# *Understanding Psychology 14th edition Feldman Solutions Manual*

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# Chapter 2

# Psychological Research

## OPENING THEMES

The scientific method is central to understanding the field today. Although it may seem as though these topics are not really about "psychology," without a scientific approach, psychology would be no different than the pseudo-sciences that are propagated in the media.

## MODULE 4: THE SCIENTIFIC METHOD

### LEARNING OBJECTIVES

4–1 What is the scientific method?

4–2 What role do theories and hypotheses play in psychological research?

The **scientific method** is the approach used by psychologists to systematically acquire knowledge and understanding about behavior and other phenomena of interest. It consists of four main steps: (1) identifying questions of interest, (2) formulating an explanation, (3) carrying out research designed to support or refute the explanation, and (4) communicating the findings. See **Figure 1.**

### THEORIES: SPECIFYING BROAD EXPLANATIONS

In using the scientific method, psychologists start by identifying questions of interest. Once a question has been identified, the next step in the scientific method is to develop a theory to explain the observed phenomenon. **Theories** are broad explanations and predictions concerning phenomena of interest. They are established on the basis of a careful study of the psychological literature to identify earlier relevant research and previously formulated theories, as well as psychologists' general knowledge of the field.

Psychologists Bibb Latané and John Darley, responding to the failure of bystanders to intervene when Kitty Genovese was murdered in New York, developed what they called a theory of diffusion of responsibility.

### HYPOTHESES: CRAFTING TESTABLE PREDICTIONS

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Although the diffusion of responsibility theory seems to make sense, it represented only the beginning phase of Latané and Darley's investigative process. Their next step was to devise a way to test their theory. To do this, they needed to create a hypothesis. A **hypothesis** is a prediction stated in a way that allows it to be tested. Hypotheses stem from theories; they help test the underlying soundness of theories.

A hypothesis must be restated in a way that will allow it to be tested, which involves creating an operational definition. An **operational definition** is the translation of a hypothesis into specific, testable procedures that can be measured and observed in an experiment.

## KEY TERMS

**hypothesis** A prediction, stemming from a theory, stated in a way that allows it to be tested.

**operational definition** The translation of a hypothesis into specific, testable procedures that can be measured and observed in an experiment.

**scientific method** The approach through which psychologists systematically acquire knowledge and understanding about behavior and other phenomena of interest.

**theories** Broad explanations and predictions concerning phenomena of interest.

## LECTURE IDEAS

**Psychology in the Real World:** Ask students to find three instances from real life that demonstrate psychological concepts in their lives. This can be done individually or in groups. Have students share their ideas and discuss which major subdisciplines best explain the experience.

**Importance of Research:** Ask the psychology majors in the room what courses they are most and least looking forward to. Generally, they will say they are looking the least forward to Research Methods and Statistics. Then ask them why those classes are required for their major. Use this as a jumping-off point for a discussion about the importance of research in psychology.

**Nature and Nurture:** How do psychologists tease apart how much of a trait is due to genetics and how much is due to environment? A common approach is to study twins (both identical and fraternal) who are reared apart or reared together. A brief overview of behavioral genetics and personality can be found at http://www.personalityresearch.org/bg.html. It reviews twin and adoptee research on personality and how behavioral genetics has influenced methodology.

## CLASSROOM ACTIVITIES AND STUDENT ASSIGNMENTS

**Skepticism:** Bring in a couple of self-help books that you checked out from the library. Break the class into groups and have them look through one of the self-help books and choose one of the treatments or

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suggestions the author gives for a problem. Ask the groups to discuss whether or not the treatment or advice sounds factual. Ask them to write down what credentials the author has. Discuss with the class how self-help books may seem helpful but should be read and followed carefully. Discuss with them how using the scientific method when conducting research results in more factual conclusions.

**Teacher Bias:** Have students read a great article that expands Rosenthal's research into teacher bias: Rosenthal, R., S. L., and Jacobson, L. (1966). Teachers' expectancies: Determinates of pupils' IQ gains. *Psychological Reports, 19*, 115–118. Have them write two paragraphs that summarize the article and then one paragraph that illustrates a personal experience in which they have experienced the bias themselves.

**Research Design:** Have students get into groups and give them the following theory: media violence and adolescent aggression are related. Assign each group to a different research design (correlation, experiment, survey, case study, and naturalistic observation), and ask them to come up with a testable hypothesis and method of testing.

## DISCUSSION QUESTIONS

Why is it necessary for psychological researchers to use the scientific method?

Think about a psychological issue of interest to you. How would you approach it from a scientific perspective?

Is it more or less difficult for psychologists to study phenomena of interest than is true for scientists in other disciplines?

Students may have difficulty differentiating theories from hypotheses. Tell them of some different theories you have and ask them to pull out testable hypotheses. For example, you can tell them that a researcher believed that frozen foods do not have calories. Calories are measures of heat. Frozen food, by definition, can't have calories. Therefore, frozen foods are calorie-free. Explain what events this theory might lead to: diets of frozen candy bars, ice cream, Starbucks Frappacinos, frozen cookie dough, and so on that lead to weight gain instead of weight loss. What is the theory? Hypotheses? How can they be tested?

When you see an advertisement, whether it be in a newspaper, magazine, on television, or online, do you pay attention to the statistics that are given? For example, "Four out of five dentists have chosen Brand X toothpaste over other brands." Do you ever think about who those four out of five dentists are and the source of the statistics?

## POLLING QUESTIONS

**Polling Question:** Mrs. Smith was found dead in her boarding house. By her side a knife with the initials JB was found. She had one stab wound. Examining the evidence, Inspector Lestrade said, "I believe that John Butcher did it. It's his knife. He knew Mrs. Smith." Is this a theory or hypothesis?

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## SUGGESTED MEDIA

*Aspects of Behavior.* CRM/McGraw-Hill, 1971, 26:00.
This video introduces the field of psychology. There are also taped interviews with noted historical psychology scholars such as Stanley Milgrim and Abraham Maslow.

*Association of Psychological Science.* http://www.psychologicalscience.org.
This is the official website of the Association of Psychological Science.

*Discovering Psychology 1: Past, Present, and Promise*. Annenberg/CBS Project, 2001, 30:00.
This piece introduces the field of psychology and what this entire field entails. Talks about the relationship between psychology as a science and the other fields of science.

*Discovering Psychology 2: Understanding Research*. Annenberg/CPB Project, 2001, 30:00.
This covers the scientific method and the process of data collection in both the laboratory and in a natural setting.

The Psych Files. www.thepsychfiles.com.
This is a good website housing several free podcasts and videos on various topics related to psychology, including research methods and statistics.

## ADDITIONAL READINGS

Latané, B., & Darley, J. M. (1970). *The unresponsive bystander: Why doesn't he help?* Prentice Hall.

Lillenfield, S. O. (2005). The 10 commandments for helping students distinguish science from pseudoscience in psychology. *APS Observer, 18*, http://people.ucalgary.ca/~mueller/P305/Science-Pseudo.pdf.

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Mikulak, A. (2014). Using pseudoscience to shine light on good science. *APA Observer, 27*.

Shermer, M. (1997). *Why people believe weird things: Pseudoscience, superstition, and other confusions of our time.* New York: W.H. Freeman.

Stanovich, Keith E. (2013). *How to Think Straight about Psychology* (10th edition). Boston, MA: Pearson Publishing.

## MODULE 5: CONDUCTING PSYCHOLOGICAL RESEARCH

### LEARNING OBJECTIVES

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5–1 What research methods do psychologists use?

5–2 How do psychologists establish cause-and-effect relationships in research studies?

Research —systematic inquiry aimed at the discovery of new knowledge—is a central ingredient of the scientific method in psychology. It provides the key to understanding the degree to which hypotheses (and the theories behind them) are accurate.

Descriptive research is designed to systematically investigate a person, group, or patterns of behavior. These methods include archival research, naturalistic observation, survey research, and case studies.

## ARCHIVAL RESEARCH

In **archival research**, existing data, such as census documents, college records, and newspaper articles, are examined to test a hypothesis. Archival research is a relatively inexpensive means of testing a hypothesis because someone else has already collected the basic data. Of course, the use of existing data has several drawbacks. The data may not be in a form that allows the researcher to test a hypothesis fully. The information could be incomplete, or it could have been collected haphazardly.

## NATURALISTIC OBSERVATION

In **naturalistic observation**, the investigator observes some naturally occurring behavior and does not make a change in the situation. Although the advantage of naturalistic observation is obvious—we get a sample of what people do in their "natural habitat"—there is also an important drawback: the inability to control any of the factors of interest.

## SURVEY RESEARCH

In **survey research**, a sample of people chosen to represent a larger group of interest (a population) is asked a series of questions about their behavior, thoughts, or attitudes. Survey methods have become so sophisticated that even with a very small sample researchers are able to infer with great accuracy how a larger group would respond. However, survey research has several potential pitfalls. For one thing, if the sample of people who are surveyed is not representative of the broader population of interest, the results of the survey will have little meaning. In addition, survey respondents may not want to admit to holding socially undesirable attitudes or to engaging in behaviors that they feel are somehow abnormal. Finally, in some cases, people may not even be consciously aware of what their true attitudes are or why they hold them.

## THE CASE STUDY

In contrast to a survey, in which many people are studied, a **case study** is an in-depth, intensive investigation of a single individual or a small group. Case studies often include psychological testing; a procedure in which a carefully designed set of questions is used to gain some insight into the personality

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of the individual or group. The drawback to case studies is that, if the individuals examined are unique in certain ways, it is impossible to make valid generalizations to a larger population.

## CORRELATIONAL RESEARCH

**Variables** are behaviors, events, or other characteristics that can change, or vary, in some way. In **correlational research**, two sets of variables are examined to determine whether they are associated, or "correlated." The strength and direction of the relationship between the two variables are represented by a mathematical statistic known as a correlation which can range from +1.0 to -1.0. A positive correlation indicates that as the value of one variable increases, we can predict that the value of the other variable will also increase. A negative correlation tells us that as the value of one variable increases, the value of the other decreases. The inability of correlational research to demonstrate cause and-effect relationships is a crucial drawback to its use. See **Figure 1** for an illustration of this last point.

## EXPERIMENTAL RESEARCH (SEE **FIGURE 2**)

In a formal **experiment**, the researcher investigates the relationship between two (or more) variables by deliberately changing one variable in a controlled situation and observing the effects of that change on other aspects of the situation. The change that the researcher deliberately makes in an experiment is called the **experimental manipulation**. Experimental manipulations are used to detect relationships between different variables.

Latané and Darley, in testing their theory of the diffusion of responsibility in bystander behavior, developed this hypothesis: The higher the number of people who witness an emergency situation is, the less likely it is that any of them will help the victim. They then designed an experiment to test this hypothesis. Their first step was to formulate an operational definition of the hypothesis by conceptualizing it in a way that could be tested.

### EXPERIMENTAL GROUPS AND CONTROL GROUPS

Experimental research requires that the responses of at least two groups be compared. One group will receive some special **treatment**—the manipulation implemented by the experimenter—and another group will receive either no treatment or a different treatment. Any group that receives a treatment is called an **experimental group**; a group that receives no treatment is called a **control group**.

Returning to Latané and Darley's experiment, we see that the researchers needed to translate their hypothesis into something testable. To do this, they decided to create a false emergency situation that would appear to require the aid of a bystander. As their experimental manipulation, they decided to vary the number of bystanders present.

### INDEPENDENT AND DEPENDENT VARIABLES

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The **independent variable** is the condition that is manipulated by an experimenter. In the case of the Latané and Darley experiment, the independent variable was the number of people present, which was manipulated by the experimenters.

Crucial to every experiment is the **dependent variable**, the variable that is measured and is expected to change as a result of changes caused by the experimenter's manipulation of the independent variable. The dependent variable is dependent on the actions of the participants or subjects—the people taking part in the experiment. For Latané and Darley, the dependent variables were the measure of whether bystanders in each of the groups provided help and the amount of time it took them to do so.

## RANDOM ASSIGNMENT OF PARTICIPANTS

To make the experiment a valid test of the hypothesis, Latané and Darley needed to add a final step to the design: properly assigning participants to a particular experimental group.

How can we ensure that participants in each experimental group will be equally intelligent, extroverted, cooperative, and so forth, when the list of characteristics—any one of which could be important—is potentially endless? The solution is a simple but elegant procedure called random assignment to condition: Participants are assigned to different experimental groups, or "conditions," on the basis of chance and chance alone.

## WERE LATANÉ AND DARLEY RIGHT?

To test their hypothesis that increasing the number of bystanders in an emergency situation would lower the degree of helping behavior, Latané and Darley placed the participants in a room and told them that the purpose of the experiment was to talk about personal problems associated with college. The sizes of the discussion groups were two, three, and six people, which constituted the manipulation of the independent variable of group size. Participants were randomly assigned to these groups upon their arrival at the laboratory. Each group included a trained confederate, or employee, of the experimenters. In each two-person group, then, there was only one real "bystander."

As the participants in each group were holding their discussion, they suddenly heard through the intercom one of the other participants—the confederate—having what sounded like an epileptic seizure and then calling for help. The participants' behavior was now what counted. The dependent variable was the time that elapsed from the start of the "seizure" to the time a participant began trying to help the "victim."

As predicted by the hypothesis, the size of the group had a significant effect on whether a participant provided help. The more people who were present, the less likely it was that someone would supply help (see **Figure 4**).

Because these results are straightforward, it seems clear that the experiment confirmed the original hypothesis. However, Latané and Darley could not be sure that the results were truly meaningful until they determined whether the results represented a significant outcome.

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## MOVING BEYOND THE STUDY

The Latané and Darley study contains all the elements of an experiment: an independent variable, a dependent variable, random assignment to conditions, and multiple experimental groups.

Psychologists, like other scientists, require that findings be **replicated**, or repeated, sometimes using other procedures, in other settings, with other groups of participants, before full confidence can be placed in the results of any single experiment. A procedure called meta-analysis permits psychologists to combine the results of many separate studies into one overall conclusion. For example, follow-up research shows that college students aren't the only ones who show the bystander effect; young children do as well (see the **Applying Psychology in the 21st Century** box).

## KEY TERMS

**archival research** Research in which existing data, such as census documents, college records, and newspaper clippings, are examined to test a hypothesis.

**case study** An in-depth, intensive investigation of an individual or small group of people.

**control group** A group participating in an experiment that receives no treatment.

**correlational research** Research in which the relationship between two sets of variables is examined to determine whether they are associated, or "correlated."

**dependent variable** The variable that is measured in an experiment. It is expected to change as a result of the experimenter's manipulation of the independent variable.

**experiment** The investigation of the relationship between two (or more) variables by deliberately producing a change in one variable in a situation and observing the effects of that change on other aspects of the situation.

**experimental group** Any group participating in an experiment that receives a treatment.

**experimental manipulation** The change that an experimenter deliberately produces in a situation.

**independent variable** The variable that is manipulated by an experimenter.

**naturalistic observation** Research in which an investigator simply observes some naturally occurring behavior and does not make a change in the situation.

**random assignment to condition** A procedure in which participants are assigned to different experimental groups or "conditions" on the basis of chance and chance alone.

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**replicated research** Research that is repeated, sometimes using other procedures, settings, and groups of participants, to increase confidence in prior findings.

**significant outcome** Meaningful results that make it possible for researchers to feel confident that they have confirmed their hypotheses.

**survey research** Research in which people chosen to represent a larger population are asked a series of questions about their behavior, thoughts, or attitudes.

**treatment** The manipulation implemented by the experimenter.

**variables** Behaviors, events, or other characteristics that can change, or vary, in some way.

## LECTURE IDEAS

### ARCHIVAL RESEARCH:

**Provide students with these examples of archival research:**

Searching high school records of people who later became criminals to see if there were early signs of misbehavior.

Looking up marriage licenses to find out the average age difference between spouses.

Finding out whether there are racial biases in jury decisions by examining court records.

Studying speeches made in Congress by men and women to see if there are differences in their use of particular words or phrases.

Examining census records to determine whether there are relationships between education and death rates.

Examining the use of online help manuals by people who buy printers to see if those with more knowledge of computers are less likely to use manuals.

Using cell phone signals to identify the behavioral patterns of people as they carry out their everyday activities.

### NATURALISTIC RESEARCH:

**Provide students with these examples of naturalistic research:**

Watching the patients in a psychiatric ward during meals to see if they speak to each other.

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Having people of different races drop their books while walking on a campus sidewalk and counting the number of people who stop to help to see if people are more likely to help those of the same race as themselves.

Determining whether people are more or less likely to ride an elevator than to take the stairs in the morning versus the afternoon.

Watching people in a computer lab and counting the number of times that they interrupt their studies to answer emails.

Counting the length of time it takes people in a grocery store to decide on a cereal brand.

Watching men and women in conversation to examine their nonverbal behavior.

Counting the number of times that students versus nonstudents make calls on their cell phones during basketball games.

Watching children in a playgroup and recording the number of times they smile at other children.

Recording the number of times that a teacher in a classroom calls on boys and girls to see if boys are more likely to be called on to answer questions.

Observing whether people are more likely to cross against the light on a suburban street or a street in the center of a city.

Counting the number of times clients with various disorders cancel their psychotherapy appointments.

## SURVEY RESEARCH:

**Provide students with these examples of survey research:**

Asking a random sample of people to complete an online questionnaire about political attitudes.

Asking people to list their favorite foods to determine if there are geographic differences in food preferences.

Interviewing people to ask them about their health practices.

Asking people to rate their preferences for different yogurt flavors.

Asking people to rate their attitudes toward new television technologies.

Giving people a chance to rate their preferences for catalog shopping by phone or online.

Having people describe whether or not they have experienced particular psychological symptoms throughout their lifetimes.

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Asking about people's experiences in elementary school with male versus female teachers.

Asking a sample of 50 people to participate in an opinion poll.

Finding out from airline passengers whether they would prefer to buy their meals on the airplane or in the airport terminal.

## CASE STUDY

**Provide students with these examples of case studies:**

Giving a troubled adolescent a set of lengthy questionnaires and interviews.

Examining a group of substance-addicted adults with tests of biological functioning.

Asking a mother to talk in-depth about her experiences raising a child with autism.

Asking a human resources manager to describe how she makes decisions about recommending applicants for employment.

Studying intensively the work habits of a small group of successful CEOs.

Conducting intensive neurological and neuropsychological testing of a group of children with a rare brain disorder.

Documenting progress in psychotherapy with a victim of Hurricane Katrina.

## VARIABLES TO STUDY IN CORRELATIONAL RESEARCH:

**Provide students with these examples of variables to study in correlational studies:**

Depression and chocolate consumption.

Self-esteem and height.

Exercise and cancer risk.

Depression and length of Internet use.

Time spent playing video games and grades.

Attractiveness and popularity.

Height and intelligence.

Noise level of music and heart rate.

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Body image and weight.

Achievement test scores and scholarship funding.

Stress hormones and perceived stress level.

Number of action movies seen in past 12 months and sensation-seeking as a personality variable.

Intelligence and enjoyment of pop music.

Marijuana smoking and high school grades.

Time spent reading novels and depression scores.

Alcohol consumption and problem-solving ability.

Sex role attitudes and political conservatism.

Weight gain and risk of poor self-rated health.

Anxiety and lack of concern over test performance.

Behavior problems and popularity in schoolchildren.

## EXPERIMENTAL RESEARCH

**Provide students with these examples of experimental research:**

Determining whether negatively worded advertisements cause people to buy more or less of a product.

Testing people to determine whether memory is better for words or pictures.

Having people take a memory test in a laboratory to determine which conditions are best for promoting short-term memory.

Providing therapy to people with severe anxiety disorders and comparing them to a control group that did not receive therapy.

Determining whether people are more likely to lie when they are put in a condition of thinking they need to impress the experimenter compared to a condition in which they do not think they need to impress the experimenter.

Comparing people's anxiety levels when told to imagine a stressful job interview compared to when told to imagine listening to relaxing music.

## SUMMARY OF DESCRIPTIVE RESEARCH METHODS

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Use this chart to summarize research methods used in descriptive research:

| Research Method | Advantages | Disadvantages |
|---|---|---|
| Archival | Inexpensive | Data can be in poor form.<br>Incomplete information<br>Haphazardly collected<br>Records often don't exist. |
| Naturalistic | Natural habitat | Inability to control factors<br>Need perfect conditions<br>Subjects may alter actions. |
| Surveys | Straightforward<br>Accuracy with small samples | Memory lapses in respondents<br>Responses tailored to what researcher wants to hear<br>Sample may not be representative of population. |
| Case Study | In-depth and focused | Generalizations must be made cautiously. |

This could be used as a classroom activity in which students work together to fill in the advantages and disadvantages of each method.

**Operationally Define the Variables**. In pairs or small groups, have students operationally define the following: *integrity, generosity, love, maturity, liberal, conservative, exhaustion, stress, attractiveness*. To facilitate discussion, have students share their results with the rest of the class.

## "PSYCHIC EXPERIMENTS"

To show the importance of the scientific method, particularly ruling out alternative, competing hypotheses, here are three demonstrations that are very simple to do. It just takes a bit of show "person"ship.

**Experiment 1:**

This idea is loosely based on the "magic" tricks of Daryl Bem, Cornell University psychologist.

The idea is to lure students into thinking that you can read their minds by guessing which object in the classroom they will have chosen. You will use a trick called "Black Magic." After amazing them with your psychic powers, you then ask students to suggest alternative hypotheses to the possibility that you actually read their minds. The setup for this demonstration is reference to the Ganzfield procedure in which a "receiver" attempts to read the mind of a "sender." The procedure involves the receiver trying to guess which of four objects the sender chose. The chance rate is 25% correct, but Bem's meta-analysis demonstrated a hit rate of 33%–35%. Say that Bem was therefore able to prove the existence of psychic phenomena (also called the "Psi" effect). If the class cooperates by concentrating their thoughts on an object in the room, you may be able to demonstrate the effect today.

*Follow these steps:*

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Before the class, arrange to have a volunteer assist you. This volunteer will appear to have been randomly chosen during the class, but actually you will have preselected this person. You can honestly ask this person in front of the class whether you arranged ahead of time regarding which object was selected, and the honest answer will be no because you will not have arranged ahead of time which object was actually selected. You will arrange ahead of time which object the assistant will point to before whatever object the class selects. This will be a black object. Any object that the volunteer points to after the black one will be the object chosen by the class. As you can see, nothing is really left to chance at all, nor have you been dishonest.

Tell the class that you will step out of the room and they will have up until the time you count to 30 to choose the object. The assistant will be in the room during this time.

Return to the room and now tell the class that in order to replicate the Ganzfield procedure, you will need to have the volunteer point to several objects in the room. You will use your psychic powers (along with the class's cooperation) to determine which object they have chosen. During this time, the volunteer will point to three or four objects, then to an object that is black. The object after the black one should be what the class selected.

Feel free to ham this up. For each object, carefully inspect it, put your hands on it, look as though you are concentrating, and then announce in a loud voice, "No, this is definitely not the object." For one or two of the objects, you can start to say yes, but then shake your head and say no. Chide the class and tell them to concentrate harder because you are getting confusing signals. For the object after the black one, first start to say no, then say very loudly, "YES! THIS IS THE OBJECT." Look at the class and take a well-deserved bow.

Now ask the class if they now believe in ESP. With luck, no one will have seen this trick performed before. Encourage them to think of alternative hypotheses, and if necessary, lead them to think of the trick as involving not the object itself but the object AFTER the black object.

**Experiment 2:**

Prepare three piles of cards:
Pile 1 has three cards,
Pile 2 has four 3's (from all four suits).
Pile 3 the third pile

Put them together at the top of a deck to create the illusion that you are going to be randomly taking them off the top, but they will have been prearranged.

Now ask for a volunteer and state that you will predict which pile the volunteer will pick because your psychic powers are so strong. In fact, you will write down your prediction ahead of time! Without allowing the volunteer to see what you are doing, write down the number 3 on a large sheet of paper, fold it up, and then turn to the task at hand. Instruct the volunteer to think of a number and really concentrate.

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Close your eyes and pretend to be "sensing" what the volunteer is thinking. Then instruct the volunteer to point at the pile she or he has chosen. After pointing to any of the piles, say, "Yes, that is what I predicted! I have written down the number 3!!" Of course you will be right because in Pile #1, there are 3 cards, Pile #2 has all 3's, and the third pile is "Pile #3." After the applause dies down, ask the audience if you have proven you are truly psychic. Of course they won't think you are, but now you can ask them to generate hypotheses about the secret of the trick. Through this process, you will be demonstrating the value of considering alternative hypotheses and being ready to critique a result even if it seems to be dramatically proving a point.

## CURRENT RESEARCH EXAMPLES

Interesting research examples can be taped from news documentary programs and cable networks such as the History Channel (somewhat a misnomer as it now incorporates many scientific programs) and shown for educational purposes on a one-time basis without violating copyright laws. The purpose of showing one of these examples in connection with this module (compared to the others on research) would be to highlight the importance of using the scientific method to arrive at conclusions about human behavior.

One excellent example comes from the Discovery Channel program *Myth Busters* in which the team debunks the notion of mind control (https://www.youtube.com/watch?v=Ydxb1gN2Tag). Have students connect the experiment run on the show to concepts from this chapter (e.g., scientific method, theory, hypothesis).

## CLASSROOM ACTIVITIES AND STUDENT ASSIGNMENTS

**Naturalistic Observation:** Have the students write down five places where naturalistic observation research could take place. Next, break the students into groups and have them discuss within their groups the five places they wrote down. Have the groups choose three of the places, describe the types of research variables a researcher would possibly be looking at in these settings, and explain why laboratory research could not be conducted in these settings. The students will get an idea of the differences between laboratory research and naturalistic observation and why certain variables cannot be manipulated in both settings.

**Correlations:** Draw graphs on the board representing both positive and negative correlations. Put various correlation coefficients on the board under the graphs. Break the class into groups and ask them to identify each graph as either a positive or a negative correlation and say if it represents a strong or a weak correlation. After the groups have finished, ask one member of each group to come to the board and write down what their group decided. This activity will give the students experience in identifying different types of correlations.

**Design an Experiment:** Explain to students that they are going to study the influence of smiling on social behaviors. The experimental group will interact with a confederate who smiles a lot during the interaction. Ask students: What has to happen in the control group? Would a confederate keep a blank expression?

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**Words That Are Alike:** On the board or electronically, write the word *correlation* in one column and the word *causation* in another column. Either in groups or individually, ask students to identify as many words as possible that are synonyms to these column labels. Afterward, discuss recent media illustrations using or even misusing these terms. Lastly, was there a discrepancy in the number of synonyms in each column? Have student speculate as to why that may or may not be.

**PsycInfo:** For a brief assignment, have students use PsycInfo (or Google Scholar) to find a current example of each type of research method (e.g., archival, case study). Briefly describe the method used in each study that students identify.

**Double-Blind Study:** Have students write a short essay regarding their voluntary participation in a double-blind drug study. How would their participation influence its external validity?

**Reality Television:** Instruct students to design a reality television series that explores psychological processes. What ethical safeguards would be in place to protect participants?

**Media and Research:** Have students find a report of research by a media outlet (e.g., TV news, online news source, or radio station) and report to the class what the essence of the report entailed and how the conclusions should be evaluated. Ask students what is missing or what more information they would need before determining the credibility and validity of the research being reported in their media selection.

**Professional Journal Articles:** Have the students bring research articles (choose articles with Methods, Results, and Discussion/Conclusion sections) from psychology journals to class. In class, in groups of two or three, have the students identify the different steps and tools of the scientific method. Have them determine if the research is descriptive, correlational, or experimental. In addition, have them list the criteria in the article that led them to determine the type of research. Discuss these in class.

**Significantly Significant:** Before class, find a few current articles and parse out the results sections. In groups, give students an example of research results and ask them to discuss whether or not the results were statistically significant and what that means to them. *(Since this is often a difficult concept for students to understand, having them put this in their own words may help clarify the misunderstandings.*)

**Subjective Well-Being:** Have the students write down what their subjective well-being is, or what it is that makes them happy. What do they think happiness consists of? Break the class into groups and have them discuss each of their comments. Discuss as a class how happiness comes from within and is different for each person.

**Little Albert—Is It Ethical?** Have students watch John Watson's experiment with Little Albert at http://www.youtube.com/watch?v=Xt0ucxOrPQE. After watching the video clip, discuss the ethics of the experiment by using the APA ethical guidelines as a checklist. Ask the students if they would be willing to allow their own baby to participate in a research experiment. Why or why not?

**HANDOUT 1: Common Sense or Fact:** Use *Handout 1: Common Sense or Fact* as a way to help students realize that what they think they already know about common everyday occurrences may not

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actually be true. This activity involves students reading through a list of common occurrences or common information and stating whether the information is true or false.

**HANDOUT 2: Methods of Research:** NOTE TO INSTRUCTOR: Edit out the correct answers before distributing to students.

Research, systematic inquiry aimed at the discovery of new knowledge, is a central ingredient of the scientific method in psychology. It provides the key to understanding the degree to which hypotheses (and the theories behind them) are accurate. Just as we can apply different theories and hypotheses to explain the same phenomena, we can use a number of alternative methods to conduct research.

In this exercise, students will learn more about several methods of research that psychologists use to gain new knowledge about human behavior.

**HANDOUT 3: Correlational Research:** NOTE TO INSTRUCTOR: Edit out the correct answers before distributing to students.

In correlational research, the relationship between two sets of variables is examined to determine whether they are associated, or correlated. When we find that two variables are strongly correlated with one another, it is tempting to presume that one variable causes the other. The mere fact that two variables occur together does not mean that one causes the other. It is impossible to determine which variable is the "cause" and which is the "result." In addition, there may be a third variable not accounted for that is responsible for the correlation. This principle is known as "correlation is not causation."

In this activity, students will have the chance to learn for yourself about the problems involved in making conclusions about causality in correlational research.

**HANDOUT 4: Experimental Design:** NOTE TO INSTRUCTOR: Edit out the correct answers before distributing to students.

The only way psychologists can establish cause-and-effect relationships through research is by carrying out an experiment. In a formal experiment, the relationship between two (or more) variables is investigated by deliberately producing a change in one variable in a situation and observing the effects of that change on other aspects of the situation. In an experiment, then, the conditions required to study a question of interest are created by an experimenter, who deliberately makes a change in those conditions in order to observe the effects of that change. The change that an experimenter deliberately produces in a situation is called the "experimental manipulation." Experimental manipulations are used to detect relationships between different variables. In this activity, you will have the chance to explore the factors involved in designing an experimental study.

**HANDOUT 5: Operational Definitions:** Use *Handout 5: Operational Definitions* to have the students find operational definitions in an experiment. In the activity, the students are given various segments from actual journal articles and asked to identify the operational definition(s) in each of the articles.

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**HANDOUT 6: Independent and Dependent Variables/Experimental and Control Groups:** Use *Handout 6: Independent and Dependent Variables/Experimental and Control Groups.* This activity has different examples of hypotheses for research ideas. The students have to identify both the independent and dependent variables in the hypotheses. They also have to identify who makes up the experimental group and who makes up the control group.

**HANDOUT 7: Populations and Samples:** Use *Handout 7: Populations and Samples* to give the students experience in identifying the population and samples in various examples. The students should be able to differentiate between who the population is and who makes up the sample.

## SURVEY AND CORRELATIONAL RESEARCH

To demonstrate both survey and correlational methods, conduct a brief study with your students as participants. Have students fill out a brief, simple survey with the following questions (or questions of your choosing):

Favorite ice cream flavor:
Height:
Shoe size:
Number of siblings:

At the next class meeting, present students with the data from their classmates. First, display a figure illustrating the favorite ice cream flavors of students: this is an example of a simple survey question. Second, present the calculated correlation coefficient and display a scatter plot illustrating the correlation between height and shoe size: this is an example of a positive correlation. Finally, present the calculated correlation coefficient and display a scatter plot of the correlation between height and number of siblings: this is an example of a near zero correlation. Correlations can be a difficult topic for students; giving them an example from their own lives can make it easier to understand.

## DISCUSSION QUESTIONS

Can psychologists really fully understand human behavior? We say that the mission of psychological research is to understand human behavior, but is this possible, considering that all human beings are separate individuals and no two people are exactly alike?

Do you think self-help books are based on factual information that came from psychological research? What purpose do you think self-help books serve? What are the intentions of the authors?

Can psychological researchers really control the third variable problem? How do you conduct research while knowing you cannot think of every possible variable that could confound your results?

Can you think of a situation where correlation does equal causation?

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Can you describe how a researcher might use naturalistic observation, case studies, and survey research to investigate gender differences in children's aggressive behavior at school?

First state a hypothesis, and then describe your research approaches. What positive and negative features does each method have?

## POLLING QUESTIONS

**Polling Question: Since I Can Use It, It Must Be Ok!**
Take a few minutes to review the critical controversy over deception in research. Let's share our own thoughts and ideas about this. How many think that using deception in research is acceptable under any condition? Who thinks that it is not all right to trade one's ethical responsibility such as informed consent for advancement in research through deception? How many people in the class have been deceived by someone they trusted?

**Polling Question: It's All over the News… Video Games Cause Children to Be Violent!**
Much controversy surrounds the culture of video gaming andits effect on our youth. Over the past several years, video games have become increasingly more graphic, dramatic, and some would say violent. As a result, how many of you have heard that video games cause children to be more violent or act aggressively? How many of you agree with the statement that "The companies that make violent video games should be held responsible if children imitate and ultimately hurt others as a result of playing their games"? Who thinks people are misunderstanding what the word *causation* means when they are talking about explaining childhood aggression and video game playing? In this discussion, illustrating very clear points, students will have a more applicable understanding of the uses and misuses of causation and correlation terminology.

## SUGGESTED MEDIA

*Endless Questions: Critical Thinking and Research.* Insight Media, 2006, 30:00.
This film examines the various types of research methods in psychology.

*Experimental Research Methods in Psychology*. Online Classroom, 2004, 28:00.
This video explores experimental research methods used in psychology.

*Independent variable practice worksheet:*
http://dvusd.org/cms/lib07/AZ01901092/Centricity/Domain/4763/variables_worksheet.pdf.

*Kinsey* (2004) is a racy, but good, example of surveys and interviewing techniques. The opening sequence can be shown by going to http://www.youtube.com/watch?v=e19GnyNdC48.

*McGraw-Hill Psychology Episode III – Insight into Research Methods.* https://soundcloud.com/user-250403395/episode-iii-insight-into-research-methods.

Merlot.org. https://www.merlot.org/merlot/index.htm.

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This is a useful website for resources in learning and online teaching that houses learning experiences, peer-reviewed activities, and personal collections of psychological materials.

*Research Methods in Psychology*. Insight Media, 2001, 28 minutes.
The film details the various research procedures of descriptive, correlational, and experimental studies.

*Research Methods: From Question to Conclusion,* Annenberg Learning Series Videos Discovering Psychology: Updated Edition (2013).
http://www.learner.org/series/discoveringpsychology/methods/index.html

*Research Methods.* http://www.youtube.com/watch?v=kyOlUekJmUA.
This clip, part of the "Headless Professor" series, explains introspection, case studies, surveys, and experiments.

*Sybil* (1976) is a great example of a case study.

*The Jane Goodall Institute.* http://www.janegoodall.org/.

A great video from Annenberg with Phil Zimbardo, former president of the APA, discussing research methods in psychology: Part 1, http://www.youtube.com/watch?v=PrlI9oErJJg; Part 2, http://www.youtube.com/watch?v=5KoRfdC11-o&feature=related; and Part 3, http://www.youtube.com/watch?v=zIpDPrbRiBo&feature=related.

*This Scientific American Frontiers* episode features the ways in which placebo effects can bias research on treatment effectiveness: http://www.chedd-angier.com/frontiers/season13.html.

## ADDITIONAL READINGS

Madson, L. (2005). Demonstrating the importance of question wording on surveys. *Teaching of Psychology, 32*, 40–43.

Martin, D.W. (2000). *Doing Psychology Experiments* (5th ed.). Belmont, CA: Wadsworth/Thomson Learning.

## MODULE 6: CRITICAL RESEARCH ISSUES

### LEARNING OBJECTIVES

6–1 What major issues confront psychologists conducting research?

### THE ETHICS OF RESEARCH

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Because research has the potential to violate the rights of participants, psychologists are expected to adhere to a strict set of ethical guidelines aimed at protecting participants. Those guidelines involve the following safeguards:

- Protection of participants from physical and mental harm.
- The right of participants to privacy regarding their behavior.
- The assurance that participation in research is completely voluntary.
- The necessity of informing participants about the nature of procedures before their participation in the experiment.
- All experiments must be reviewed by an independent panel before being conducted.

One of psychologists' key ethical principles is **informed consent**. Before participating in an experiment, the participants must sign a document affirming that they have been told the basic outlines of the study and are aware of what their participation will involve, what risks the experiment may hold, and the fact that their participation is purely voluntary and they may terminate it at any time.

Furthermore, after participation in a study, participants must be given a debriefing in which they receive an explanation of the study and the procedures that were involved.

## EXPLORING DIVERSITY: CHOOSING PARTICIPANTS WHO REPRESENT THE SCOPE OF HUMAN BEHAVIOR

When Latané and Darley, both college professors, decided who would participate in their experiment, they turned to the people at hand: college students. Using college students as participants has both advantages and drawbacks. The big benefit is that because most research occurs in university settings, college students are readily available. The problem is that college students may not represent the general population adequately. In fact, undergraduate research participants are typically a special group of people: relative to the general population, college students tend to be from **W**estern, **e**ducated, **i**ndustrialized, **r**ich, and **d**emocratic cultures (WEIRD).

Because psychology is a science whose goal is to explain all human behavior generally, its studies must use participants who are fully representative of the general population in terms of gender, age, race, ethnicity, socioeconomic status, and educational level. See **Neuroscience in Your Life: The Importance of Using Representative Participants** in the text for an example.

## APPLYING PSYCHOLOGY IN THE 21ST CENTURY: FINDING RESEARCH PARTICIPANTS ON FACEBOOK

Facebook is a good recruitment tool because it provides researchers with access to a large sample (over 2 billion people) from diverse backgrounds. It is a cost-effective recruitment tool as well and relies on snowball sampling, whereby initial participants share the study with their friends and recruit more

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participants. There are potential limitations with the data collected via Facebook, including concerns that participants may be inaccurate in their responses and that the ethical guidelines for protecting data are unclear.

## SHOULD ANIMALS BE USED IN RESEARCH?

Researchers who use nonhuman animals in experiments have their own set of exacting guidelines to ensure that the animals do not suffer. Specifically, researchers must make every effort to minimize discomfort, illness, and pain. Procedures that subject animals to distress are permitted only when an alternative procedure is unavailable and when the research is justified by its prospective value. Psychological research that employs nonhumans is designed to answer questions different from those posed in research with humans.

## THREATS TO EXPERIMENTAL VALIDITY: AVOIDING EXPERIMENTAL BIAS

Even the best-laid experimental plans are susceptible to **experimental bias**—factors that distort the way the independent variable affects the dependent variable in an experiment. One of the most common forms of experimental bias is experimenter expectations, when an experimenter unintentionally transmits cues to participants about the way the experimenter expects them to behave.

A related problem is participant expectations about appropriate behavior. If participants form their own hypotheses and then act on their hunches, it may be their expectations, rather than the experimental manipulation, that produce the results. To guard against participant expectations biasing the results of an experiment, the experimenter may try to disguise the true purpose of the experiment.

Sometimes it is impossible to hide the actual purpose of research. To solve this problem, psychologists typically use a procedure in which all the participants receive a treatment, but those in the control group receive only a **placebo**— a false treatment, such as a pill, "drug," or other substance that has no significant chemical properties or active ingredient.

To overcome the possibility that experimenter expectations will affect the participant, the researcher can use the double-blind procedure. By keeping both the participant and the experimenter who interacts with the participant "blind" to the nature of the treatment that is being administered, researchers can more accurately assess the effects of the treatment.

## BECOMING AN INFORMED CONSUMER OF PSYCHOLOGY: THINKING CRITICALLY ABOUT RESEARCH

Because the field of psychology is based on an accumulated body of research, we must scrutinize thoroughly the methods, results, and claims of researchers. Several basic questions can help us sort through what is valid and what is not. Among the most important questions to ask are these:

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- What was the purpose of the research?
- How well was the study conducted?
- Are the results presented fairly?

## KEY TERMS

**experimental bias** Factors that distort how the independent variable affects the dependent variable in an experiment.

**informed consent** A document signed by participants affirming that they have been told the basic outlines of the study and are aware of what their participation will involve.

**placebo** A false treatment, such as a pill, "drug," or other substance, without any significant chemical properties or active ingredient.

## LECTURE IDEAS

### ETHICAL CONCERNS

Enhance this part of the lecture by presenting a brief history and synopsis of the Ethical Principles of Psychologists and Code of Conduct (http://www.apa.org/ethics/code/).

Be sure to differentiate clearly between the need to protect participants from undue risk, the need to inform participants in advance regarding what will take place when they complete the research, and the need to maintain the scientific integrity of the research. For example, if Bibb Latané and John Darley (1970) had informed participants of exactly what would transpire in the study on diffusion of responsibility and the bystander effect, their results would not necessarily have provided them with valid results because participants would have known that they were expected to help (this issue relates also to participant expectations). Another topic of interest to students is that of withholding psychological services in the interests of maintaining the integrity of the experimental design.

### EXPERIMENTAL BIAS

Cite specific problems associated with experimental bias in psychological research, distinguishing between bias due to experimenter expectations and bias due to participant expectations. Placebos can be used to minimize the effects of participant expectation, particularly when used in a double-blind procedure. However, placebos can sometimes lead to improvement due to the "placebo effect" (see http://www.nytimes.com/2010/05/04/opinion/04judson.html for an excellent discussion of this issue). Raise the issue of why deception is needed and how best to handle the balance between informed consent and the need to minimize bias.

## CLASSROOM ACTIVITIES AND STUDENT ASSIGNMENTS

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**HANDOUT 8: Ethical Dilemmas:** Use *Handout B: Ethical Dilemmas* as a way for students to think about ethical considerations when conducting research. This activity gives students research scenarios that deal with ethical concerns. Questions regarding their own ethical considerations follow each scenario.

**Ethics on the Web:** In class, use the APA website and review some of the ethical guidelines that are listed. Explore the guidelines and discuss why ethical conduct is so important in psychology and in research in general.

### EXPERIMENTAL BIAS

**Have students volunteer to be participants in a psychological experiment.**
After they have completed their participation, ask them to answer these questions:

- Did you know what the hypothesis was in this study?
- If so, how do you think your performance was affected by this knowledge? If not, how might your performance have been affected by this knowledge?

### ETHICAL PRINCIPLES

Go to the APA website and look up the Ethical Principles of Psychologists and Code of Conduct: http://www.apa.org/ethics/code/.

**Choose three of the principles and answer the following questions:**

- Why do you think this principle is important?
- What difficulties might psychologists encounter when applying this principle?
- Describe a real-life situation in which this principle might be used.

## DISCUSSION QUESTIONS

Do you think psychological research has really controlled for ethnic bias and overcome the problems of ethnicity in research?

Why do you think some individuals are more comfortable with animal testing on rats but uncomfortable with animal tests on dogs?

Ask students to stand up if they believe research on animals is unethical; have them move to stand on the left side of the room. If they believe that it is ethical, have them stand on the right side. If they are unsure, they can stay in the middle. Have the left and right sides discuss their perspectives, and then ask people to move to the part of the room that now represents their stance. Generally, many students will shift views after discussion, and this will illustrate attitude change.

## POLLING QUESTIONS

**Polling Question:** Do you think it is ethical to use animals in psychological research?

a) Yes

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b) No
c) It depends.

**Polling Question: Clients as Friends, We'll See?**
While many digital immigrants (i.e., older therapists) recoil at the thought of having clients as Facebook friends and too readily call it "unethical," is the answer really that simple? Knowing that the digital age is moving so fast and that access to therapy may have a technological counterpart, what do you think? How many would accept a former client as a *friend* on a social media site once therapy ended? How many think it would be acceptable for a therapist to have a professional social media site and accept friend requests there? Who has had an experience (either their own or that of someone they know) of crossing the boundary lines of ethical behavior with someone in a professional role? Lastly, how many people think it is all right for the therapist to text their clients? Let's discuss the implications of ethical behavior and its effects on others.

## SUGGESTED MEDIA

*American Psychological Association*: http://www.apa.org/research/index.aspx.
This is the official website of the APA. It discusses the ethical regulations and codes of conduct that must be followed when conducting psychological research.

*Aspects of Behavior.* CRM/McGraw-Hill, 1971, 26:00.
This video introduces the field of psychology. There are also taped interviews with noted historical psychology scholars such as Stanley Milgram and Abraham Maslow.

*Association of Psychological Science.* http://www.psychologicalscience.org.
This is the official website of the Association of Psychological Science.
*Do Scientists Cheat?* Annenberg/CPB Collection, 60 minutes.

Espisodes of the Discovery Channel's *MythBusters*, in which experiments are designed and run in an attempt to debunk common myths, can be found at: https://www.youtube.com/show/mythbusters-show.

*Reenactment of Darley and Latane's research*: http://www.youtube.com/watch?v=KE5YwN4NW5o.

*Research Ethics*. Insight Media, 2008, 21:00.
The video focuses on ethical issues in conducting and reporting research.

A great video from Annenberg with Phil Zimbardo, former president of the APA discussing research methods in psychology: Part 1, http://www.youtube.com/watch?v=PrlI9oErJJg; Part 2, http://www.youtube.com/watch?v=5KoRfdC1l-o&feature=related; and Part 3, http://www.youtube.com/watch?v=zIpDPrbRiBo&feature=related.

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*This Scientific American Frontiers* episode features the ways in which placebo effects can bias research on treatment effectiveness: http://www.chedd-angier.com/frontiers/season13.html.

Articles, Research, & Resources in Psychology: http://kspope.com/.

The site covers a broad range of subjects, including licensing laws, regulation, ethics, medication, military-related issues, suicide and sexual issues, etc. A unique feature that deserves mention is that the website is designed for people with disabilities in accordance with W3C Accessibility Guidelines.

## ADDITIONAL READINGS

American Psychological Association. (2002). Ethical principles of psychologists and code of conduct. *American Psychologist, 57*(12).

Baumrind, D. (1964). Some thoughts on ethics of research: After reading Milgram's 'Behavioral study of obedience.' *American Psychologist, 19,* 421–423.

Chastain, G., & Landrum, R. E. (1999). *Protecting Human Subjects: Departmental Subject Pools and Institutional Review Boards*. Washington, DC: American Psychological Association.

Guthrie, R. V. (2003). *Even the rat was white* (2nd ed.). Allyn-Bacon.

Latané, B., & Darley, J. M. (1970). *The unresponsive bystander: Why doesn't he help?* Prentice Hall.

Placebo effect: https://www.scientificamerican.com/podcast/episode/placebos-work-even-when-you-know-10-12-23.

Rosenthal, R. (1976). *Experimenter effects in behavioral research.* New York: Irvington Publishers.

Zimbardo, P. G. (2007). *The Lucifer effect: Understanding how good people turn evil.* New York: Random House.

## CONNECT

The following are assignable via Connect:

| Practice Quizzes | Concept Clips | Interactivities |
|---|---|---|
| • Pre-Test<br>• Reading Assignment quizzes (one per module) | • Scientific Method<br>• Hypotheses and Theories | • The Scientific Method<br>• Designing an Experiment: Dependent |

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| | | |
|---|---|---|
| • Post-Test<br>• Terminology Quiz | • Independent and Dependent Variables<br>• Replication of Research<br>• Correlation | and Independent Variables<br>• Naturalistic Observation<br>• Understanding Correlations<br>• Ethical Dilemmas |
| <u>NewsFlashes</u> (these may change due to article availability)<br><br>• NewsFlash: Protoscience to Proper Science<br>• NewsFlash: The Science Reproducibility Crisis<br>• NewsFlash: Is Happiness a Warm Puppy?<br>• NewsFlash: Gender Bias in Autism Research | | **Course-wide Content**<br><br>• Psychology at Work Videos<br>• McGraw-Hill Psychology APA Documentation Guide<br>• Scientific Reasoning Exercises<br><br>Power of Process Readings (from main assignment page) |

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## HANDOUTS

### HANDOUT 1: COMMON SENSE OR FACT?

Read the following statements and determine if they are true or false. Write the letter T in the space provided if you believe the statement is true and the letter F if you believe the statement is false.

1. _____ People dream on average around five or six times a night.

2. _____ Dogs dream.

3. _____ Psychiatrists attend the same medical school as did your family physician or a surgeon.

4. _____ Psychology originally stemmed from the area of biology.

5. _____ You are more likely to receive help if there are two people around than if there are 20 people around.

6. _____ You would value receiving $10 for helping a neighbor clean out his garage more than getting $10 for doing nothing.

7. _____ Adults in their sixties start to decline in their interest in sex.

8. _____ Psychology is all about making people feel better.

9. _____ Living together before marriage will result in a better marriage.

10. _____ Intelligence is inherited.

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## HANDOUT 2: METHODS OF RESEARCH

NOTE TO INSTRUCTOR: Edit out the correct answers before distributing to students.

Research, systematic inquiry aimed at the discovery of new knowledge, is a central ingredient of the scientific method in psychology. It provides the key to understanding the degree to which hypotheses (and the theories behind them) are accurate. Just as we can apply different theories and hypotheses to explain the same phenomena, we can use a number of alternative methods to conduct research.

In this exercise, you will learn more about several methods of research that psychologists use to gain new knowledge about human behavior.

1. You are conducting research on gender differences in e-mails. Your hypothesis is that men use more declarative statements and women use more questions. Answer each of the following questions:

What might be the advantages of using the archival method?

[Answers: A large amount of available data; inexpensive.]

What might be the disadvantages of using the archival method?

[Answers: Difficulty of organizing the information; Not all e-mails contain punctuation.]

2. Now imagine that you are conducting research on the length of time it takes customers to select items in a grocery store. Assume that your hypothesis is that people will spend more time deciding on more expensive items than on cheaper items.

What might be the advantages of using naturalistic observation?

[Answers: People are completing the behavior in a naturalistic setting rather than a laboratory; The data will be easily scored.]

What might be the disadvantages of using naturalistic observation?

[Answers: People might act differently if they know they are being watched; It is not possible to control the choices that people make.]

3. You have decided to conduct a survey on whether a political candidate will be popular with Latino voters.

What is an advantage of the survey method?

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[Answers: Those who are surveyed can be followed up with more detailed questions if necessary; Can use a small sample to predict how a population would respond.]

What is a disadvantage of the survey method?

[Answers: People may alter their answers to provide responses that they think the experimenter wishes to get; Question wording is very important to avoid bias.]

4. You have decided to use the case study method to investigate a mother's experience in raising a child with autism.

What is an advantage of the case study method?

[Answers: In-depth understanding of a few unusual or important instances; Gain insights into complex human problems.]

What is a disadvantage of the case study method?

[Answers: Possibility of collecting data that cannot be analyzed; Inability to draw cause-and-effect conclusions.]

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## HANDOUT 3: CORRELATIONAL RESEARCH

NOTE TO INSTRUCTOR: Edit out the correct answers before distributing to students.

**Correlation and Causation**

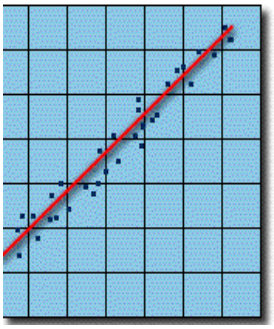
In correlational research, the relationship between two sets of variables is examined to determine whether they are associated, or correlated. When we find that two variables are strongly correlated with one another, it is tempting to presume that one variable causes the other. The mere fact that two variables occur together does not mean that one causes the other. It is impossible to determine which variable is the "cause" and which is the "result." In addition, there may be a third variable not accounted for that is responsible for the correlation. This principle is known as "correlation is not causation."

In this activity, you will have the chance to learn for yourself about the problems involved in making conclusions about causality in correlational research.

Part 1

GRAPH A:

Here is the correlation between amount of stress hormones in the blood and the ratings by participants of how much stress they are feeling.



*x* axis= Stress hormones

*y* axis= Perceived stress levels

Is this correlation positive, negative, or zero?

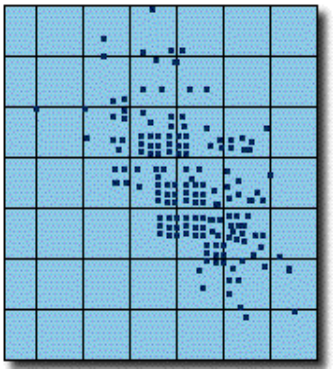
[Answer: Positive]

GRAPH B:

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Here is the correlation between number of action movies seen in the last 12 months and a personality trait called “fear of arousal.”



*x* axis: Number of action movies

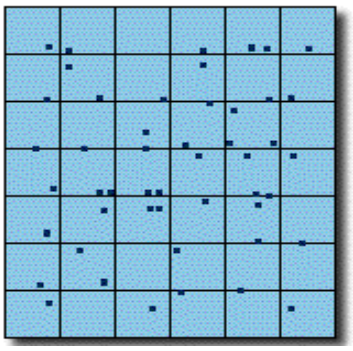
*y* axis: Arousal personality trait

Is this correlation positive, negative, or zero?

[Answer: Negative.]

GRAPH C:

Here is the correlation between intelligence and enjoyment of popular music.



*x* axis: Intelligence

*y* axis: Enjoyment of pop music

Is this correlation positive, negative, or zero?

[Answer: Zero.]

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Out of the three graphs you just saw, which one showed the STRONGEST (closest to 1) relationship?

[Answer: Graph A]

Part 2

Now that you have learned the basics of correlational studies, let's go on to examine ways of interpreting the results of this type of research.

Dr. Robert Denver is conducting a study examining the relationship between Internet surfing and self-esteem by using a telephone survey of 50 people selected randomly from all over the country. He hypothesizes that Internet surfing can harm a person's self-esteem. Each participant completed a survey involving 10 questions on self-esteem, a question asking for the number of hours per week spent surfing the Internet, and other questions asking for age, occupation, education, salary, and attitudes toward a variety of current issues. He finds that Internet surfing is negatively correlated with self-esteem.

Dr. Denver is excited about his findings and contacts his colleague, Dr. Gilligan, to let him know.

Here's what he writes:

Dear Dr. Gilligan,

As you can see from the attached file of my data, I have shown that people who spend many hours on the Internet each day are more likely to have low self-esteem than those who spend a little time on the Internet. This study proves that, as we have long suspected, the Internet is psychologically harmful. People should try not to use it because if they do, they will have lower self-esteem. I expect to publish these findings very soon in the Journal of the Society of Scientists (J-SOS).

Thank you for your attention.

Sincerely,

Dr. Robert Denver

Dr. Gilligan writes back:

Dear Dr. Denver,

I have looked over your data, but unfortunately, I see that there is a serious problem with your conclusions. It would be best if you would take a more careful look at your findings before you try to publish them, especially in such a well-respected journal as the J-SOS.

Best regards,

Dr. William Gilligan

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Clearly, Dr. Denver has made a serious error that caused Dr. Gilligan to warn him not to try to publish the findings. What was that error?

[Answer: Trying to show any type of cause and effect.]

Dr. Denver made the classic error of failing to realize that correlation does not equal causation. His study cannot show cause and effect. Check off below all the possible interpretations of Dr. Denver's findings:

[Answers: Each is a possible interpretation.]

_ Internet surfing caused low self-esteem (Dr. Denver's conclusion).

_ Low self-esteem caused Internet surfing.

_ A third factor caused people to engage in Internet surfing and to have low self-esteem.

_ Men were more likely to engage in Internet surfing and have lower self-esteem.

_ Women were more likely to engage in Internet surfing and have lower self-esteem.

_ People without jobs were more likely to have low self-esteem and engage in Internet surfing.

_ People with few friends are likely to have low self-esteem and spend time surfing the Internet because they have fewer social activities.

_ Being ill could lead people to have low self-esteem due to feeling unwell and to have more time to surf the Internet.

_ Living alone could cause people to have low self-esteem because they are lonely and to spend more time on the Internet.

_ People who spend a great deal of time on the Internet may be working very hard and also feel stressed, leading them to have low self-esteem.

_ Spending many hours on the Internet could lead people to realize that they are not as successful as other people and therefore to have low self-esteem.

_ People looking for better housing may spend many hours on the Internet and become frustrated that they cannot afford it, lowering their self-esteem.

_ People with lower income have lower self-esteem and are also less able to afford going out, so they spend more time on the Internet.

AS YOU CAN SEE, THERE ARE MANY POSSIBLE INTERPRETATIONS OF THE FINDINGS FROM DR. DENVER'S STUDY. FORTUNATELY, HE HAD MANY OTHER VARIABLES TO EXPLORE, ALLOWING HIM EVENTUALLY TO ELIMINATE FACTORS SUCH AS HEALTH,

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## EDUCATION, EMPLOYMENT STATUS, AND LIFESTYLE.HANDOUT 4: EXPERIMENTAL DESIGN

NOTE TO INSTRUCTOR: Edit out the correct answers before distributing to students.

The only way psychologists can establish cause-and-effect relationships through research is by carrying out an experiment. In a formal experiment, the relationship between two (or more) variables is investigated by deliberately producing a change in one variable in a situation and observing the effects of that change on other aspects of the situation. In an experiment, then, the conditions required to study a question of interest are created by an experimenter, who deliberately makes a change in those conditions in order to observe the effects of that change. The change that an experimenter deliberately produces in a situation is called the "experimental manipulation." Experimental manipulations are used to detect relationships between different variables. In this activity, you will have the chance to explore the factors involved in designing an experimental study.

You are the manager of MassChips, a manufacturing plant that produces computer chips. Your department's production has been down lately, and you want to find out how to improve it. You hire Dr. H. Thorne, a noted industrial/organizational psychologist, to help you solve this problem. Here is what he has to say:

"After looking over the situation, I can see that, obviously, you need to improve the conditions in this place! First, you have to improve the lighting. I am now going to do research that will test the hypothesis that better lighting will lead to higher productivity among your workers."

If Dr. Thorne is going to test his hypothesis that better lighting will lead to higher productivity, what should he do next?

[Answer: Design an experimental study.]

Now that he has decided to do an experiment, Dr. Thorne has to define the independent and dependent variables. If Dr. Thorne wants to improve productivity by turning up the lights, then:

What is the independent variable?

[Answer: Level of light]

What is the dependent variable?

[Answer: Productivity]

Dr. Thorne then moves on to the next phase of the experiment. He hands out cards to the workers. Half of the cards say, "Go to Room 108." The other half of the cards say, "Go to Room 109." Room 108 is brightly lit, and Room 109 has the same lighting the whole factory had before. Over the next 2 weeks, Dr. Thorne's research assistants will sit in both rooms and count the number of computer chips that each group of workers produces.

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What is the name for the group that will be working in Room 108?

[Answer: Experimental group]

What is the name of the group that will be working in Room 109?

[Answer: Control group]

The next day, Dr. Thorne's research assistants are sitting in each room, counting the chips as they come off the production line.

Two weeks later, the workers are now all working in a brightly lit environment. Dr. Thorne is holding a thick report, and he is looking pleased. Here's what he has to say:

"Well, the experiment worked! My statistics show that the experimental group (those in Room 108) were more productive than the control group (those in Room 109). However, I noticed that the control group's productivity went up as well! At least MassChips will be making a profit now. I guess I can move on to my next assignment, which I hope will be as successful as this one was!"

What can Dr. Thorne conclude about lighting and productivity?

[Answer: That lighting contributed to productivity but that there was another cause as well because the control group's productivity also went up.]

What step was important for Dr. Thorne to take in order to ensure that there were no preexisting differences between the experimental and control groups that would have influenced the results of the experiment?

[Answer: Random assignment to conditions]

What Dr. H. Thorne did not know is that simply by observing the workers, their productivity would improve, as was seen by the improved performance of workers in Room 109 (the control room). In fact, the "Hawthorne effect," named after the Hawthorne plant of Western Electric, was demonstrated in a series of studies conducted by researchers from Harvard Business School. Production increased not as a consequence of actual changes in working conditions introduced by the plant's management but because management demonstrated interest in the improvements. In the case of this experiment, having observers watch both groups of workers also added to the effect. The Hawthorne effect is now one of the known risks of research involving live observations to obtain measures. However, this study also was considered the first in the rapidly growing field of industrial-organizational psychology.

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## HANDOUT 5: OPERATIONAL DEFINITIONS

Read the abstracts below from various journal articles, and then state in the space provided the study's operational definition.

1. The present study examined the relationships of masculinity and femininity with concession in an experimental collaborative eyewitness testimony task, using the MORI technique. Participants formed same-sex or mixed-sex pairs and watched a videotaped event. Their eyewitness memories were assessed three times: immediately after watching, after discussing the event together, and individually one week later. The participants' self-confidence in their recalled memories and percentages of concessions were also examined. The Masculinity-Humanity-Femininity Scale was administered to the participants at the end of the experiment. The results showed that masculinity negatively correlated with concession and that both masculinity and femininity were associated with inaccuracy in collaborative memory recall.

Operational Definition:

2. The present study examined the extent to which the achievement strategies deployed by adolescents and those used by their peers would predict adolescents' school adjustment, academic achievement, and problem behavior. The participants were 286 14- to 15-year-old comprehensive school students (121 boys and 165 girls) from a middle-sized town in central Sweden. The results showed that not only the maladaptive strategies used by adolescents but also those reported by their peers predicted adolescents' norm-breaking behavior, low school adjustment, and low level of achievement; high levels of failure expectations and task avoidance among adolescents' peers were positively associated with the adolescents' own norm-breaking behavior and, indirectly via this, also with their maladjustment at school and their low grades. These associations were found after controlling for the impact of the adolescents' own achievement strategies.

Operational Definition:

3. An ability to match faces with corresponding names was studied under various conditions involving encoding and retrieval. Twenty photographs of undergraduates were randomly paired with 20 common names. Experiment 1 presented photographs of 10 faces, followed by either presentation of the names alone with an instruction to write facial characteristics from memory or presentation of the photographs again with instructions to write from memory the names and anything unusual about the names themselves. Later retrieval, which was best for the former condition, proved that showing names could prime image representations of faces. Experiment 2 was a partial replication of Experiment 1, with retrieval measured over seven weeks. These results showed that memories for face-name matches lasted several weeks. Also, consistent with Experiment 1, the number of reported initial facial characteristics was highly predictive of matches between faces and names. These studies show the importance for later retrieval of forming and maintaining vivid images of faces even when the faces have no outstanding characteristics.

Operational Definition:

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4. This study examined whether certain personality characteristics are associated with susceptibility to false memories. Participants first answered questions from the Myers-Briggs Type Indicator in order to measure various personality characteristics. They then watched a video excerpt, the simulated eyewitness event. They were next encouraged to lie about the videotaped event during an interview. A week later, some participants recognized confabulated events as being from the video. Two personality characteristics in particular—the introversion–extroversion and thinking–feeling dimensions—were associated with susceptibility to false memories.

Operational Definition:

5. In the present study, three alternative causal models concerning the relationships between implicit theories of intelligence, perceived academic competence, and school achievement were tested. The direction of changes in implicit theories and perceived competence during early adolescence was also examined. A total of 187 fifth and sixth graders were tested and then retested a year later, when they were sixth and seventh graders. Cross-lagged regression analyses indicated that school achievement determined the adoption of a particular implicit theory through the mediation of perceived competence. Implicit theories were found to change toward the adoption of more incremental beliefs, and perceived academic competence declined; however, high achievers, as compared with their low- and middle-level classmates, adopted more incremental beliefs and had significantly higher perceived competence.

Operational Definition:

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## HANDOUT 6: INDEPENDENT AND DEPENDENT VARIABLES/EXPERIMENTAL AND CONTROL GROUPS

Read the statements below and then identify what the independent and dependent variable is, and determine who the experimental group is and who the control group is.

1. Participants taking part in a sleep study to determine whether the number of hours of sleep a person gets determines how well they will do on an exam were randomly assigned to either the group that was woken up at various times throughout the night or the group that was allowed to sleep throughout the night.

Independent variable:

Dependent variable:

Experimental group:

Control group:

2. Participants took part in a study to determine the number of consumed beers it would take to affect their ability to walk in a straight line.

Independent variable:

Dependent variable:

Experimental group:

Control group:

3. Pharmaceutical Company X conducted an experiment to determine if its new migraine headache pill would alleviate migraine headaches.

Independent variable:

Dependent variable:

Experimental group:

Control group:

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4. College Y conducted an experiment to determine if freshmen who had their schedules made for them did better in their freshman year than freshmen who made up their own schedules.

Independent variable:

Dependent variable:

Experimental group:

Control group:

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## HANDOUT 7: POPULATIONS AND SAMPLES

Read the statements below. In the space provided, identify who the population is and who the sample could be. (None of the examples is factual.) In each case, it is hypothesized that:

1. There is a higher rate of teenage pregnancy in single-parent households than in two-parent households.

Population:

Sample:

2. There is more school violence in inner-city schools than in suburban schools.

Population:

Sample:

3. Infants born prematurely make better grades in high school than infants not born prematurely.

Population:

Sample:

4. College freshmen drink more alcoholic beverages than do college seniors.

Population:

Sample:

5. Students who started their education at a community college are more likely to graduate than students who started their education at a four-year college.

Population:

Sample:

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## HANDOUT 8: ETHICAL DILEMMAS

Read the following scenarios and answer the reflection questions that follow.

1. Jennifer and Bethany have both recently declared psychology as their majors. One evening as they are looking over their required courses, they start talking.

   *Jennifer:* "I don't see why we have to learn statistics and research methods! I am never going to use them anyway. I want to be a counselor, and I am just going to deal with each person as an individual. Science treats everyone as if they are interchangeable and totally predictable. In fact, I think people would be better counselors and teachers and social workers if they didn't take research classes at all because then they would treat everyone as individuals, not clones."

   *Bethany*: "People are a lot more predictable than you think. Psychologists have learned so much about human behavior in the last hundred years or so using the scientific method. I really believe that if you can figure out all of the factors that are affecting someone's behavior, you can be pretty accurate in figuring out what they are going to do. I've decided that I want to be a researcher because I think I can help more people in the long run than you will as a therapist. As a researcher, I can develop programs that will help a lot of people who suffer from the same problem. A therapist can only help one person at a time, and sometimes it takes years for a person to get better."

   Reflection questions:

   a. How do Jennifer and Bethany differ in their understanding of what people are like? Who do you agree with more and why?

   b. What is ethically troubling about taking Jennifer's position to the extreme? What would happen if therapists received no training in the scientific study of human behavior?

   c. What is ethically troubling about taking Bethany's position to the extreme? What is the problem with assuming that if you can figure out all the variables (genes, environment, etc.) that you can perfectly predict people's behavior?

2. Dr. Franklin designed a treatment for panic attacks, tried it with all of her clients who suffered from panic attacks, and had great success. Over a 10-year period, Dr. Franklin treated over 100 clients, and the technique significantly reduced panic in all of her clients. The treatment consisted of the therapist (Dr. Franklin) leading the patient through a series of relaxation exercises in her office. Dr. Franklin was so excited about the success of this treatment that she decided to market it to therapists nationwide. For $33 (which is pretty reasonable for a psychological measure or technique), she sent the therapist a script of everything she said to the patient during the relaxation exercises. A lot of therapists purchased the treatment because they were very impressed with the success rate that Dr. Franklin reported. However, six months later, Dr. Franklin started to receive calls, letters, and e-mails from therapists all over the country who complained that the treatment was completely useless for their clients.

   Reflection questions:

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a. How would you explain the fact that Dr. Franklin had so much success and the other therapists experienced such failure? How would reliability analyses have helped this problem?

b. From an ethical point of view, why should Dr. Franklin have done reliability analyses before marketing her treatment program?

c. Keeping in mind that she never gave any false information to anyone who purchased her treatment program, do you think Dr. Franklin should give them a refund of their money? Why or why not?

3. Karen has been working with Dr. Tarner on a research study for the past two years. They have collected data on flavor preferences in rats and found some very impressive results. They presented their research at a conference and submitted a paper about the project to an academic journal. When the reviews of their manuscript come back from the journal, the reviewers have several questions about the data. Dr. Tarner asks Karen to look over the data and the SPSS output from the study and double-check that they did everything correctly. When Karen reviews the data, she realizes that she made a mistake in entering the data. Inadvertently, she had repeated some of the same data values twice in the data file, so it appeared there were 270 observations when there were actually 240.

   Reflection questions:

   a. Why might Karen decide not to tell Dr. Tarner about the error?

   b. What are some possible negative consequences that might result if Karen tells Dr. Tarner and they both report it to the journal editors?

   c. What are some possible negative consequences that might result if Karen tells Dr. Tarner but they agree not to report the mistake to the journal editor?

4. Beverly really wants to go to graduate school in psychology, and she has the grades to get in, but she knows that she needs to get some research experience. She begins working with Dr. Miserendino on a project in which she is observing white rats and measuring the amount of time it takes them to learn to navigate through a maze depending on whether the animal has been given a drug or a placebo. Beverly is supposed to collect data every day for six days in a row (Monday through Saturday) to see what happens as the drug gradually wears off. She collects the data Monday through Friday, but on Saturday, she isn't able to get to campus because of a family emergency. She knows from talking to Dr. Miserendino about the study that it is too expensive to repeat because both the rats themselves and the drugs are very costly. She also knows that if she tells Dr. Miserendino that she missed a day of data collection, Dr. Miserendino will be really upset. She considers making up the data just for Saturday based on the data she collected the rest of the week. She knows that Dr. Miserendino would never have to find out what happened.

   Reflection questions:

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a. Assuming Dr. Miserendino never does find out about the made-up data, what are some possible negative ethical consequences of Beverly's decision to falsify the data?

b. Why is it risky for Beverly to make up the data?

c. What would you choose to do if you were in Beverly's place? Explain.

5. As part of their class requirements, the students in Dr. Taylor's Research Design and Analysis class are sent over to Trumbull Mall to observe interactions between mothers and their toddler-aged children. They are told not to interact with the moms at all but to just record certain behaviors, such as the number of times they speak harshly to their child and the number of times the child whines or cries.

One of the mothers notices that the students are watching people and she complains to mall security. The manager of the mall asks the students where they are from, then writes a letter of complaint to Dr. Taylor. Here is an excerpt:

> "I am requesting that you do not engage in any more observational research at Trumbull Mall. I don't think it is right to allow students to observe people's behavior without getting their permission first. It is a violation of privacy, and it's wrong even if they don't realize they are being watched. People come to the mall to shop, not to be watched."

Reflection questions:

a. What are some good reasons for the manager's concerns? Explain.

b. What are some good reasons why the students should be able to do this type of research? Explain.

c. If you were in Dr. Taylor's position, how would you handle the situation?

6. A mock drill with a person trying to commit suicide is held on a busy Brooklyn street. A psychologist is observing the passersby from a distance. He wants to observe the number of people who try to stop the suicide and the people who just pass by. Which of the following issues does the scenario represent?

a. Informed consent

b. Confidentiality

c. Debriefing

d. Deception

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Reflection question:

a. Had the psychologist told people it was a mock drill and no one was committing suicide, would the result still have been the same?

7. Merriam Grey, a leading psychologist on child care and upbringing, has appointed Martha, a junior researcher, to observe 10 infants in the incubators. Martha is expected to find one common characteristic trait among the infants by observing them for a specific period and on every alternate day for two weeks. Due to a prior commitment, Martha observes the infants only for a week and makes a report about her observations. However, Martha's observations are not based on the given guidelines and she does not inform Grey about it.

Reflection questions:

a. What would be the consequences of Martha's action?

b. What are the ethical issues involved when Martha fabricates the report?

c. How would you act if you were in Martha's place?

8. Give reasons in support of OR against the following arguments.

a. Is it ethical for a boss to get her employee to pick up coffee for her every day?

b. Is it ethical for a student to provide sexual favors to a professor for better grades?

c. Is it ethical for a medical practitioner to not tell a dying patient about his condition?

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# Answer Key to Various Handouts

## HANDOUT 5: OPERATIONAL DEFINITION ANSWER KEY

Read the below abstracts from various journal articles and then state in the space provided what the operational definition is.

1. The present study examined the relationships of masculinity and femininity with concession in an experimental collaborative eyewitness testimony task, using the MORI technique. Participants formed same-sex or mixed-sex pairs and watched a videotaped event. Their eyewitness memories were assessed three times: immediately after watching, after discussing the event together, and individually one week later. The participants' self-confidence in their recalled memories and percentages of concessions were also examined. The Masculinity-Humanity-Femininity Scale was administered to the participants at the end of the experiment. The results showed that masculinity negatively correlated with concession, and that both masculinity and femininity were associated with inaccuracy in collaborative memory recall.

**OPERATIONAL DEFINITION: score on the Masculinity-Humanity-Femininity scale**

2. The present study examined the extent to which the achievement strategies deployed by adolescents and those used by their peers would predict adolescents' school adjustment, academic achievement, and problem behavior. The participants were 287 fourteen- to fifteen-year-old comprehensive school students (121 boys and 165 girls) from a middle-sized town in central Sweden. The results showed that not only the maladaptive strategies used by adolescents, but also those reported by their peers, predicted adolescents' norm-breaking behavior, low school adjustment, and low level of achievement; high levels of failure expectations and task-avoidance among adolescents' peers were positively associated with adolescents' own norm-breaking behavior, and indirectly via this, also with their maladjustment at school and low grades. These associations were found after controlling for the impact of adolescents' own achievement strategies.

**OPERATIONAL DEFINITION: grades in school**

3. The ability to match faces with corresponding names was studied under various conditions involving encoding and retrieval. Twenty photographs of undergraduates were randomly paired with 20 common names. Experiment 1 presented the photographs for 10 each, followed by either presentation of the names alone with the instruction to write facial characteristics from memory or presentation of the photographs again with instructions to write from memory the names and anything unusual about the names themselves. Later retrieval was best for the former condition and was interpreted as showing that names could prime image representations of faces. Experiment 2 was a partial replication of Experiment 1 with retrieval measured over seven weeks. These results showed that memories for face-name matches lasted several weeks. Also, consistent with Experiment 1, the number of reported initial face characteristics was highly predictive of matches between faces and names. These studies show the importance for later retrieval of forming and maintaining vivid images of faces even when the faces have no outstanding characteristics.

**OPERATIONAL DEFINITION: name retrieval**

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4. This study examined whether certain personality characteristics are associated with susceptibility to false memories. Participants first answered questions from the Myers-Briggs Type Indicator in order to measure various personality characteristics. They then watched a video excerpt, the simulated eyewitness event. They were next encouraged to lie about the videotaped event during an interview. A week later, some participants recognized confabulated events as being from the video. Two personality characteristics in particular—the introversion/extroversion and thinking/feeling dimensions—were associated with susceptibility to false memories.

**OPERATIONAL DEFINITION: MBTI scores**

5. In the present study, three alternative causal models concerning the relationships between implicit theories of intelligence, perceived academic competence, and school achievement were tested. The direction of changes in implicit theories and perceived competence during early adolescence was also examined. A total of 187 fifth and sixth graders were tested and retested a year later, when they were sixth and seventh graders, respectively. Cross-lagged regression analyses indicated that school achievement determined the adoption of a particular implicit theory through the mediation of perceived competence. Implicit theories were found to change toward the adoption of more incremental beliefs and perceived academic competence declined; however, high achievers, as compared with their low- and middle-level classmates, adopted more incremental beliefs, and had significantly higher perceived competence.

**OPERATIONAL DEFINITION: Implicit theories of intelligence operationalized as incremental beliefs; other operationalizations not clear but presumably academic achievement was operationalized as grades or GPA.**

## HANDOUT 6: INDEPENDENT AND DEPENDENT VARIABLES/EXPERIMENTAL AND CONTROL GROUPS ANSWER KEY

Read the statements below and then identify the independent and dependent variables and the experimental and control groups.

1. Participants taking part in a sleep study to determine whether the number of hours of sleep a person gets determines how well they will do on an exam were randomly assigned to either the group that was woken up at various times throughout the night or the group that was allowed to sleep throughout the night.

**Independent variable: hours of sleep**

**Dependent variable: exam performance**

**Experimental group: group that was woken up**

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**Control group: group that was allowed to sleep through the night**

2. Participants took part in a study to determine the number of consumed beers it would take to affect their ability to walk in a straight line. Subjects were randomly assigned to either a group that drank alcoholic beer or a group that drank non-alcoholic beer.

**Independent variable: number of alcoholic beers**

**Dependent variable: walking in a straight line**

**Experimental group: group given beers**

**Control group: group given non-alcoholic beer**

3. Pharmaceutical Company X conducted an experiment to determine if the new migraine headache pill would alleviate the number of migraine headaches. Subjects were randomly assigned to a group that was given the medication with the active ingredient or a group that was given a placebo pill.

**Independent variable: migraine medication**

**Dependent variable: number of migraine headaches**

**Experimental group: group given the new migraine pill**

**Control group: group given placebo pill**

4. College X conducted an experiment to determine if freshmen who had their schedules made for them achieved higher grades in their freshman year than freshmen who made their own schedules.

**Independent variable: type of schedule**

**Dependent variable: school performance as measured by higher grades**

**Experimental group: group that had schedules made for them**

**Control group: group that made their own schedules**

## HANDOUT 7: POPULATIONS AND SAMPLES ANSWER KEY

Read the statements below. In the space provided, identify who the population is and who the sample could be. (None of the examples is factual.) In each case, it is hypothesized that:

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1. There is a higher rate of teenage pregnancy in single-parent households than in two-parent households.

**Population: all female teenagers**

**Sample: random sample of female teenagers**

2. There is more school violence in inner-city schools than in suburban schools.

**Population: all inner-city and suburban schools**

**Sample: random sample of inner-city and suburban schools**

3.Infants born prematurely get better grades in high school than those infants not born prematurely.

**Population: all children**

**Sample: random sample of high school students**

4. College freshman drink more alcoholic beverages than college seniors.

**Population: all college students**

**Sample: random sample of freshmen and seniors**

5. Students who started their education at a community college are more likely to graduate than students who started their education at a four-year college.

**Population: all college students**

**Sample: Random sample of community college and four year college students**

## HANDOUT 8: ETHICAL DILEMMAS ANSWER KEY

Read the following scenarios and answer the reflection questions that follow.

1. Jennifer and Bethany have both recently declared psychology as their majors. One evening as they are looking over their required courses, they start talking.

*Jennifer*: "I don't see why we have to learn statistics and research methods! I am never going to use them anyway. I want to be a counselor, and I am just going to deal with each person as an individual. Science treats everyone as if they are interchangeable and totally predictable. In fact, I

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think people would be better counselors and teachers and social workers if they didn't take research classes at all because then they would treat everyone as individuals, not clones."

*Bethany*: "People are a lot more predictable than you think. Psychologists have learned so much about human behavior in the last hundred years or so using the scientific method. I really believe that if you can figure out all of the factors that are affecting someone's behavior, you can be pretty accurate in figuring out what they are going to do. I've decided that I want to be a researcher because I think I can help more people in the long run than you will as a therapist. As a researcher, I can develop programs that will help a lot of people who suffer from the same problem. A therapist can only help one person at a time, and sometimes it takes years for a person to get better."

Reflection questions:

a. How do Jennifer and Bethany differ in their understanding of what people are like? Who do you agree with more and why?

   **Jennifer does not understand that psychology is a science and requires the application of the scientific method.**

b. What is ethically troubling about taking Jennifer's position to the extreme? What would happen if therapists received no training in the scientific study of human behavior?

   **By not understanding the research on the treatment methods that are most effective, Jennifer could use the wrong treatments.**

c. What is ethically troubling about taking Bethany's position to the extreme? What is the problem with assuming that if you can figure out all the variables (genes, environment, etc.) that you can perfectly predict people's behavior?

   **Psychological research must eventually be taken back to the individual to ensure that it makes sense and is feasible. A researcher has control over many variables, whereas a counselor does not.**

2. Dr. Franklin designed a treatment for panic attacks, tried it with all of her clients who suffered from panic attacks, and had great success. Over a 10-year period, Dr. Franklin treated over 100 clients, and the technique significantly reduced panic in all of her clients. The treatment consisted of the therapist (Dr. Franklin) leading the patient through a series of relaxation exercises in her office. Dr. Franklin was so excited about the success of this treatment that she decided to market it to therapists nationwide. For $33 (which is pretty reasonable for a psychological measure or technique), she sent the therapist a script of everything she said to the patient during the relaxation exercises. A lot of therapists purchased the treatment because they were very impressed with the success rate that Dr. Franklin reported. However, six months later, Dr. Franklin started to receive calls, letters, and e-mails from therapists all over the country who complained that the treatment was completely useless for their clients.

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Reflection questions:

a. How would you explain the fact that Dr. Franklin had so much success and the other therapists experienced such failure? How would reliability analyses have helped this problem?

**Multiple therapists should administer the treatment before drawing conclusions.**

b. From an ethical point of view, why should Dr. Franklin have done reliability analyses before marketing her treatment program?

**Conclusions were potentially misleading.**

c. Keeping in mind that she never gave any false information to anyone who purchased her treatment program, do you think Dr. Franklin should give them a refund of their money? Why or why not?

**Answers vary.**

3. Karen has been working with Dr. Tarner on a research study for the past two years. They have collected data on flavor preferences in rats and found some very impressive results. They presented their research at a conference and submitted a paper about the project to an academic journal. When the reviews of their manuscript come back from the journal, the reviewers have several questions about the data. Dr. Tarner asks Karen to look over the data and the SPSS output from the study and double-check that they did everything correctly. When Karen reviews the data, she realizes that she made a mistake in entering the data. Inadvertently, she had repeated some of the same data values twice in the data file, so it appeared there were 270 observations when there were actually 240.

Reflection questions:

a. Why might Karen decide not to tell Dr. Tarner about the error?

**Karen is afraid, or the results don't change.**

b. What are some possible negative consequences that might result if Karen tells Dr. Tarner and they both report it to the journal editors?

**The paper might not be published.**

c. What are some possible negative consequences that might result if Karen tells Dr. Tarner but they agree not to report the mistake to the journal editor?

**The conclusions drawn from the data could be misleading and even false.**

4. Beverly really wants to go to graduate school in psychology, and she has the grades to get in, but she knows that she needs to get some research experience. She begins working with Dr. Miserendino on a project in which she is observing white rats and measuring the amount of time it takes them to learn to

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navigate through a maze depending on whether the animal has been given a drug or a placebo. Beverly is supposed to collect data every day for six days in a row (Monday through Saturday) to see what happens as the drug gradually wears off. She collects the data Monday through Friday, but on Saturday, she isn't able to get to campus because of a family emergency. She knows from talking to Dr. Miserendino about the study that it is too expensive to repeat because both the rats themselves and the drugs are very costly. She also knows that if she tells Dr. Miserendino that she missed a day of data collection, Dr. Miserendino will be really upset. She considers making up the data just for Saturday based on the data she collected the rest of the week. She knows that Dr. Miserendino would never have to find out what happened.

Reflection questions:

a. Assuming Dr. Miserendino never does find out about the made-up data, what are some possible negative ethical consequences of Beverly's decision to falsify the data?

   **Incorrect conclusions will be drawn from the data thereby compromising the scientific process.**

b. Why is it risky for Beverly to make up the data?

   **Incorrect conclusions will be drawn from the data thereby compromising the scientific process.**

c. What would you choose to do if you were in Beverly's place? Explain.

   **The only correct answer is to admit to the researcher your error.**

5. As part of their class requirements, the students in Dr. Taylor's Research Design and Analysis class are sent over to Trumbull Mall to observe interactions between mothers and their toddler-aged children. They are told not to interact with the moms at all but to just record certain behaviors, such as the number of times they speak harshly to their child and the number of times the child whines or cries.

One of the mothers notices that the students are watching people and she complains to mall security. The manager of the mall asks the students where they are from, then writes a letter of complaint to Dr. Taylor. Here is an excerpt:

> "I am requesting that you do not engage in any more observational research at Trumbull Mall. I don't think it is right to allow students to observe people's behavior without getting their permission first. It is a violation of privacy and it's wrong even if they don't realize they are being watched. People come to the mall to shop, not to be watched."

Reflection questions:

a. What are some good reasons for the manager's concerns? Explain.

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**Participants did not give informed consent.**

b. What are some good reasons why the students should be able to do this type of research? Explain.

**Participants were in public; participants' routine was not altered by the students; there were no risks.**

c. If you were in Dr. Taylor's position, how would you handle the situation?

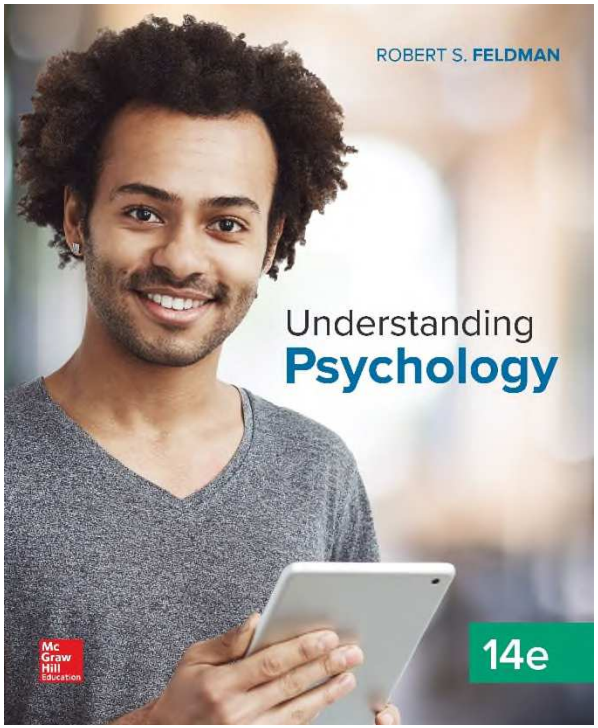
**Researchers should seek permission from an owner/manager when they wish to collect data in public.**

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Robert S. Feldman | Fourteenth Edition

# Understanding Psychology




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# Chapter 2
# Psychological Research

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# MODULE 4 - The Scientific Method

What is the scientific method?

What role do theories and hypotheses play in psychological research?

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# Scientific Method

Approach through which psychologists systematically acquire knowledge and understanding about behavior and other phenomena of interest

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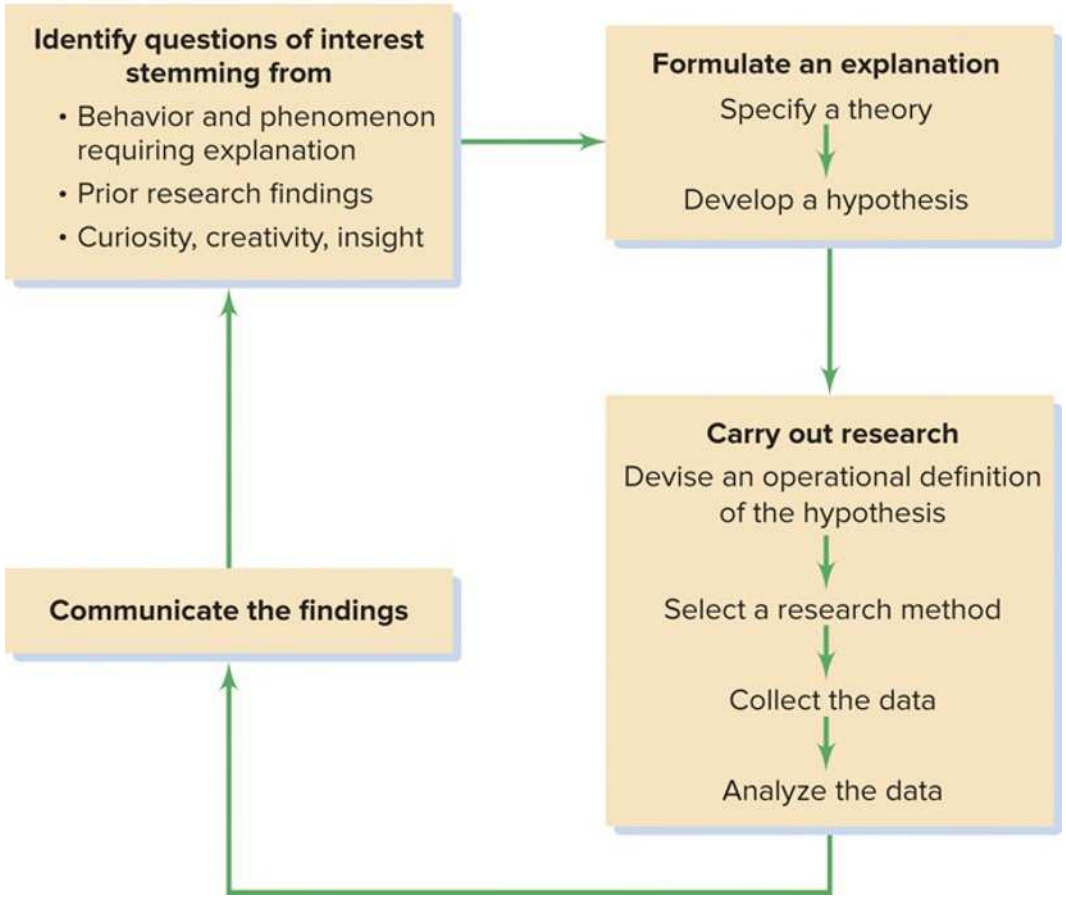



Figure 1 - The Scientific Method

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# Theories

Broad explanations and predictions concerning phenomena of interest

- Provide a framework for understanding the relationships among a set of unorganized facts or principles
- Example: diffusion of responsibility
  - With more bystanders in an emergency situation, the smaller the share of the responsibility each person feels
  - Developed by Bibb Latané and John Darley

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# Hypotheses: Crafting Testable Predictions (1)

**Hypothesis**: A prediction, stemming from a theory, stated in a way that allows it to be tested

**Operational definition**: Translation of a hypothesis into specific, testable procedures that can be measured and observed

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# Hypotheses: Crafting Testable Predictions (2)

Psychologists rely on formal theories and hypotheses for many reasons

- Permits them to place bits of observations within a coherent framework
- Help psychologists to make deductions about unexplained phenomena
- Develop ideas for future investigation

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# MODULE 5 - Conducting Psychological Research

What research methods do psychologists use?

How do psychologists establish cause-and-effect relationships in research studies?

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# Introduction

Research

- Systematic inquiry aimed at the discovery of new knowledge
- Key to understanding the accuracy of hypotheses and theories

Descriptive research

- Systematic investigation of a person, group, or pattern of behavior
- Several types of descriptive research

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# Archival Research

Existing data are examined to test a hypothesis

- Census documents
- College records
- Online databases
- Newspaper clippings

Advantage - Inexpensive

Disadvantage - Problems with using existing data

- Data may not be in a form that allows the researcher to test a hypothesis fully

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# Naturalistic Observation

Investigator observes some naturally occurring behavior

- Does not make a change in the situation

Advantage - Sample of what people do in their natural habitat

Disadvantage - Inability to control any factors of interest

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# Survey Research

People are asked a series of questions about their behavior, thoughts, or attitudes

Advantage – can infer how a larger group would respond, if a representative sample is surveyed

Disadvantage – results will be inconsequential if the sample is not representative

- Survey respondents may not want to admit to holding socially undesirable attitudes

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# The Case Study

In-depth, intensive investigation of an individual or a small group of people

- Often include psychological testing

Advantage – Can use insights to improve our understanding of people in general

Disadvantage – Unique individuals make it impossible for generalizations

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# Correlational Research (1)

Research in which the relationship between two sets of variables is examined to determine:

- Whether they are associated, or correlated
- **Variables**: Behaviors, events, or other characteristics that can change, or vary, in some way

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# Correlational Research (2)

Correlation coefficient – Represents the strength and direction of the relationship between two variables

- Value can range from +1.00 to −1.00
- Positive – As the value of one variable increases, so will the value of the other variable
- Negative – As the value of one variable increases, value of the other variable will decrease
- Lack of relationship – Value near 0 indicates no relationship

Disadvantage – Inability to demonstrate cause-and-effect relationships

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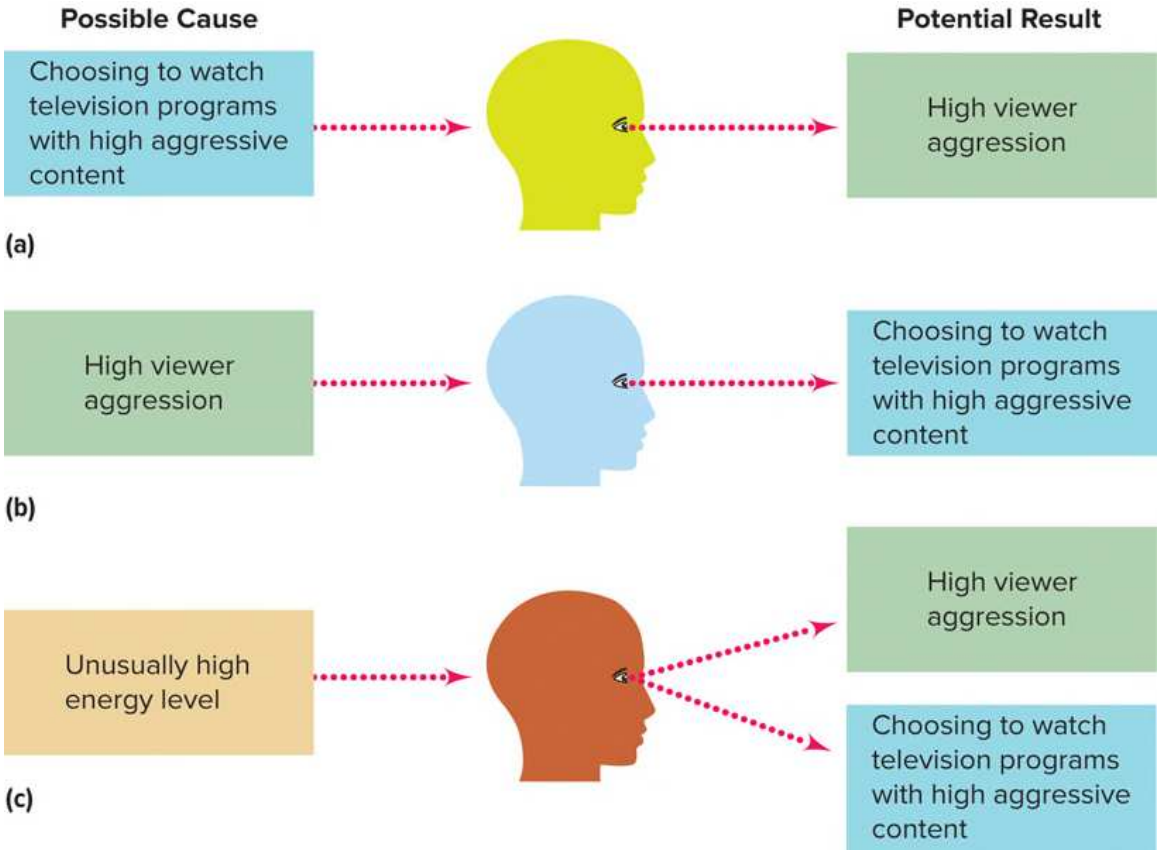



Figure 1: Aggression and TV Viewing

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# Experimental Research (1)

**Experiment**: Investigation of the relationship between two (or more) variables by:

- Producing a change in one variable in a situation and observing the effects on the second variable

**Experimental manipulation**: Change that an experimenter deliberately produces in a situation

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# Experimental Research (2)

Experimental groups and control groups

- **Treatment**
  - Manipulation implemented by the experimenter
- **Experimental group**
  - Any group participating in an experiment that receives a treatment
- **Control group**
  - Group participating in an experiment that receives no treatment

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# Experimental Research (3)

**Independent variable**: The variable that is manipulated by an experimenter

**Dependent variable**: The variable that is measured

- Expected to change as a result of changes in the independent variable
- Dependent on the actions of the research participants that are taking part in the experiment

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# Experimental Research (4)

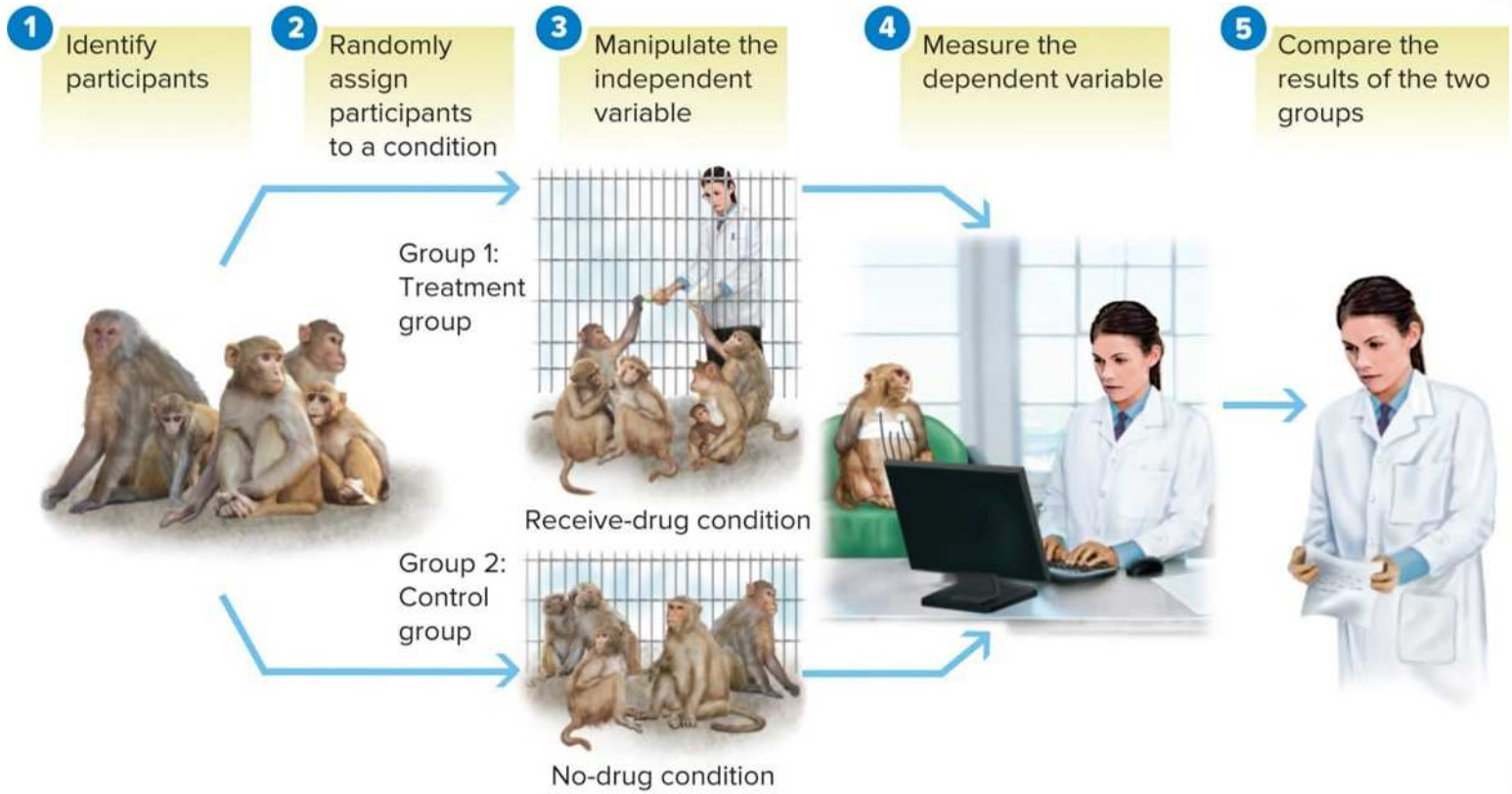
**Random assignment to condition**: Participants are assigned to different experimental groups or conditions on the basis of chance

**Significant outcome**: Statistically meaningful results

- Makes it possible for researchers to feel confident that they have confirmed their hypotheses

**Replicated research**: Research that is repeated, in other settings and with other groups of participants, to increase confidence in prior findings

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Source: Based on a study by Kaplan & Manuck, 1989.

## Figure 2: True Experiments

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# MODULE 6 - Critical Research Issues

What major issues confront psychologists conducting research?

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# The Ethics of Research (1)

## Guidelines that protect participants

- Protection of participants from physical and mental harm
- Right of participants to privacy regarding their behavior
- Assurance that participation in research is completely voluntary
- Necessity of informing participants about the nature of procedures before their participation in the experiment
- All experiments must be reviewed by an independent panel before being conducted

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# The Ethics of Research (2)

**Informed consent**: A document signed by participants

- Affirms that they have been told about the basic outlines of the study and are aware of what their participation will involve

**Debriefing**: Participants receive an explanation of the study and the procedures that were involved

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# Should Animals Be Used in Research?

Researchers must make every effort to minimize discomfort, illness, and pain

Procedures that subject animals to distress are permitted:

- When an alternative procedure is unavailable
- When the research is justified by its prospective value

Provides greater experimental control over nonhumans

Procedures that might not be possible with people can be carried out

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# Threats to Experimental Validity: Diversity in Research Subjects

**Most research uses Intro Psych students**

- WEIRD (Western, Educated, Rich, Democratic culture)

Findings may not generalize to other types of people

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# Threats to Experimental Validity: Avoiding Experimental Bias (1)

**Experimental bias**: Factors that distort the way the independent variable affects the dependent variable

- Experimenter expectations
- Participant expectations

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# Threats to Experimental Validity: Avoiding Experimental Bias (2)

**Placebo**: A false treatment without any significant chemical properties

**Double-blind procedure**: Keeping experimenter and participant blind to the nature of the drug administered

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# Accessibility Content: Text Alternatives for Images

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# Appendix: Image Descriptions for Unsighted Students

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# Figure 1 - The Scientific Method Text Alternative

Figure 1 is flowchart consisting of four boxes with arrows pointing from each box to the next, illustrating the stages of the scientific method. At the upper left, the title of the first box is “Identify questions of interest stemming from.” The bulleted items below the title read: “Behavior and phenomenon requiring explanation,” “Prior research findings,” and “Curiosity, creativity, insight.” An arrow points to the box at the upper right, which is titled “Formulate an explanation.” Below the title the first item, “Specify a theory,” points to the second item, “Develop a hypothesis.” An arrow points to the box at the lower right, which it titled “Carry out research.” Below the title, the first item, “Devise an operational definition of the hypothesis,” which points to the second item, “Select a research method,” which points to the third item, “Collect the data,” which points to the fourth item, “Analyze the data.” An arrow points to the box at the lower left, which is titled “Communicated the Findings.” There are no items beneath the title. An arrow points back to the box at the upper left.

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# Figure 1: Aggression and TV Viewing Text Alternative

Figure 1 is a three-column, three-row chart consisting of boxed items in the left and right columns and illustrations of human heads in the center column. The chart demonstrates three plausible reasons for violent television leading to aggressive behavior. Arrows point from the boxes in the left column to the heads in the center column and from the eyes of the heads in the center column to the boxes in the right column. The left column is labeled “Possible Cause” and the right column is labeled “Potential Result.” The first row illustrates one plausible cause: The box in the left column reads “Choosing to watch television programs with high aggressive content,” which leads to the first head illustration in the center column and then the box in the right column, which reads, “High viewer aggression.” The second row illustrates another plausible cause: The box in the left column reads, “High viewer aggression,” which leads to the second head illustration in the center column and then the box in the right column, which reads,” Choosing to watch television programs with high aggressive content.” The bottom row illustrates the third plausible cause: The box in the left column reads “Unusually high energy level,” which leads to the third head illustration in the center column and then two boxes in the right column, which read, “High viewer aggression” and “Choosing to watch television programs with high aggressive content.”

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# Figure 2: True Experiments Text Alternative

Figure 2 is a chart consisting of five numbered steps in an investigative study at the top of the chart, with labeled illustrations below to demonstrate each step. The five steps are:

1) Identify participants,
2) Randomly assign participants to a condition,
3) Manipulate the independent variable,
4) Measure the dependent variable, and
5) Compare the results of the two groups. Beneath step 1 is an illustration of the participants, a group of monkeys. Beneath step 2, text explains the two assignments: Group 1 will be the treatment group and Group 2 will be the control group. Beneath step 3 are two labeled illustrations showing the manipulation of the independent variable: An illustration of a researcher handing medication to the caged monkeys is labeled “Receive-drug condition.” Beneath that illustration is another illustration of caged monkeys only, labeled “No-drug condition.” Beneath step 4 is an illustration of the researcher standing at a desk and typing data into her laptop while a monkey looks on from a chair, demonstrating the measurement of the dependent variable. Finally, beneath step 5 is an illustration of the researcher standing and looking at a printout, demonstrating the comparison of results.

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