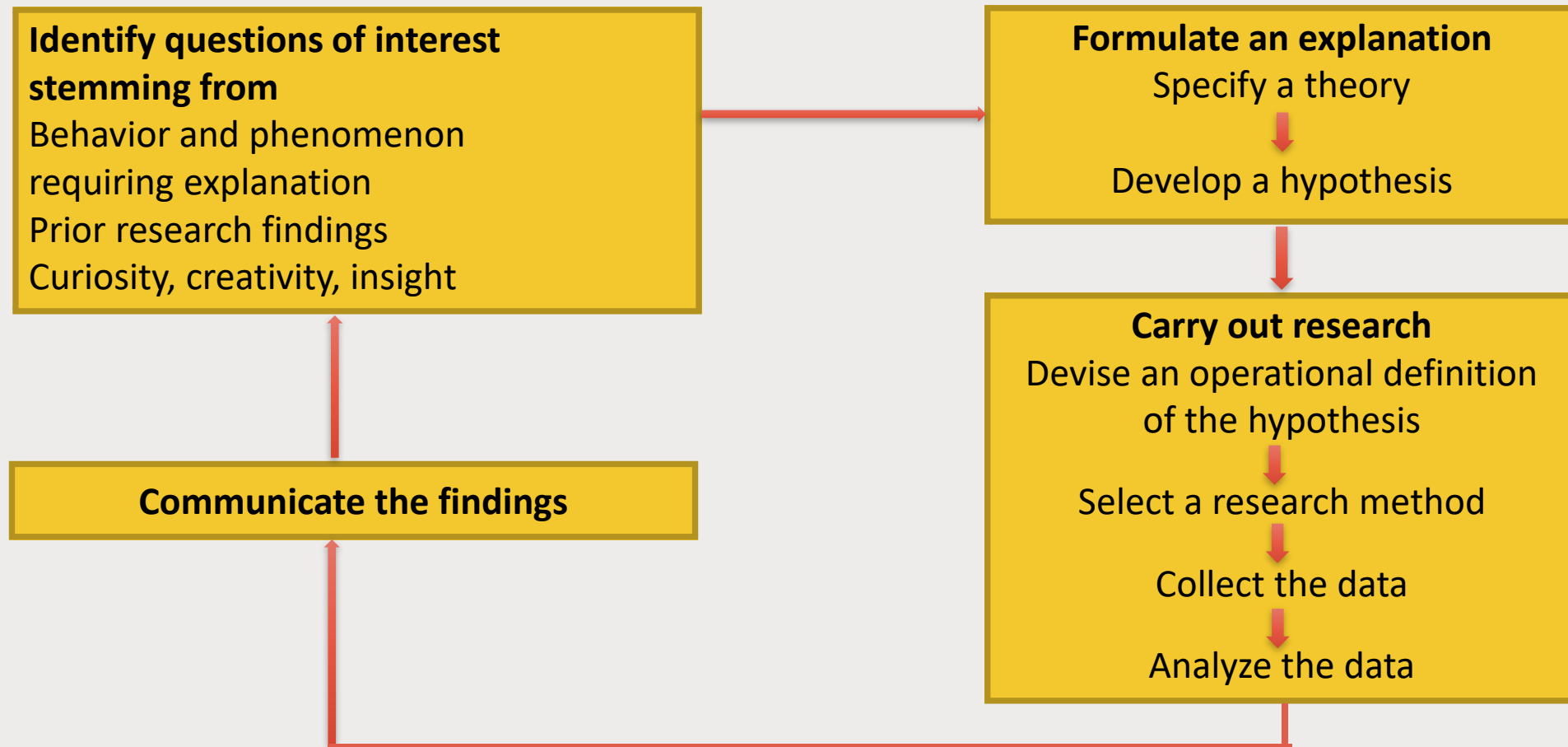


A decorative L-shaped frame made of thick, dark brown lines. One part of the frame is on the left, extending from the top to the bottom. The other part is on the right, extending from the top to the bottom. They meet at the top and bottom corners, leaving the center open for text.

# PSYCHOLOGICAL RESEARCH

# 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:



# Theories: Specifying Broad Explanations

Psychologists start by identifying questions of interest. They ask questions about the nature and causes of behavior. They may explore explanations for everyday behaviors or pose questions that build on findings from their previous research or from research carried out by other psychologists. Or they may produce new questions that are based on curiosity, creativity, or insight.

**Theories are broad explanations and predictions concerning phenomena of interest. They provide a framework for understanding the relationships among a set of otherwise unorganized facts or principles.**

Psychologists' theories are more formal and focused. theories vary both in their breadth and in their level of detail. For example, one theory might seek to explain and predict a phenomenon as broad as emotional experience. A narrower theory might attempt to explain why people display the emotion of fear nonverbally after receiving a threat.

# Hypotheses: Crafting Testable Predictions

***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.***

There is no single way to go about devising an operational definition for a hypothesis; it depends on logic, the equipment and facilities available, the psychological perspective being employed, and ultimately the creativity of the researcher. For example, one researcher might develop a hypothesis that uses as an operational definition of “fear” an increase in heart rate. In contrast, another psychologist might use as an operational definition of “fear” a written response to the question “How much fear are you experiencing at this moment?”

# Conducting Psychological Research

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.

There are several types of descriptive research designed to systematically investigate a person, group, or patterns of behavior.

# Archival Research

existing data, such as census documents, college records, online databases, and newspaper articles, are examined to test a hypothesis. For example, college transcripts may be used to determine if there are gender differences in academic performance.

Archival research is a relatively inexpensive means of testing a hypothesis because someone else has already collected the basic data.

# Naturalistic Observation

the investigator observes some naturally occurring behavior and does not make a change in the situation. For example, a researcher investigating helping behavior might observe the kind of help given to victims in a high crime area of a city. The important point to remember about naturalistic observation is that the researcher simply records what occurs, making no modification in the situation that is being observed.

Because naturalistic observation prevents researchers from making changes in a situation, they must wait until the appropriate conditions occur. Furthermore, if people know they are being watched, they may alter their reactions and produce behavior that is not truly representative.

# 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.

**Pitfalls:** 1) 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. 2) survey respondents may not want to admit to holding socially undesirable attitudes. 3) people may not want to admit they engage in behaviors that they feel are somehow abnormal 4) people may not even be consciously aware of what their true attitudes are or why they hold them.



# The Case Study

*is an in-depth, intensive investigation of a single individual or a small group.* It includes psychological testing, a procedure in which a carefully designed set of questions is used to gain some insight into the personality of the individual or group. When case studies are used as a research technique, the goal is to use the insights gained from the study of a few individuals to improve our understanding of people in general.

When case studies are used as a research technique, the goal is to use the insights gained from the study of a few individuals to improve our understanding of people in general. Sigmund Freud developed his theories through case studies of individual patients. Drawback to case studies? If the individuals examined are unique in certain ways, it is impossible to make valid generalizations to a larger population.

# Correlational Research

researchers often wish to determine the relationship between two variables. ***Variables are behaviors, events, or other characteristics that can change, or vary, in some way.*** For example, in a study to determine whether the amount of studying makes a difference in test scores, the variables would be study time and test scores. 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.

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 (or, more formally, a correlation coefficient), which can range from +1.0 to -1.0.

# Correlational Research

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. In positive correlation; Higher values of the variable “amount of study time” would be associated with higher values of the variable “test score,” and lower values of “amount of study time” would be associated with lower values of “test score.” a correlation of  $+0.85$  between test scores and amount of study time, indicating a strong positive association.

a **negative correlation** tells us that as the value of one variable increases, the value of the other decreases. More studying is associated with less partying, and less studying is associated with more partying. The stronger the association between studying and partying is, the closer the correlation will be to  $-1.0$ . A correlation of  $-0.85$  would indicate a strong negative association between partying and studying.

# Correlational Research

it's quite possible that little or no relationship exists between two variables. For instance, we would probably not expect to find a relationship between number of study hours and height. Lack of a relationship would be indicated by a correlation close to 0.

When two variables are strongly correlated with each other, we are tempted to assume that one variable causes the other. For example, if we find that more study time is associated with higher grades, we might guess that more studying causes higher grades. Instead, for instance, people who are more interested in the subject matter might study more than do those who are less interested, and so the amount of interest, not the number of hours spent studying, would predict test performance. The mere fact that two variables occur together does not mean that one causes the other.

# Experimental Research

In an **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.

Experimenters must manipulate at least one variable in order to observe the effects of the manipulation on another variable while keeping other factors in the situation constant.

# Experimental Research

Their first step was to formulate an operational definition of the hypothesis by conceptualizing it in a way that could be tested. must manipulate at least one variable in order to observe the effects of the manipulation on another variable while keeping other factors in the situation constant. However, the manipulation cannot be viewed by itself, in isolation; if a cause-and-effect relationship is to be established, the effects of the manipulation must be compared with the effects of no manipulation or a different kind of manipulation.

# Experimental Groups and Control Groups

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**.

By employing both experimental and control groups in an experiment, researchers are able to rule out the possibility that something other than the experimental manipulation produced the results observed in the experiment. Without a control group, we couldn't be sure that some other variable, such as the temperature at the time we were running the experiment, the color of the experimenter's hair, or even the mere passage of time, wasn't causing the changes observed.

# Independent and Dependent Variables

The **independent variable** is the condition that is manipulated by an experimenter. The dependent variable is the variable that is measured in a study. The **dependent variable** is expected to change as a result of 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.



# Random Assignment of Participants

*Participants are assigned to different experimental groups, or “conditions,” on the basis of chance and chance alone.* The experimenter might, for instance, flip a coin for each participant and assign a participant to one group when “heads” came up and to the other group when “tails” came up.

The advantage of this technique is that there is an equal chance that participant characteristics will be distributed across the various groups. When a researcher uses random assignment—which in practice is usually carried out using computer-generated random numbers—chances are that each of the groups will have approximately the same proportion of intelligent people, cooperative people, extroverted people, males and females, and so on.

# Basic Elements of All True Experiment

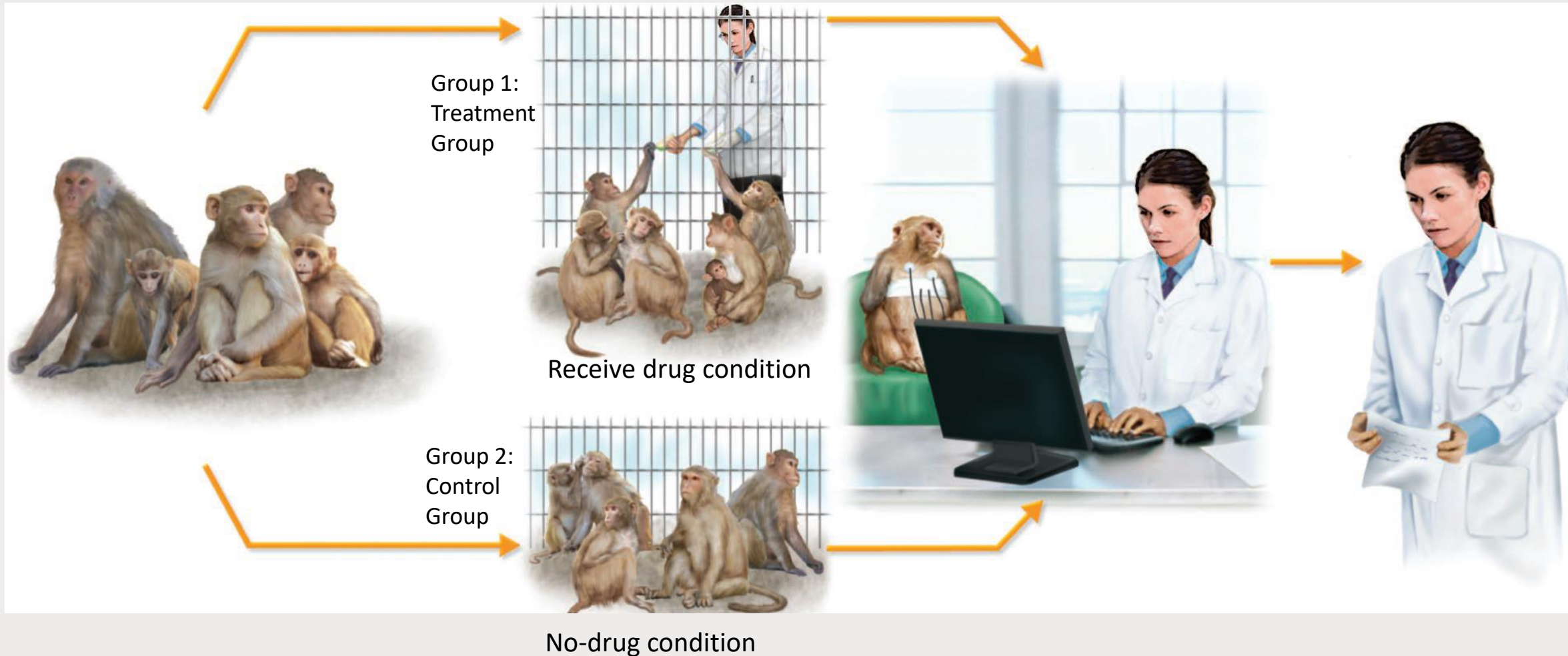
Step1: Identify participants

Step 2: Randomly assigns participant to the condition

Step3: Manipulate the independent variable

Step4: Measure the dependent variable

Step5: Compare result of the two groups



# Conditions for a True Experiment

An independent variable, the variable that is manipulated by the experimenter.

- A dependent variable, the variable that is measured by the experimenter and that is expected to change as a result of the manipulation of the independent variable.
- A procedure that randomly assigns participants to different experimental groups, or “conditions,” of the independent variable.
- A hypothesis that predicts the effect the independent variable will have on the dependent variable.

Only if each of these elements is present can a research study be considered a true experiment in which cause-and-effect relationships can be determined.

# Conditions for a True Experiment

A significant outcome indicates that the findings are statistically meaningful. Using statistical analysis, researchers can determine whether a numeric difference is a real difference or is due merely to chance. Only when differences between groups are large enough that statistical tests show them to be significant is it possible for researchers to confirm a hypothesis.

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, in which data from a large number of studies are statistically combined, yields similar general conclusions.