daily problems.

B. The Role of Psychometrics in Research

Health psychologists, like other scientists, use measuring instruments to test their hypotheses and to build their theories. To be useful, measuring devices must be both **reliable** (consistent) and **valid** (accurate).

1. Establishing Reliability

The reliability of any measuring tool is the extent to which that tool measures in a consistent fashion. Reliability can be established through test-retest and interrater methods. Reliability is usually expressed in terms of correlation coefficients.

2. Establishing Validity

Measuring instruments can be reliable (consistent) and yet lack validity (accuracy or truthfulness). Validity is the extent to which a measuring instrument measures what it is designed to measure. Predictive validity is an estimate of an instrument's ability to predict which participants will develop a particular condition and which ones will remain disease-free.

Exploring Health on the Web

The Internet offers exciting possibilities for students to access recent information and research on health.

<http://www.consort-statement.org/>

This webpage provides the full CONSORT statement and more information about randomized clinical trials.

Suggested Activities

Personal Health Profile — Reading the Research Literature

The growth of health psychology has resulted in a growing number of psychology studies on topics related to physical health. In Chapter 1 of this manual, we suggested a course assignment in which students compile a Personal Health Profile. To complete this series of assignments, they must become familiar with the current literature on health-related behaviors. However, much of this research is reported in journals in the fields of medicine, nursing, rehabilitation, and epidemiology. Psychology students may have little experience reading journals from these other disciplines (and many psychology students have difficulties in reading research in psychology journals).

The most important of the journals in health psychology are *Health Psychology* and the *Journal of Behavioral Medicine*. Both journals contain research articles oriented around health-related behaviors, so their content is similar to other psychology journals. However, psychologists conducting health research often measure health outcomes or physiological responses rather than behaviors, indicating that the differences between psychology and biomedical research are blurring. Other journals of interest differ in terminology and format from psychology journals. These include such journals as the *New England of Medicine*, *Journal of the American Medical Association*, *American Journal of Epidemiology*, *American Journal of Public Health*, *Psychosomatic Medicine*, *Annals of Behavioral Medicine*, *Psychology and Health*, and *Brain, Behavior and Immunity*. These and other journals can serve as source material for students in writing their personal health profile.

To familiarize your students with the various sources of research, give them an assignment to find three research articles on some topic—for example heart disease or obesity—

one in a psychology journal, one a medical journal, and one an epidemiology journal. What are the differences and similarities in the format among the three? What are the sources of these differences? For example, does the psychology journal concentrate on behavioral manipulation and measures whereas the medical journal emphasizes physiology, or has the interdisciplinary collaboration of researchers from various areas led to a blurring of the differences among content areas in health research?

Debate: The Ethics of Placebo Treatment

Urge your students to explore the ethics controversy surrounding placebo treatments. As the text explains in the "Would You Believe. . . ?" box for this chapter, placebo treatments—even placebo surgery—are considered ethically acceptable according to current medical and psychological ethical standards. However, some researchers (and many members of the general public) find this practice unacceptable.

The controversy has made its way into many journals, so your students have published sources from which to draw. However, people often have strong opinions. Arrange a debate on this issue, considering the experts' opinions and personal opinions of your students.

One group at Harvard University, led by Dr. Ted Kaptchuk, is at the forefront investigating placebo treatments as ethical treatment alternatives (<http://www.programinplacebostudies.org>). When do they consider a placebo treatment to be an ethical treatment? What about the ethics of making people aware of possible side effects of medications? An interesting news article (<http://blogs.plos.org/neurotribes/2012/07/16/are-warnings-about-the-side-effects-of-drugs-making-us-sick/>) highlights how informing patients of side effects of actual prescription drugs may make them more likely to experience those side effects!

Medical Research and Media

Assign your students the project of finding media errors or distortions in coverage of medical research, which they can find by consulting one of the online news sites, such as CBS's Health section or the comparable section of many news sites. It is not even necessary to use the Internet; television, newspapers, and magazines carry health-related stories. The emphasis for the media is to grab attention and present a concise summary of an interesting research finding. The result is often to sensationalize and simplify research findings.

Direct your students to search for the original report of the misrepresented findings and contrast the technical report with the popular coverage, making exhibits of the contrasting material. Conduct a class discussion about the impact of these types of reporting errors and what information should be included in popular press news articles.

One helpful website may be <http://www.benchpressproject.org.uk>, a UK based site that encourages journalists and scientists to help each other to report scientific news accurately. There are some activities on the webpage.

Understanding the Numbers Behind the News

Most people (including students) have trouble understanding the results of health research and how those results may apply to them. Part of the difficulty stems from the way that results are reported and the inclusion of numbers that are essential to research and statistical analysis. For example, one confusion involves the terms *absolute risk* and *relative risk*, both of

which are terms from epidemiology research. If a person's risk for a disease is expressed in terms of absolute risk, the risk seems very small, but if expressed in terms of relative risk, the risk seems much larger.

You can help your students understand these terms (and possibly their own personal risks) by assigning a variety of topics for which students must obtain both numbers. One dramatic example is the risk of dying of lung cancer for smokers. The absolute risk is about 1 in 1,000 per year, which means that about 1 out of 1,000 smokers will die of lung cancer in any given year. However, the relative risk is about 23 times higher for smokers than for nonsmokers. Smokers have elevated risks for many diseases that your students can examine. In addition, obesity, diabetes, sedentary lifestyle, alcohol, and a variety of drugs increase the risks for many disorders. Examining the absolute risk may not impress your students as much as the relative risk, but understanding that these two numbers both express increased risk will help them academically and possibly personally.

To use this activity as part of the Personal Health Profile, instruct students to choose a risk that applies to them and to find their absolute and relative risk for the development of at least one disease stemming from this risk. Students may choose either behavioral risks such as smoking or sedentary lifestyle or inherent risks such as family background, ethnicity, or gender.

Computing a Correlation

Instructors may wish to have each student contribute data to a correlational study on weight and hypertension. Each student could collect information on height, weight, frame size, and blood pressure level from four or five acquaintances. The study will be more representative and a better illustration of correlation if middle-aged or older participants are included. Blood pressure can be reported in terms of systolic level, diastolic level, or both. When the data are gathered, a Pearson product-moment correlation can be calculated. Any standard statistics text will provide the formula, and access to a computer program (such as Excel) will make the calculation easy.

Whether the resulting correlation coefficient is positive or negative, large or nonsignificant, students may offer explanations for the reason the correlation turned out the way it did. They should remember that a positive correlation between weight and blood pressure does not indicate that weight *causes* hypertension, but this type of research is the basis for establishing risk factors for many diseases.

Correlations Do Not Equal Causation

A fun activity is to provide students with some correlational results (<http://www.jolley-mitchell.com/teachRDE/C07/Correlation&Causality.html>) and ask them for possible third variables or explanations. You could also add to this activity by reading the finding ("the positive correlation between ice cream consumption and number of assaults") and asking students to draw that correlation in graph form, so students gain further exposure to differentiating between positive and negative correlations.

Designing a Research Study

One study described in this chapter is an observational study examining whether posted calorie counts of food influences food choice (Ebel, Gyamfi, & Kersh, 2011). Although this study design was observational, similar questions about food choices and calorie counts could be conducted using a variety of methodologies. In small groups, each group could design a follow-up study using a different research design. Students should be able to answer specific questions

about their study, including: What is the research design of your study? What is your hypothesis? What are the observational definitions of your variables? What results would support your hypothesis?

Then by sharing these studies during class, other groups may also be able to identify possible confounds as well.

Video Recommendations

From Films for the Humanities & Sciences:

Placebo: Mind over Medicine? (2002) explores the placebo effect in treatment and research, presenting case studies of its effectiveness and interviews with health care professionals who comment on the placebo effect.

From Filmmakers Library:

Plagued: A Series on Disease and Society (1994) is a 4-part series on epidemics that attempts to put the AIDS epidemic into global and historical perspective. In this attempt, parts of this series provide information about epidemics and epidemiology. Part 1: *The Origin of Disease* investigates how epidemics break out. Part 2: *Epidemics* concentrates on the historical perspective of the spread of disease, including bubonic plague and cholera. Part 3: *Invisible Armies* explores the relationship between the immune system and history. Part 4: *Will We Ever Learn?* explores the relationship between HIV and syphilis.

Videos from the Web:

http://www.ted.com/talks/ben_goldacre_battling_bad_science.html – In a longer video Dr. Ben Goldacre, author of the books “Bad Science” and “Bad Pharma” gives an entertaining talk about “bad science.” This clip highlights several issues discussed in Chapter 2, including the use of meta-analyses and the importance of publicizing all relevant research findings, not simply those findings that show a treatment as effective (14:20).

<http://www.youtube.com/watch?v=wsFTgirKXHk> – Dr. Ben Goldacre explains the placebo effect and describes its role in medical research and in the pharmaceutical industry (4:56).

<http://youtu.be/nFLma2bTaVY> – This video “Coffee Lowers Stroke Risk” provides a nice explanation of a study conducted by researchers at UCLA (2: 36).

<http://youtu.be/CMSomLjyui4> – “Overeaters Brains” is a short video that explains how researchers can use technology, such as PET scans, to understand eating differences (1:34).

Multiple Choice Questions

1. An inactive substance or condition that has the appearance of the independent variable and that may cause participants in an experiment to improve or change behavior due to their belief is called
 - a. a nocebo.
 - b. a placebo.

- c. a dependent variable.
- d. an experimental design.

ANS: b REF: The Placebo in Treatment and Research

2. The effect of a placebo varies according to people's expectancies and previous learning, but in general, that response rate is about
- a. 5%.
 - b. 10%.
 - c. 35%.
 - d. 60%.

ANS: c REF: The Placebo in Treatment and Research

3. Which of these conditions is likely to produce the highest positive placebo effect?
- a. a physician dressed casually in blue jeans and sneakers
 - b. a physician who is enthusiastic in describing the treatment
 - c. a physician with a reputation for medical errors
 - d. a physician who, when prescribing medication says, "This may not help, but it won't hurt."

ANS: b REF: The Placebo in Treatment and Research

4. The placebo effect is
- a. most prominent in well-designed experiments.
 - b. an imaginary effect applicable to everyone.
 - c. an imaginary effect that occurs almost exclusively in hypochondriacs.
 - d. physiologically real and capable of improving organic and psychological symptoms.

ANS: d REF: The Placebo in Treatment and Research

5. Which of these "sugar pills" is likely to have the greatest positive effect?
- a. white pills rather than colored pills
 - b. very small pills rather than middle size pills
 - c. capsules rather than tablets
 - d. generic pills rather than brand-name drugs

ANS: c REF: The Placebo in Treatment and Research

6. Placebos have been known to help
- a. reduce insomnia.
 - b. decrease low back pain.
 - c. lower high blood pressure.
 - d. bowel movements.

ANS: d REF: The Placebo in Treatment and Research

7. To determine whether Drug Z lowers blood pressure, it is necessary to demonstrate that an experimental group, which has been given Drug Z, will have lower blood pressure than a comparison group, which has been given

- a. a higher dose of Drug Z.
- b. a lower dose of Drug Z.
- c. a placebo.
- d. no treatment at all.

ANS: c REF: The Placebo in Treatment and Research

8. Which of these statements is true?

- a. Placebo effects can influence both psychological and physical disorders.
- b. Valuable research is done by people outside the scientific community, but scientists try to discount the importance of this research.
- c. Scientific breakthroughs happen every day.
- d. Experimental rather than observational research is required to learn about patterns of disease.

ANS: a REF: The Placebo in Treatment and Research

9. The placebo effect

- a. makes it easier to determine the effectiveness of a therapeutic intervention.
- b. does not produce any type of unfavorable effect.
- c. is easy to control in psychotherapeutic treatment.
- d. hampers the evaluation of the effectiveness of treatment programs.

ANS: d REF: The Placebo in Treatment and Research

10. When neither the participants nor the experimenters know which group has received the treatment and which has received a placebo, the design is called

- a. confounding.
- b. double-blind.
- c. correlational.
- d. naturalistic.

ANS: b REF: The Placebo in Treatment and Research

11. The nocebo effect occurs when

- a. participants in a placebo study experience a negative effect.
- b. participants in a placebo study experience a positive effect.
- c. experimenters use a double-blind study.
- d. experimenters use the case-control method.

ANS: a REF: The Placebo in Treatment and Research

12. Placebos can be beneficial in treating many conditions EXCEPT:

- a. depression
- b. hypertension
- c. insomnia
- d. broken bones

ANS: d REF: The Placebo in Treatment and Research

13. The _____ a placebo resembles an effective treatment, the _____ the placebo effect.

- a. more; stronger
- b. more; weaker
- c. less; stronger
- d. less; weaker

ANS: d REF: The Placebo in Treatment and Research

14. Dr. Smith, a clinical health psychologist, is conducting research on whether relaxation training before a swim meet improves swimmer's race times. It is most likely Dr. Smith is using a _____ design.

- a. correlational
- b. single-blind
- c. double-blind
- d. retrospective

ANS: b REF: The Placebo in Treatment and Research

15. Most health-related evidence

- a. is the result of a variety of research methods.
- b. has been discovered accidentally.
- c. is withheld from the general public to avoid widespread panic.
- d. comes from the results of experimental designs.

ANS: a REF: Research Methods in Psychology

16. Dr. Rich is conducting research that examines whether 20-year olds eat more low-fat foods than 70-year olds. This research is using a _____ design.

- a. cross-sectional
- b. experimental
- c. ex post facto
- d. retrospective

ANS: a REF: Research Methods in Psychology

17. Dr. Sweedey is conducting research that examines 5 year olds and their aggressive behaviors. She follows up with these same participants 10 years later to measure their reactivity to stress. She is using a _____ design.

- a. cross-sectional
- b. experimental
- c. longitudinal
- d. ex post facto

ANS: c REF: Research Methods in Psychology

18. There is a _____ correlation between physical age and physical health, such that as age increases, physical health decreases.

- a. positive
- b. negative
- c. weak
- d. non-existent

ANS: b REF: Research Methods in Psychology

19. A correlation of .80 would indicate a _____ and _____ relationship between two variables.

- a. strong; positive
- b. strong; negative
- c. weak; positive
- d. weak; negative

ANS: a REF: Research Methods in Psychology

20. A positive correlation between physical health and education would indicate that as education _____, physical health _____.

- a. decreases, decreases
- b. decreases, increases
- c. increases, decreases
- d. increases, increases

ANS: d REF: Research Methods in Psychology

21. The major difference between longitudinal studies and cross-sectional studies is that cross-sectional studies occur _____ whereas longitudinal studies occur _____.

- a. once; over time
- b. over time; once
- c. with the same participants; with different participants
- d. with the same participants; over time

ANS: a REF: Research Methods in Psychology

22. One of the advantages of conducting a longitudinal study is that longitudinal studies can _____.

- a. be completed quickly.
- b. help identify developmental trends and patterns.
- c. determine causality.
- d. be completed with relatively few researchers.

ANS: b REF: Research Methods in Psychology

23. A recent research study examined whether sending text messages to overweight children would help enable them to maintain a weight-loss program. In this experiment, some children were randomly assigned to receive text messages and other children were assigned to the control condition and did not receive text messages. The dependent variable in this experiment was

- a. continued enrollment in a weight-loss program.
- b. text messages.
- c. weight loss.
- d. not receiving text messages.

ANS: a REF: Research Methods in Psychology

24. Researchers want to examine whether writing about the experience of breast cancer increases feelings of hope and optimism. Breast-cancer patients were randomly assigned to one of two essay conditions: writing about their breast cancer or writing about their everyday tasks. The independent variable in this experiment would be:

- a. hope and optimism
- b. breast cancer diagnosis
- c. writing about everyday tasks
- d. the essay conditions

ANS: d REF: Research Methods in Psychology

25. One of the challenges of conducting health research is that it is impossible, and unethical, to manipulate certain variables, such as sexual behaviors or smoking. The research design that examines differences between groups without manipulating these groups is:

- a. experimental
- b. ex post facto
- c. random assignment
- d. longitudinal

ANS: b REF: Research Methods in Psychology

26. If two variables increase or decrease together, they are

- a. positively correlated.
- b. negatively correlated.
- c. positively skewed.
- d. negatively skewed.

ANS: a REF: Research Methods in Psychology

27. Correlational studies

- a. cannot indicate cause and effect.
- b. are a type of experimental design.
- c. cannot be used in psychological research.
- d. cannot be used in epidemiological research.

ANS: a REF: Research Methods in Psychology

28. Correlational studies are a type of

- a. experimental study.
- b. double-blind study.
- c. ex post facto design.
- d. descriptive research.

ANS: d REF: Research Methods in Psychology

29. Small correlations, for example 0.08 or 0.10,

- a. may be statistically significant.
- b. cannot be statistically significant.
- c. indicate cause and effect between the two correlated variables.

- d. both a and c

ANS: a REF: Research Methods in Psychology

30. Cross-sectional studies

- a. follow disease-free participants over a long time period.
- b. follow participants with a disease over a long time period.
- c. are also called longitudinal.
- d. compare participants of at least two different age groups or developmental periods.

ANS: d REF: Research Methods in Psychology

31. A study that compares cholesterol levels of 10-year-old children and 30-year-old adults would most likely be a(n) _____ study.

- a. experimental
- b. cross-sectional
- c. longitudinal
- d. ex post facto

ANS: b REF: Research Methods in Psychology

32. A study that follows the history of overweight male participants over a 30-year period would be

- a. an experimental study.
- b. a longitudinal study.
- c. a cross-sectional study.
- d. a case-control study.

ANS: b REF: Research Methods in Psychology

33. Which of these is NOT a characteristic of longitudinal studies?

- a. Longitudinal studies are a comparison of two separate groups.
- b. Longitudinal studies tend to be time consuming.
- c. Longitudinal studies frequently require a team of researchers
- d. Longitudinal studies are prospective designs

ANS: a REF: Research Methods in Psychology

34. An investigator measures blood pressure in a group of college students and then repeats these measurements every year for 20 years. This is an example of

- a. a longitudinal study.
- b. a cross-sectional study.
- c. an experimental study.
- d. a clinical trial.

ANS: a REF: Research Methods in Psychology

35. Although causality is difficult to determine, which scientific method most strongly yields evidence for cause and effect relationships?

- a. correlational study
- b. experimental design

- c. ex post facto design
- d. descriptive research

ANS: b REF: Research Methods in Psychology

36. The cause of a disease or condition is most readily suggested by

- a. case control studies.
- b. experimental designs.
- c. correlational studies.
- d. a single-participant design.

ANS: b REF: Research Methods in Psychology

37. In an experimental design that investigates the effects of a low carbohydrate diet on weight loss, diet would be

- a. the independent variable.
- b. the dependent variable.
- c. an extraneous variable.
- d. a placebo.

ANS: a REF: Research Methods in Psychology

38. In an experimental design that investigates the effects of weight loss on heart rate in middle-aged men, the dependent variable would be

- a. stress.
- b. heart rate.
- c. age.
- d. gender.

ANS: b REF: Research Methods in Psychology

39. Which of the following is part of an ex post facto study but not an experimental study?

- a. manipulation of an independent variable
- b. control of extraneous variables
- c. measurement of a dependent variable
- d. inclusion of a subject variable

ANS: d REF: Research Methods in Psychology

40. A study comparing smokers and nonsmokers on their scores on a personality inventory is most likely to be

- a. an ex post facto design.
- b. an experimental design.
- c. a correlational study.
- d. a retrospective study.

ANS: a REF: Research Methods in Psychology

41. The branch of medicine that investigates the factors that contribute to the occurrence of diseases within a population is

- a. psychoneuroimmunology.
- b. behavioral medicine.
- c. behavioral health.
- d. epidemiology.

ANS: d REF: Research Methods in Epidemiology

42. A risk factor is any characteristic or condition that
- a. occurs with a lower frequency in people with a disease than in people free from that disease.
 - b. occurs with a greater frequency in people with a disease than in people free from that disease.
 - c. is known to cause a disease.
 - d. is a measure of the dependent variable in an experimental design.

ANS: b REF: Research Methods in Epidemiology

43. Prospective and retrospective studies are both considered:
- a. experimental studies
 - b. longitudinal studies
 - c. clinical trials
 - d. correlational studies

ANS: d REF: Research Methods in Epidemiology

44. A study examined two groups of people--those who were exercising and those who weren't—and examined their past history to try to understand why some people currently exercise whereas others do not. This is an example of what type of correlational design?
- a. retrospective study
 - b. prospective study
 - c. clinical trial study
 - d. all of the above

ANS: a REF: Research Methods in Epidemiology

45. Occasionally factors that predict death, or _____, are not the same factors that predict disease, or _____.

- a. mortality, morbidity
- b. morbidity, incidence
- c. morbidity, mortality
- d. mortality, incidence

ANS: a REF: An Example of Epidemiological Research

46. Prevalence of an illness refers to
- a. the proportion of the population that has a disease at a specific time.
 - b. the number of new cases of a disease in a year.
 - c. the percentage of new cases of a disease in a year.
 - d. the percentage of total deaths caused by a disease in one year.

ANS: a REF: Research Methods in Epidemiology

47. Observational methods in epidemiology are most closely related to which psychology method?

- a. correlational studies
- b. experimental designs
- c. ex post facto designs
- d. case history method

ANS: a REF: Figure Research Methods in Epidemiology

48. Prospective epidemiological studies are also

- a. cross-sectional.
- b. longitudinal.
- c. experimental.
- d. clinical trials.

ANS: b REF: Research Methods in Epidemiology

49. A study that begins with a group of participants who already have a disease is most likely to be

- a. a retrospective study.
- b. a prospective study.
- c. a correlational study.
- d. an experimental study.

ANS: a REF: Research Methods in Epidemiology

50. Which type of study begins with a group of people who already have a disease and then looks into factors that are associated with that disease?

- a. experimental
- b. placebo
- c. prospective
- d. retrospective

ANS: d REF: Research Methods in Epidemiology

51. Which type of epidemiological study is most similar to an experimental design in psychology?

- a. case-control.
- b. retrospective.
- c. prospective.
- d. randomized, controlled trial.

ANS: d REF: Research Methods in Epidemiology

52. Which of the following situations would most seriously complicate the interpretation of causation in a research design?

- a. a study in which participants are unaware that they are part of an experiment
- b. a study in which participants are aware that they are part of an experiment
- c. a design in which participants are allowed to self-select
- d. a design in which participants are not allowed to self-select

ANS: c REF: Research Methods in Epidemiology

53. Psychologists and epidemiologists would agree that which type of study is the most desirable design, the "gold standard" of scientific research?

- a. case-control study
- b. randomized, placebo-controlled, double-blind trial
- c. natural experiment
- d. correlational study

ANS: b REF: Research Methods in Epidemiology

54. Natural experiments in epidemiology are most similar to what kind of psychology study?

- a. experimental
- b. ex post facto
- c. correlational
- d. observational

ANS: b REF: Research Methods in Epidemiology

55. A statistical technique for combining the results of several studies is

- a. meta-analysis.
- b. transactional analysis.
- c. hypothesis testing.
- d. scientific myopia.

ANS: a REF: Research Methods in Epidemiology

56. The results of a meta-analysis allow researchers to determine one type of information that other statistical analyses do not, which is

- a. the statistical significance of the effect.
- b. the correlation between variables.
- c. the size of the effect.
- d. the main effects and interactions of variables.

ANS: c REF: Research Methods in Epidemiology

57. The Alameda County study is an example of

- a. an experimental longitudinal design.
- b. a prospective design.
- c. an experimental descriptive design.
- d. a correlational cross-sectional design.

ANS: b REF: Research Methods in Epidemiology

58. Mortality is to death as morbidity is to

- a. mortality.
- b. disease.
- c. trauma.
- d. gruesome.

ANS: b REF: Research Methods in Epidemiology

59. Research has found that obesity is related to high blood pressure. This finding means that

- a. obesity is a risk factor for high blood pressure.
- b. obesity is an independent risk factor for high blood pressure.

- c. most overweight people die of high blood pressure.
- d. thin people are protected against high blood pressure.

ANS: a REF: Determining Causation

60. A research study found a direct, consistent association between late bedtime and childhood obesity. This is known as a _____ relationship.

- a. negative
- b. dose-response
- c. positive
- d. causal

ANS: b REF: Determining Causation

61. The ratio of the incidence or prevalence of a disease in an exposed group to the incidence or prevalence of that disease in the unexposed group is called

- a. a risk factor.
- b. dose-response relationship.
- c. a relative risk.
- d. causation.

ANS: c REF: Determining Causation

62. The determination of causation is most easily accepted on the basis of

- a. clinical trials.
- b. studies using the risk factor approach.
- c. community trials.
- d. experimental studies.

ANS: d REF: Determining Causation

63. Wendi is a long-time smoker, which carries a relative risk of about 23.0 for lung cancer death and 2.0 for heart disease mortality. From this information you can conclude that

- a. Wendi is more than four times as likely to die from lung cancer as from heart disease.
- b. Wendi's absolute risk for lung cancer is greater than her absolute risk for heart disease.
- c. Wendi is about 23 times more likely to die of lung cancer than those who do not smoke.
- d. Wendi is about 23 times more likely to die of heart disease than her twin sister.

ANS: c REF: Determining Causation

64. Research has found that lung cancer increases with number of cigarettes smoked. This finding

- a. indicates a negative relationship between smoking and lung cancer.
- b. indicates a positive relationship between smoking and lung cancer.
- c. proves that smoking causes lung cancer.
- d. suggest that cancer prone personalities are more likely to begin smoking.

ANS: b REF: Determining Causation

65. A direct, consistent relationship between the independent variable and the dependent variable

- a. is an example of the placebo effect.
- b. is an example of the nocebo effect.
- c. indicates a dose-response relationship.
- d. indicates a transverse relationship.

ANS: c REF: Determining Causation

66. In order for epidemiologists to infer that Behavior A causes Disease B, they must observe

- a. that Behavior A precedes Disease B.
- b. a dose-response relationship between Behavior A and Disease B.
- c. a decline in Disease B when Behavior A is eliminated.
- d. all of these.

ANS: d REF: Determining Causation

67. Theories should be viewed as

- a. tools of philosophy.
- b. tools of science.
- c. tested hypotheses.
- d. untested hypotheses.

ANS: b REF: Research Tools

68. We are designing a new instrument to measure happiness. If we ask participants to complete the same instrument of happiness over several days, we are testing this new instruments' _____.

- a. external validity
- b. interrater reliability
- c. predictive validity
- d. test-retest reliability

ANS: d REF: Research Tools

69. For a scale that is measuring eating disorder likelihood to have good _____, it needs to be able to differentiate between those who will get eating disorders versus those who would not.

- a. external validity
- b. interrater reliability
- c. predictive validity
- d. test-retest reliability

ANS: c REF: Research Tools

70. Which of these is NOT a function of a useful theory?

- a. generate research
- b. serve as a guide to action
- c. eliminate researcher bias

d. organize observations

ANS: c REF: Research Tools

71. Reliability means

a. accuracy.

b. structure.

c. validity.

d. consistency.

ANS: d REF: Research Tools

72. When scores on two administrations of the same test are in close agreement, then that test is

a. reliable.

b. valid.

c. both reliable and valid.

d. neither reliable nor valid.

ANS: a REF: Research Tools

73. Test X is designed to predict which individuals in a smoking cessation program will successfully quit smoking. Scores from Test X administered at the beginning of a cessation program correlate .89 with length of time smokers are able to quit. This evidence suggests that Test X is

a. reliable.

b. valid.

c. standardized.

d. consistent.

ANS: b REF: Research Tools

74. The extent to which a test measures what it is designed to measure is an expression of

a. test-retest reliability.

b. internal consistency.

c. homogeneity.

d. validity.

ANS: d REF: Research Tools

75. If a test predicts some future condition, it is said to have

a. negative validity.

b. criterion-related validity.

c. predictive validity.

d. no validity.

ANS: c REF: Research Tools

76. A valid test

- a. is both accurate and reliable.
- b. is consistent but not accurate.
- c. is accurate but not consistent.
- d. has a time limit.

ANS: a REF: Research Tools

True/False Questions

1. The placebo has treatment benefits but presents problems to researchers.

ANS: T

2. The placebo can affect psychological disorders, but it has no effect on biological processes.

ANS: F

3. For a treatment to be considered effective, the treatment must show an equal rate of effectiveness when compared to a placebo.

ANS: F

4. When the placebo treatment is described in a hidden manner, placebos can lead to fewer symptoms and better quality of life when compared to no treatment.

ANS: F

5. Correlational studies yield information about causation.

ANS: F

6. Experimental studies yield information about causation.

ANS: T

7. Epidemiology is a branch of medicine.

ANS: T

8. The number of new cases of AIDS per year reveals the incidence of that disease.

ANS: T

9. A prospective study begins with a group of participants who have a given condition or disease.

ANS: F

10. With an ex post facto study, researchers compare two or more groups.

ANS: T

11. Retrospective studies begin with a group of people who already have a disease or disorder.

ANS: T

12. The randomized, clinical trial is a type of retrospective study.

ANS: F

13. The number of new cases of a particular disease during a specific period of time is incidence.
ANS: T

14. A study that allows participants to choose whether they are in the experimental condition or the control condition is committing the problem of self-selection.
ANS: T

15. A useful theory should generate, organize, and guide research.
ANS: T

16. An experiment consists of at least two groups: an experimental group and a control group.
ANS: T

Essay Questions

1. *Discuss the disadvantages and advantages of placebos.*
 - A. A placebo is a treatment that is capable of causing effects through expectation concerning the effectiveness of the treatment, independent of the influence of the treatment itself.
 - B. The disadvantages of placebos occur in research settings.
 1. Placebos create problems in assessing the effectiveness of treatment because people who get treatment expect the treatment to be effective, and the people show improvement even to “sugar pills.”
 2. Placebos create problems in assessing the effectiveness of psychological treatment because people expect psychological interventions to work, and the people show improvement even if the treatment has no effective component.
 - C. The advantages of placebos can be seen in treatment situations.
 1. Placebos bring about improvements and cures that are indistinguishable from those brought about by medically and psychologically effective treatments.
 2. The placebo effect can add to the effect of medical and psychological treatment, boosting the effectiveness.

2. *What are the advantages and disadvantages of experimental studies and correlational studies? What might prompt a researcher to choose a correlational design over an experimental design?*
 - A. Experimental studies
 1. Have the advantage of yielding information about causal relationships, a type of information that no other single method has the power to show.
 2. Have the disadvantages of being difficult to conduct and somewhat artificial because experiments require the manipulation of independent variables and the control of all other variables, which includes appropriate control group (or groups).
 - B. Correlational studies
 1. Have the advantage of yielding information about the degree and direction of relationships between variables.
 2. Have the disadvantage of being incapable of revealing causal relationships.
 - C. Researchers can make the choice of correlation over experimental method because
 1. Some variables cannot be manipulated as part of an experiment due to ethical or practical problems in performing the manipulation. If a researcher had an interest in such variables, that researcher would have to choose another method of investigation.
 2. Some research is designed to reveal strength of relationships between variables, which makes correlational research the best choice.

3. *Contrast and compare research methods in psychology with those in epidemiology.*

- A. Psychology research
 - 1. Strives to understand behavior.
 - 2. Includes correlational studies, cross-sectional and longitudinal studies, experimental studies, and ex post facto designs; all of these methods have different goals and are appropriate for answering different research questions.
 - B. Epidemiology research
 - 1. Strives to understand the origins of disease, to determine if the hypotheses about disease drawn from other studies are consistent with the epidemiological data, and to evaluate preventive procedures.
 - 2. Includes prospective and retrospective studies; randomized, controlled trials; and natural experiments.
 - 3. Each method has different requirements, and each answers different research questions.
 - C. Comparing the two areas shows that
 - 1. Both psychology and epidemiology use methods based on observation as well as manipulation.
 - 2. Some of the methods are the same but the names may differ.
 - a. Experiments are common to both areas.
 - b. Ex post facto studies are similar to natural experiments.
 - c. Prospective studies are longitudinal.
 - 3. Some of the methods differ; for example, retrospective studies do not appear in psychology.
4. *Without regard to ethics or practicality, design a study that would settle the question of whether or not smoking causes lung cancer.*
- A. The critical study would have to be an experiment, the only method that allows the determination of causality.
 - 1. Such an experiment has not been done with humans for ethical reasons.
 - 2. Such experiments have been done with nonhuman animals, but generalizing those results to humans has not been persuasive to everyone.
 - B. The experiment
 - 1. Begins with a representative sample of the population.
 - 2. Randomly assigns participants to two equal groups, smoking and nonsmoking.
 - 3. Requires the smoking group to continue and the nonsmoking group to refrain from smoking.
 - 4. Continues for at least 20 years.
 - 5. Controls for the events that might occur to the participants during the 20 or more years of the study so as to eliminate these factors as possible causes for lung cancer.
 - 6. Determines cause of death for all participants who died.
 - 7. Compares the number of deaths due to lung cancer in the smoking versus nonsmoking group.
 - 8. Allows for conclusions concerning the causal role of smoking in the development of lung cancer
 - C. Because only a controlled experiment like the one described here can form the basis for conclusions about causality, obvious practical and ethical problems exist in attempting to answer this question.
5. *Discuss the strengths and weaknesses of the risk factor approach.*
- A. A risk factor is a characteristic that relates to the development of illness.

1. Risk factors are determined by correlational studies, and therefore, show no causality.
 2. Many risk factors relate to the development of disease, yielding a list of risk factors each with different strengths of relationship to the disease.
 - B. The advantages of the risk factor approach include
 1. Furnishing a list of factors that relate to development of illness.
 2. Allowing some predictive power based on strength of the risk factor.
 3. Allowing health care professionals to focus on prevention rather than forcing them to strive toward a cure.
 - C. The main weakness of the risk factor approach is its inability to demonstrate causation.
 1. Even if a risk factor causes a disease, the risk factor approach is not capable of revealing such relationships.
 2. The predictions of the development of disease based on the risk factor approach do not lead to precise predictions of who will get sick and who will remain disease free.
6. *Contrast the concepts of reliability and validity. How is each important for psychological assessment?*
- A. Reliability is consistency of measurement.
 1. Reliability can refer to test-retest or interrater reliability.
 2. Reliability is typically expressed as a correlation coefficient, and this correlation expresses the degree of relationship between the two variables (first administration of a test versus second administration; Rater 1 versus Rater 2).
 3. High reliability coefficients indicate consistent measurement, but low reliability coefficients are difficult to interpret.
 - B. Validity is accuracy of measurement.
 1. Accuracy of measurement is judged against some independent criterion.
 2. Validity may also be expressed as a correlation, reflecting the degree of relationship between the test score and the criterion.
 - C. Both reliability and validity are necessary for good measurement.
 1. A measurement cannot be valid without being reliable, but a measurement can be reliable and still lack validity.
 2. These coefficients are important in deciding about the acceptability of scores on psychological tests, and higher reliability and validity scores indicate better tests.