Student Research: A Guide to Creating Scientific Learners

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PART I. Introduction

Understanding Research

Psychology is generally classified as a social science in which the scientific method plays a central role. The study of psychology is based on empirical research, and empirical research involves the collection and analysis of data. Using the scientific method (described in Module 4), psychologists collect data to help them learn about various aspects of psychology.

To understand the role of research in psychology, it is helpful for students to participate in the research process. Through carrying out even simple research designs, students get hands-on experience that contributes to a deeper understanding of both the process of the scientific method and the content of the field of psychology. Most important, perhaps, analyzing data helps students learn to question others' assertions, as well as their own observations.

Incorporating research into the psychology classroom is easy. In all likelihood, if you have taught psychology before, you have involved your students in many aspects of the research process. This appendix has two purposes: The first is to provide basic information to guide students through research projects independently, and the second is to give you additional ways in which research may become a part of your daily curriculum. However, it is important to note that this appendix presumes that your students have already had some exposure to research design via Module4.

The first section of the appendix provides a little information about the main steps in the research process (for example, formulating a hypothesis, selecting a sample, and so forth). Although some of this information may help your students work on the projects described in the second part of the appendix, it is meant primarily to enable them to dream up, design, and execute entirely new projects. Some teachers assign students such projects as a final class project, for example. Even in the absence of such an assignment, some students become so captivated with a topic or an idea they encounter in their psychology class that they wish to pursue it further in an independent project. Hopefully, the first section of this appendix will help you guide and support your students through any such endeavors.

The second section of this guide includes at least one research activity to accompany each chapter, except Chapter 3, The Biological Bases of Behavior. All the activities are written for the audience of the researcher. You may choose sometimes to act as the researcher, using your students as assistants or participants. At other times you may prefer to reproduce the instructions for your students to carry out the research on their own. Each activity presents all the steps necessary to make the research process easy. In addition, the projects afford you the opportunity to alter and/or expand the scope of investigation in numerous ways. So, rather than feel constrained by the instructions, you may use them to help you think of additional ways to incorporate research into your curriculum.

Finding a Topic

Identifying a topic to study, especially for a long-term project, is an important decision. The best topics are ones that fully capture your interest and imagination. Although far more research has been done on some topics than on others, it is possible to do something new and exciting in any field that interests you.

Research begins with a question. *Are girls more politically active than boys? Is it more difficult for an older person to get hired for a job than a younger person? Do drug education programs in health class decrease drug use? Why are so many high school students tired so much of the time?* You need to find a question that interests you so much that you want to devote an enormous amount of time and energy to finding and understanding the answer.

Good researchers think of questions all the time. One reason for this is that we are constantly bombarded by phenomena that need explanation. Research questions can come from something you hear on the news. You can also look at what other researchers are doing. Your textbook, the *APA Monitor,* and the "Science Times" section of Tuesday's *New York Times* are good places to begin. Another approach is to go to a college library and wander through the rows of recent issues of psychology journals. Find journals that have titles that interest you and then read the contents page. When you find an article that sounds interesting, read the abstract, the summary of the article that usually appears right under the title. If you are still interested, copy the article and take it home to read.

After you have identified a topic, you need to familiarize yourself with the related work that has been done. Search online for information. Go to a college library and search for recent journal articles that deal with the topic (see the **Tips on Reading Journal Articles** below).

Once you have a good sense of what other researchers have learned about your topic, you can formulate your own hypotheses and begin to design your own study.

Tips on Reading Journal Articles

At first, you may be intimidated by the articles you find in academic psychology journals. However, they all follow the same basic format; and, after reading a few, you will become accustomed to that format. The information below will help you approach these articles with greater ease.

Abstract – Most journal articles begin with a brief overview of the study, known as the *abstract.* By reading the abstract, you can determine whether the article truly interests you. In addition, the abstract also helps give you a sense of what will follow and, therefore, will help you understand the rest of the article.

Introduction/Literature Review – Journal articles generally begin by summarizing the body of work that leads up to the study they are reporting. This section will help you gain an understanding of the context in which the research is set. It will also provide you with a wealth of other resources in the form of citations.

Method – This section lays out exactly what the researchers did and how they did it. If you wish to replicate the study, all the information you need generally appears in this section. By reading other people's method sections, you will develop a sense of how to design your own studies. Often, you will find useful materials (appropriate questionnaires, surveys, and so forth) described in this section, as well.

Results and Discussion – Here, the researchers tell you what they found (**Results**) and what it all means (**Discussion**). The Results section will be the most difficult for you to understand because it will include a lot of statistical information with which you will most likely be unfamiliar. Fortunately, the typical journal article is set up so that the findings are repeated in the Discussion section (without the mathematical formulas) and then explained. Therefore, even without being able to follow the entire Results section, you can get a good idea of what the researchers found from the Discussion.

References – The References section of an article is an often underestimated source of valuable information. Looking through the sources cited in the article can provide you with many further avenues to explore.

The next page provides a form that might help you take notes and organize your thoughts as you do your background research.

Journal Article Report Form

To facilitate your understanding, make sure to put the information you record into your own words. It is best to write in note, rather than full sentence, form.

Your Name: **Date:**

Article Citation:
(use APA format found at **www.lib.usm.edu/~instruct/guides/apa.html**)

Subjects (people on whom the study was conducted):

Procedure:

Materials:

Results:

Significance/Relevance to your topic:

Formulating a Hypothesis and Choosing a Research Design

Once you have identified a research question, you can start thinking about how to approach it. One of the first things you need to do is formulate a hypothesis. Remember, as explained in Module 4, a **hypothesis** is a testable prediction of what you expect the outcome of the research to be. Let's pretend my research question is: "What is the relationship between eating breakfast and academic performance?" This question could lead to a variety of hypotheses, such as: (1) students who eat breakfast will have higher GPAs; (2) students who eat breakfast will have lower GPAs; or (3) eating breakfast will be unrelated to GPA. So, how do you decide? That is the purpose of the background reading. Your hypothesis should follow logically from what you read in your literature search.

Another critical decision is how to test your hypothesis or, in other words, what research design to use. As you read in Module 4, psychologists generally prefer the experimental method because it is the only way that they can establish cause and effect relationships. Sometimes, however, it is difficult (sometimes even impossible) to do experiments. The breakfast research is an example of a study that would be difficult to do experimentally. To do so, you would need to control when subjects ate breakfast and what they ate over a period long enough to impact their GPAs. Therefore, in this case, you might choose to use the survey method. Other types of research designs included in this appendix are descriptive research and the *ex post facto* method, a kind of quasi-experimental design. Even after you select your general research design, many decisions remain. You must determine exactly what materials to use and what procedures to follow. Again, the background literature you read can be a fertile source of ideas, but do not feel that you have to conduct your research exactly the same way as someone else did. Designing your research should serve as an outlet for your creative spirit.

Selecting a Sample

As explained in Module 4, one of the first steps in the research process is to select a sample from a population. Although it is always preferable to select a sample randomly, (thus increasing your ability to generalize your conclusions to your population), sometimes practical concerns make it impossible to do so. Although it is important to stress the value of a random sample to your students, there is nothing wrong with engaging in simpler, "dirtier," data collections for the purpose of learning about research.

Most of the projects in this guide are set up so that you can collect data in any one of the following three ways:

1. The teacher can act as researcher and collect data from his or her classes.
2. Each student can collect data from a few subjects and the class can pool the results.
3. Students can work individually or in groups to identify a population and select a random sample to test.

The third method gives students the most work and responsibility and will allow them to generalize their findings to their population. The easiest group for high school students to use as subjects are their peers. However, your research question should dictate the population from which you draw a sample. Clearly, if you were interested in how people learn to read or how they adjust to old age, high school students would be an inappropriate group to study.

The main advantage to using students (high school age or younger) is that you can get a reasonably representative sample of the population by randomly selecting classes in school. It is, of course, easiest to use students in your own district. However, if your research question necessitates it, it is not impossible to collect data in other schools.

The main advantage to using adults as subjects is that you never need to obtain consent from their parents. Getting students to bring back the consent forms is often a sur-

prisingly frustrating aspect of the research process. The problem in using adults is that it is very difficult to get a representative sample of a larger population.

Finding/Creating an Appropriate Survey

If your research involves using surveys, the choice or production of these instruments is a critical part of the research process. In some ways, you are much better off using an instrument that already exists. Good surveys that have been designed by psychologists will be reliable and valid. **Reliability** means that the survey yields consistent results; in other words, someone who takes it several times should score about the same each time. A **valid survey** measures what it is supposed to measure; it is accurate. There are many types of reliability and validity but, in general, reliability and validity are measured by decimals and the closer the value is to 1.0, the better.

Once you know that you are interested in measuring something like self-esteem, stress, or risk aversion, you should begin to look for reliable and valid tools to use. The best way to find such instruments is to pay close attention to those described in the articles you read. Sometimes whole instruments are included in articles; other times, the place to find them is cited in the References section; another good way to get such instruments is to contact the author of the article you read and ask how to get the instrument that was used. The address of the author is usually on the first page of the article; e-mail is often the most efficient means of communication.

It is important to keep copyright issues in mind. If a survey has been copyrighted and is for sale, you may not use it unless (1) you buy the copies or (2) you get written permission from both the author and the publisher.

In the event that you cannot find an instrument to measure what you want to measure, you will need to create your own. One of the basic choices you will have to make in drafting your instrument is whether and when to use open-ended or closed-ended questions. An example of an open-ended question is "What did you eat for breakfast this morning?" It would be more difficult to solicit this information using a closed-ended question as it would involve listing all possible breakfast foods and asking people to circle the ones they consumed. Open-ended questions allow your respondents more freedom to answer as they like but, because of that, the answers are more difficult to analyze. You will decide when to use each type of question depending on your objectives and your preferences.

One common way to ask closed-ended questions is to use a Likert-type scale. An example appears below.

How likely is it that you will become an astronaut someday?

	1	2	3	4	5	6	7	
Extremely Unlikely								Extremely Likely

An advantage to using such a scale is that the responses can be analyzed easily. Such scales generally contain an odd number of answer choices so that participants may choose the middle one (a neutral response) if they wish. It is critical that the points on the scale are evenly spaced out as most of the analyses in which you will use such numbers make that assumption.

In general, it is a good idea to make the survey as easy for your participants to fill out as possible. For instance, instead of asking participants, "What race are you?" and having them write in the answer, list all the choices and allow them simply to circle the appropriate one. It is also a good idea to avoid asking questions people are probably unable to answer accurately. For instance, people probably could not tell you how many calories they consume in an average day or how many times they were yelled at as a child.

Once you draft your survey, you can pilot test it on a small group of people similar to your intended sample. Ask your pilot group for suggestions about how to make the survey clearer and more user-friendly. Once you make these alterations, you can try using your instrument (although, in truth, you will not know whether it is reliable or valid). Creating an instrument is a complicated and involved process, but that should not prevent you from making initial, imperfect attempts. In addition, feel free to modify any of the materials in this booklet if you would like to begin with adapting an instrument rather than creating one from scratch.

Control Groups

One hallmark of good, experimental research is that the researcher controls the different conditions so that the only difference between them is the independent variable. Even in nonexperimental research, however, some aspects can and should be controlled. When you design your own research, it is essential that you attempt to eliminate as many extraneous (confounding) variables as possible.

In all research, it is important that all participants have similar contact with the researcher—unless that is your independent variable. To that end, it is often helpful to script out the directions you will give in advance and simply read them to your subjects. Because of experimenter bias (the inadvertent tendency of researchers to look for evidence that confirms their initial beliefs), it is even better if you can get someone who is "blinded" to your hypothesis (does not know what your hypothesis is) to read the script for you.

To the greatest extent possible, you would like all your participants to be in equivalent environments. That way, their responses will not vary because of situation-relevant variables, such as differences in time of day or location.

Finally, in an experiment, it is crucial that you randomly assign participants to the different conditions. If subjects in the different groups differ from each other at the outset of the research, in the end you will not know whether differences between them were caused by the independent variable you were testing or these pre-existing differences. The simplest way to randomize is by drawing names out of a hat. Alternatively, many calculators and all computers can be programmed to generate a sequence of random numbers.

Ethics and the Institutional Review Board (IRB)

As explained in Module , it is essential to follow some basic ethical guidelines when conducting research. Although all studies present some risks to their participants, those discussed in this guide involve only very minor ones. Nonetheless, prior to doing experimental or survey research, you should always obtain informed consent from your participants. Keep in mind that minors are unable to give informed consent.

Therefore, if you wish to collect data from minors, you ought to obtain parental consent as well. In addition, whenever possible, the data you collect should be anonymous, which means that you should be unable to determine its source. Finally, you should always debrief your participants after the study is over, especially if the methods involved any kind of deception. The debriefing can be done verbally or be written out on a handout. It should explain the true purpose of the research to the participants and give them a way to contact the researcher if they have any questions or concerns.

Prior to collecting any data, make sure that you consider any and all risks that might be involved in your study. If your school has an IRB (an ethics committee), ask them to review your proposal before collecting data. If not, make sure to consult your teacher and any other appropriate adults (your school psychologist or an administrator, for example).

Typical examples of risks common in social science studies are

- emotional stress that might result if you ask questions people might consider embarrassing, personal, or stressful.
- invasion of privacy or risk of harm that might result from people being able to identify certain subjects' responses.
- asking participants to engage in any activity that could put them at physical risk (for example, exercise or ingesting any type of substance to which someone could have an allergy or other kind of bad reaction).

If a lot of research involving human subjects is conducted at your school and you do not have an IRB, you might want to think about setting one up. The IRB should consist of at least three adults, one of whom is a school administrator and one of whom has psychological training, such as a psychologist or psychiatrist. The teacher sponsoring the research may not be part of the IRB. More information about the federal regulations that govern IRBs at research institutions is available from the Office of Protection from Research Risks (OPRR) of the National Institutes of Health: (301) 496-7041 and http://ohrp.osophs.dhhs.gov/polasur.htm.

Data Analysis

Although many people are intimidated by the math involved in analyzing data, today's computers provide us with the ability to conduct such analyses, despite our own mathematical limitations. All the projects in the second part of this guide are designed to lend themselves to a few, simple analyses. Instructions on how to use Microsoft Excel to carry out these analyses appear at the end of the booklet. You may decide that you wish to complicate some of the designs suggested by adding additional conditions. Although such alterations may render you unable to test the data for statistical significance, you will still be able to "eyeball" the means.

You may also use the instructions in the Data Analysis Appendix at the end of the book to analyze data from other projects you design if you want to do one of the following things:

- **Chi-square test**—Compare two different groups in terms of their response on a categorical variable. A categorical or nominal variable has no numeric meaning. For instance, although I could refer to my experimental group as Group 1 and my control group as Group 2, the second group is not twice the first in any sense. If I wanted to see whether people are more likely to help a lost woman than a lost man, I would use a chi-square test. Notice that both the variables involved are categorical, *help* versus *not help* and *woman* versus *man.*
- ***t* test**—Compare the mean scores of two different groups, a categorical variable, on a *numerical* variable to see if the difference is significant. For instance, if I wanted to see whether a certain study technique would improve people's scores on a math test I would use a *t* test. The categorical variable is the two groups: *new technique* versus *old,* and the numerical variable are the scores on the math test.
- **Pearson correlation**—Examine the relationship in a sample between two different numerical variables. If I were interested in exploring the relationship between the number of hours students view television on an average day and their GPAs, I would run a correlation. In this example, both variables (hours of television watched and GPA are expressed in numbers).

There are far more statistical tests than I have mentioned here, and a wealth of information can be found in any introductory statistics book and on the Internet. You may choose either to design your studies around the type of statistics you know how to do or to design more ambitious studies and then teach yourself how to do the appropriate analyses.

Opportunities for Recognition of Student Research

Students who conduct empirical research in psychology can have the work recognized in a number of different ways. An annotated list appears below:

1. Teachers, schools, or groups of schools sometimes run research fairs that showcase student research. (For more information on high school psychology fairs, see **Appendix C** of this resource.)
2. Students can seek publication of the work in journals. In fact, one journal, the *Whitman Journal of Psychology* is dedicated to the publication of high school students' research. For more information, contact Sheryl Freedman, Walt Whitman High School, 7100 Whittier Blvd, Bethesda, MD 20817.
3. Intel sponsors two competitions. Both competitions are run by a Washington, DC–based organization called Science Service. For more information, contact them at (202) 785-2255 or check their Web site at www.sciserv.org.
   a. The Science Talent Search is open only to high school seniors competing as individuals. To enter, students send in a research paper and an application in the fall.
   b. The International Science and Engineering Fair welcomes individual and team projects from students in any high school grade. To enter, students must have won a local science and engineering fair.
4. The American Psychological Foundation (APF) and Teachers of Psychology in the Secondary Schools (TOPSS) currently run an Excellence in Student Research Competition. Students submit papers in the spring. More information is available on the TOPSS Web site at www.apa.org/ed/topss/.

PART II. Research Projects

Chapter 1 – Correlations

This exercise is intended to help students gain a better understanding of the meaning of a correlation while simultaneously enabling them to gather a very simple data set by means of a survey.

Research Question: Do people who study more earn better grades?

Method:

1. Formulate a hypothesis.
2. Select a sample.
3. Distribute the "Study Survey" that follows.

Data Analysis:

1. Compute each subject's average weekly study time: multiply the amount of time reported for studying on a typical weekday night by 4 and add this to the amount reported for studying during a typical weekend.
2. Use a Pearson correlation test (see page D-45) to calculate the correlation coefficient between hours studying and GPA.

Discussion Questions:

1. How does the actual correlation compare with your expectation?
2. What does the correlation actually mean? This question provides an opportunity to review the idea that correlation does not equal causation. Have students provide each of the three possible explanations: (1) studying causes better grades; (2) good grades cause students to study more; (3) a third factor (parental pressure, for example) causes students to study and get good grades.
3. If you were to extend this study, what other information would you want to include, and how might it affect your findings?
4. If you were to replicate this study on a different population, would you expect the same or different results, and why?

Study Survey

Directions: Please answer the following questions as accurately as possible. Do not put your name anywhere on the paper; your answers will all be anonymous.

1. How many hours do you study on a typical weekday night (Monday – Thursday)?

   _____ hours

2. How many hours do you study during a typical weekend (Friday night – Sunday night)?

   _____ hours

3. What is your approximate GPA? Please report a number (for example, 3.8 or 87) according to your school's grading system.

   _____ = numerical GPA

Chapter 2 – Development (Childhood)

This activity does not involve hypothesis testing, but rather collects data for purely descriptive purposes. Nevertheless, it is an example of empirical research because it employs a method of data collection.

Research Question: At what age do children accomplish various developmental tasks?

Method:

1. Select a sample. You may want simply to use your own students or you may choose to draw a more representative sample of your school.
2. Create a list of developmental milestones (crawled, took first steps, said first word, learned to read, and so forth).
3. Use the items on the list to develop a survey of open-ended questions to find out how old people generally were when they reached these milestones.
4. Distribute the surveys to your participants. Ask them to fill the surveys out at home, where they can solicit the help of their parents/guardians.

Data Analysis:

1. Find the mean for each of the developmental tasks.
2. It might also be interesting to examine some measures of variability, such as the range and standard deviation.

Discussion Questions:

1. How does the data collected compare with the information in your textbook?
2. This exercise calls attention to problems inherent in self-report data and retrospective reports. Ask students to explain how both may have affected the data.

Chapter 2 – Development (Adulthood and Aging)

Students often have negative stereotypes about aging and elderly people. This exercise involves the collection of data outside of class to compare the subjective well being (SWB) of teens and the elderly. SWB is a relatively recent construct intended to reflect the extent to which people are satisfied with their lives. This type of study is often called an *ex post facto* study because the independent variable (age) has been predetermined. In other words, it is impossible to assign participants to conditions (old and young). Therefore, although we can compare the two groups in terms of their scores on the dependent variable (satisfaction), we cannot know what exactly causes the difference, if there is any.

Research Question: Are elderly people more or less satisfied with their lives than teenagers?

Method:

1. Formulate a hypothesis.
2. Decide how to operationalize (define) the independent variable. How old does someone have to be to be considered "elderly"? Will teenagers be anyone between the ages of 13 and 19 or some subset of that range?
3. Select a sample. You need to decide if you want simply to compare your own students or their siblings to their grandparents or if you want to recruit a sample that is representative of a larger population.
4. Review/edit and distribute the survey on page D-15.

Data Analysis:

1. Compute the mean SWB for each group.
2. Use a *t* test (see page D-45) to see if the difference is significant.

Discussion Questions:

1. How satisfied were your subjects with their lives? Were these results what you expected?
2. What might explain why the data does or does not support the hypothesis?
3. To what else might SWB be related?
4. How might you extend your research to investigate more about the impact of aging on people's emotions?

Satisfaction with Life Scale

Directions: Below are five statements that you may agree or disagree with. Using the 1–7 scale below, indicate your agreement with each item by placing the appropriate number on the line preceding that item. Please be open and honest in your responses.

7 = **Strongly agree**
6 = **Agree**
5 = **Slightly agree**
4 = **Neither agree nor disagree**
3 = **Slightly disagree**
2 = **Disagree**
1 = **Strongly disagree**

____ In most ways my life is close to my ideal.

____ The conditions of my life are excellent.

____ I am satisfied with my life.

____ So far I have gotten the important things I want in life.

____ If I could live my life over, I would change almost nothing.

In what year were you born? _____

The Satisfaction with Life Scale was created by Ed Diener.

Chapter 4 – Optical Illusions

Some aspects of how we perceive the world seem to be innate; others are apparently learned. This study allows students to examine one possible influence on how we view a well-known illusion and invites discussion about how other illusions may be influenced by other factors.

Research Question: Do demographic variables affect how people perceive optical illusions?

Method:

1. Obtain a copy of the old woman/young woman illusion. This picture is generally used to demonstrate how the brain can interpret the same stimulus in multiple ways since it can be seen as either an old woman or a young woman. The picture can be found in many introductory psychology books and online at many sites including www.grand-illuisons.com/woman.htm.
2. Formulate a hypothesis about who might be more likely to see the old/young woman (for example, older or younger people).
3. Clearly operationalize (define) the selected variable.
4. Select a sample.
5. Create a "script" to read to the participants to limit the influence of confounding variables. For instance, students could say, "Hi, I'm _____. I'm doing a research project for my psychology class and was wondering if you could help me for a moment." People who agree would then be shown the illusion for 3 seconds and asked, "What is this a picture of?" It is important to note that many people are familiar with this illusion. People who indicate that they have seen it before should then be asked, "Which image do you see first?"

Data Analysis:

1. Compute the percentage of young and old people who see each image.
2. Run a chi-square test (see page D-46) to see if the different groups showed significantly different tendencies to see a particular image.

Discussion Questions:

1. Did your data support your hypothesis?
2. Why might the perception of certain illusions be affected by demographic variables? How might you further investigate this idea?
3. What else affects how people view illusions?

Chapter 4 – Attention

Students commonly do many other things while studying, such as watch television, listen to music, or communicate with friends via the Internet and the telephone. Although attention is finite, not all tasks require undivided attention. This experiment allows students to test the effect of a distraction on a specific type of studying. Regardless of the outcome, the project should raise questions about under what conditions people can successfully divide their attention.

Research Question: Does listening to music while studying impede learning?

Method:

1. Formulate a hypothesis.
2. Obtain or create a tape or CD that contains at least 10 minutes of continuous music with lyrics, some material to study, and a corresponding test of at least 10 questions.
3. Randomly assign participants to the Music or No Music condition.
4. Attempt to control the environments of the two groups to the greatest extent possible, including writing a script of everything you will say to the participants.
5. Give each group some relatively unfamiliar material to study. Possibilities include a chapter of your psychology book, vocabulary words in English or another language, or reading comprehension passages from a standardized test.
6. Give both groups 10 minutes to study the material.
7. In the Music group, begin playing the music at the beginning of the study period, and do not turn it off until the study time you have allotted has ended.
8. Give the test.

Data Analysis:

1. Score students' tests.
2. Find the mean score of each group.
3. Use a *t* test (see page D-45) to determine if the difference is significant.

Discussion Questions:

1. Was your hypothesis supported? What might explain your findings?
2. How might the type of music played affect the level of distraction?
3. Would listening to music be more likely to impede some types of studying than others?

Chapter 5 – Emotion

This study uses the method of naturalistic observation (see Module 4) to investigate gender differences in emotional expression.

Research Question: Do teenaged boys and girls differ in the type and degree of emotions they exhibit?

Method:

1. Identify the emotion(s) in which you are interested.
2. Formulate a hypothesis.
3. Make a list of the behaviors that will be seen as indicating the presence of the emotion. For instance, to study anger, a list might include the following behaviors: speaking or yelling in an angry tone; acts of physical aggression, such as kicking and hitting; and aggressively invading the personal space of another person.
4. Identify a time period and place for the observation. A good place will have members of both sexes in a context in which they are able to express the emotion you are studying. For instance, to study aggression, a classroom might not be the best place as the presence of the teacher probably serves to limit the number of opportunities for students to act in an aggressive manner.
5. To increase the reliability of the data collection, researchers should not arrange to conduct their observations independently but in pairs. That way, once the collection is finished, partners can compare notes and make sure their observations were similar. (Dissimilar observations should be eliminated from the data analysis.) To facilitate the data collection, a table is included on the next page. The *time* column will help the researchers to know that they are talking about the same incident. The *notes* column allows researchers to record anything else that might help them remember the incident later (for example, the color shirt of the target person) or anything particularly interesting about the occurrence.

Data Analysis:

1. Compute and compare the percentages of boys and girls who express the targeted emotion.
2. A chi-square test (see page D-46) can be used to see if there is a significant difference between the sexes.
3. In addition, you may wish to subdivide observations into categories. For instance, in the example above about anger, one could separately analyze verbal and physical outbursts.

Discussion Questions:

1. Was the observation process more or less difficult than you anticipated, and why?
2. Were your observations consistent with your partner's? How could you increase consistency in the future?
3. Based on this experience, what are the strengths and weaknesses of naturalistic observation?

Data Collection Table

SEX (M/F)	BEHAVIOR (e.g., punch, yell)	TIME	NOTES

Chapter 6 – Health

We often hear that breakfast is the most important meal of the day. This study gives students the opportunity to test whether there is a relationship between what students eat for breakfast and the way they feel and perform in school.

Research Question: Do students who eat a "good breakfast" feel more alert and perform better in school?

Method:

1. Formulate your hypotheses.
2. Review/edit the survey that follows.
3. Select a sample to which you can give the survey during an early morning class or homeroom.

Data Analysis:

1. First you must decide what constitutes a "good breakfast." After clearly laying out the criteria for a good breakfast, you can code each student's meal as "good" or "bad." To increase reliability, you can have two people code the data and ask a third person to settle disagreements.
2. To get a measure of students' alertness, find their average on the Alertness Scale.
3. Use *t* tests (see page D-45) to see if there are significant differences between students who eat good breakfasts and those who do not in terms of alertness and academic performance.

Discussion Questions:

1. What do students typically eat for breakfast?
2. Is it related to their level of alertness and their academic performance?
3. Can we conclude that eating breakfast has any particular effect on alertness and academic performance? What could we do if we wanted to demonstrate a cause-and-effect relationship?

Morning Survey

Directions: All your answers will remain anonymous. Please do your best to answer each question accurately and completely.

Part I—Alertness. Use the following scale to answer the questions below.

1 = **Strongly Agree**
2 = **Agree**
3 = **Undecided**
4 = **Disagree**
5 = **Strongly Disagree**

____ 1. I feel sleepy throughout the school day.

____ 2. I find it difficult to pay attention in class.

____ 3. I fall asleep in class.

____ 4. I remember nothing that my teacher says in class.

Part II—Breakfast.

1. In the space below, please list everything you consumed (ate and drank) for breakfast *this morning.*

2. In the space below, please list what you consume (eat and drink) on a *typical school morning.*

Part III—Academic performance.

What is your GPA on the numerical scale used by your school (for example, 3.8, 92)?

My GPA = _____

Chapter 7 – Operant Conditioning

This simple experiment enables students to demonstrate the impact of positive reinforcement on people's rate of learning. It can easily be expanded to contrast the efficacy of different types of reinforcement and/or punishment or different schedules of reinforcement.

Research Question: Do rewards increase the rate at which people improve at a task?

Method:

1. Select a population and sample. For this experiment, a group of late elementary school children are ideal because they will enjoy the task.
2. Randomly assign the participants to one of two conditions: *Reward* or *No Reward.*
3. Set up some type of carnival game (for example, ring toss, penny pitch, softball throw). The task should be hard enough so that most participants fail on their initial attempts.
4. Run one subject at a time. Tell them only that you are studying motor skills in children; as always, script out your instructions.
5. Establish a baseline score for all subjects by giving them 10 "practice" tosses and recording their score out of 10.
6. Next, in the *Reward* condition, give participants 25 additional trials, but this time give them a piece of candy (let them choose a kind they like) for each successful attempt. Record the number of successful trials.
7. In the *No Reward* condition, give participants the 25 additional trials but do not give any reinforcement (not even verbal) when they succeed. Record the number of successful trials.

Data Analysis:

1. To quantify how much the participants learned (improved), subtract their baseline scores from their score out of 25.
2. Calculate the mean improvement score of each group.
3. Use a *t* test (see page D-45) to determine if the difference in means is significant.

Discussion Questions:

1. How might the type of reward offered affect the degree of participants' improvement?
2. How is operant conditioning used in the real world?
3. What might be some drawbacks to using operant conditioning on people?

Chapter 7 – Observational Learning

Much research (Bandura, Ross, & Ross, 1963, for example) has documented a link between exposure to violence and aggressive behavior. In this project, students gather data from younger children to see if there is a positive correlation between the two.

Research Question: Is there a relationship between how much violence students encounter in their favorite activities and how aggressively they act?

Method:

1. Formulate a hypothesis.
2. Select a sample of late elementary school children.
3. Handout the "My Favorites" survey on the next page.
4. Ask the classroom teacher(s) to rate how aggressive each child is on a 10-point scale where higher numbers indicate higher levels of aggression. Define *aggression* for the teacher as "harming others, either physically or verbally, for any reason."
5. To protect the children's privacy, you can assign each student a code number. After replacing students' names on the "My Favorites Surveys" with their numbers, you can give the list of code numbers and names to the teachers and ask them to give you the aggressiveness ratings for each number.

Data Analysis:

1. Read through each child's survey and code each response as either violent or not violent. Unless you are on the cutting edge of elementary school culture, you may have to do some research to code them properly. You can look up the materials on the Internet or ask elementary school teachers for their opinions.
2. Give each child a score by adding all the violent-themed favorites he or she named.
3. Use Pearson correlations (see page D-45) to see if there is a relationship between students' favorites and teachers' rankings of how aggressive they are.

Discussion Questions:

1. This study serves as another opportunity to review the difference between a correlation and a cause-and-effect relationship. How strong a correlation did you find, and what might explain it?
2. What are the limitations in using the teachers' estimates of how aggressive the children are?
3. What are other places in which students might encounter violence about which the survey does not ask, and how might it effect them?

My Favorites

My name is _____

Directions: Please fill in the spaces below with your favorites in each category. If you don't have three favorites in each category, you may leave some of the spaces blank.

What are your three favorite television programs?

_____

_____

_____

What are your three favorite video games?

_____

_____

_____

What are your three favorite movies?

_____

_____

_____

What are your three favorite books?

_____

_____

_____

Chapter 8 – Levels of Processing

Students commonly use flash cards to learn vocabulary words. According to the depth of processing theory (Craik & Tulving, 1975), there is reason to suspect that this may not be the most effective method. This experiment enables students to test the flash card method against a deeper level of processing.

Research Question: Which is a more effective means of learning vocabulary words: using flash cards or putting words into sentences?

Method:

1. Formulate a hypothesis.
2. Identify 20 vocabulary words you want students to learn, and create a handout including the words and their definitions. Then, create a 10-item test on the meaning of these words. This test should ask participants to use the words in a different form (for example, recognize antonyms or solve analogies), rather than choosing the flashcard definition or making up an appropriate sentence.
3. Select a sample.
4. Script out what you will say to your subjects.
5. Randomly assign students to two groups: flash cards (FC) or sentences (S).
6. Give all students a list of 20 difficult vocabulary words and their definitions.
7. Give FC students 20 3 x 5 inch index cards and S students several pieces of paper.
8. Ask FC students to make flash cards by writing the word on one side of the card and its definition on the other side. Instruct them to use the cards to learn the words until time is up.
9. Ask S students to use each word in a sentence that they write down on a sheet of paper. Tell them to repeat the process, writing different sentences for each word until time is up.
10. Allow 15 minutes for both groups to engage in these activities.
11. Continue with your lesson.
12. Give a vocabulary test during the last 5–10 minutes of the period.

Data Analysis

1. Find the mean of each group's scores.
2. Use a *t* test (see page D-45) to determine whether the difference is significant.

Discussion Questions:

1. What ramifications do your findings have for how you study?
2. How might you extend your research to learn more about how best to memorize new information?

Chapter 8 – Reconstructive Memory

People are often surprised to learn that memory is reconstructive rather than an exact replica of events observed. This activity enables students to replicate Brewer and Treyens (1981) office study to demonstrate the impact of schemas on memory.

Research Question: Do schemas influence memory?

Method:

1. Formulate a hypothesis.
2. Select a sample of approximately 30 people.
3. Set up a room to serve as the "office." This room should include many things typically found in an office (desk, chair, telephone, and so forth), but should be missing some items commonly encountered in an office (a computer, books). In addition, the room should contain a few items not usually found in an office but not so unusual as to scream for attention (for example, a football, a small refrigerator, a toy).
4. Run subjects one at a time. As each one arrives, tell him or her (using scripted instructions) that you are not quite ready yet and ask the subject to wait in the office. Exactly what you tell them depends upon the setting of your study. You must tell people that they will be waiting in an office. It will help to be more specific, for instance, to tell them that they will be waiting in a specific person's office.
5. After 35 seconds, return to the room and escort subjects to a second room. Explain to the subject that your research is about memory. Give each subject a piece of paper and ask him or her to write down everything he or she remembers seeing in the office.

Data Analysis:

1. Tally the participants' responses.
2. Specify which items in the office were most commonly remembered and which were less often or rarely remembered.
3. Similarly, examine how often subjects remembered the atypical items.

Discussion Questions:

1. Which items seem to be in the participants' schema of an "office"?
2. How do schemas affect our ability to remember things?

Chapter 9 – States of Consciousness

Sleep is essential for health. Although there is some debate over exactly why and how sleep helps people, much research documents its importance to human functioning and health. Unfortunately, most adolescents fall far short of getting the amount of sleep (at least 8.5 hours per night) suggested by the National Sleep Foundation (*Adolescent Sleep Needs and Patterns,* 2000). This study allows students to investigate the relationship between sleep and alertness and health.

Research Question: Do students who sleep more feel more alert in school and miss fewer days of school because of illness?

Method:

1. Formulate your hypotheses.
2. Review/Edit the "Sleep Survey" that appears on the next page.
3. Choose a sample.
4. Distribute and collect the survey during the morning (for example, in homeroom).

Data Analysis:

1. Use a Pearson correlation (see page D-45) to see if there is a relationship between average nightly sleep and days of school missed because of illness.
2. Use a Pearson correlation to see if there is a relationship between the previous night's sleep and morning alertness.

Discussion Questions:

1. How does the amount of sleep your sample is getting compare with the NSF's recommendation?
2. Does your study illustrate any risks associated with insufficient sleep?
3. Why, on the basis of your findings, would it be inappropriate to conclude that a cause-and-effect relationship exists between your variables? Would it be possible to show such a relationship and, if so, how?

Sleep Survey

Directions: Please answer each of the following questions as accurately as possible. Be assured that all your answers will remain anonymous.

Part I—Sleep and health

1. How long do you sleep on a typical school night? ____ Hrs ____ Mins
2. How long did you sleep last night? ____ Hrs ____ Mins
3. How many days of school have you missed because of illness this year? ____ days

Part II—Alertness

Use the following scale to answer the questions below.

1 = Strongly Agree
2 = Agree
3 = Undecided
4 = Disagree
5 = Strongly Disagree

____ 1. I feel sleepy throughout the school day.

____ 2. I find it difficult to pay attention in class.

____ 3. I fall asleep in class.

____ 4. I remember nothing that my teacher says in class.

Chapter 10 – Thinking

Research has shown that people react to factually equivalent information differently, depending on how it is presented or framed (Rothman & Salovey, 1997). This experiment gives students a chance to test out the framing effect.

Research Question: How does framing effect people's decision making?

Method:

1. Formulate a hypothesis.
2. Select a sample.
3. Randomly assign students to one of two conditions: 25% or 75%.
4. Script out what you will say to participants.
5. Give participants the appropriate "Decision Making" handout for their condition; ask them to read the scenario and answer the question.

Data Analysis:

1. Find the mean interest level in each condition.
2. Use a *t* test (see page D-45) to determine if the difference between conditions is significant.

Discussion Questions:

1. Do your results support the framing effect?
2. What might explain why framing usually affects people's decision making?
3. How might you extend your investigation to further explore the conditions under which framing effects decision making?

Decision Making

Directions: You are signing up for courses for next year. You need one more class to fill your schedule. You are considering one that some friends took this past year, because they said it was pretty good. You are concerned about keeping up your GPA. You hear that of the students who have taken the class in recent years, 75% have earned As or Bs.

How likely would you be to sign up for this class?

1	2	3	4	5	6	7
Extremely Unlikely						Extremely Likely

Decision Making

Directions: You are signing up for courses for next year. You need one more class to fill your schedule. You are considering one that some friends took this past year, because they said it was pretty good. You are concerned about keeping up your GPA. You hear that of the students who have taken the class in recent years, 25% have earned C's, D's, or F's.

How likely would you be to sign up for this class?

1	2	3	4	5	6	7
Extremely Unlikely						Extremely Likely

Chapter 10 – Language

Recently, New York State revised its constitution to eliminate the use of gender-biased language. Gender-biased language is the use of masculine terms (for example, *he, postman*), instead of more inclusive terms (for example, *he or she, letter carrier*). Much past research has demonstrated that gender-biased language causes people to think in gender-biased ways (McConnell & Fazio, 1996). This experiment enables students to test the effects of gender-biased language for themselves.

Research Question: Does the use of gender-biased language encourage gender-biased images?

Method:

1. Formulate a hypothesis.
2. Select a sample.
3. Two versions of a job description appear on the sheets that follow.
4. Randomly assign participants to conditions and distribute the sheets accordingly.
5. Collect the sheets once participants have finished describing their images.
6. Debrief subjects.

Data Analysis:

1. Divide participants' answers by condition (gender-biased or gender-neutral).
2. Code their images as either male or female.
3. A chi-square test (see page D-46) can be used to determine if participants who were exposed to gender-biased language saw significantly more male images. Images that are not clearly male or female can either be discarded or included in the analysis by extrapolating the rules about how to conduct the chi-square test that appear on page D-45.

Discussion Questions:

1. Notice that the job descriptions differ only in one phrase (*he* vs *she or he*) used one time. How do you think the repeated use of such terms will affect your results?
2. Where do you still encounter gender-biased language? Have you been taught to avoid its use?
3. How might you test for the impact of gender-biased language on people's actions?

Imagery Study

Directions: I am interested in how people form images or pictures as they think. A short advertisement for a job appears below. As you read it, try to get a picture of what the person who would fill this job would look like. Please describe the image you see in the space below. The more detail you include in the description of your images, the better.

Job Description

Research Associate: The successful candidate for this position will have a Masters degree in experimental psychology or a related field. He will be familiar with research design and basic statistical analyses and have at least 3 years of experience working in the field. Excellent writing skills and a strong work ethic are critical. Competitive salary and benefits.

Describe your image here:

Imagery Study

Directions: I am interested in how people form images or pictures as they think. A short advertisement for a job appears below. As you read it, try to get a picture of what the person who would fill this job would look like. Please describe the image you see in the space below. The more detail you include in the description of your images, the better.

Job Description

Research Associate: The successful candidate for this position will have a Masters degree in experimental psychology or a related field. She or he will be familiar with research design and basic statistical analyses and have at least 3 years of experience working in the field. Excellent writing skills and a strong work ethic are critical. Competitive salary and benefits.

Describe your image here:

Chapter 11 – Personality

Psychologists have identified numerous personality constructs that help describe people. One of these is based on the concept of self-monitoring (Snyder, 1983). People who think a lot about how they appear to others and work to manipulate that image are known as **high self-monitors.** Others who are less concerned about the images they project are termed **low self-monitors.** What kind of self-monitors people are may have ramifications for other aspects of their lives. The activity below gives students a chance to examine the relationship between self-monitoring and smoking.

Research Question: Are high self-monitors more likely to smoke cigarettes than low self-monitors?

Method:

1. Formulate a hypothesis.
2. Select a sample.
3. Distribute the survey that follows. The 10 items are adapted from Mark Snyder's longer Self-Monitoring Scale.

Data Analysis:

1. Calculate a self-monitoring score for all subjects by giving them one point for every time they responded "True" to an odd-numbered question and one point for every "False" response to an even-numbered question. Scores should range from 0–10. For the purposes of this project, participants who score between 0 and 5 will be considered low self-monitors, and those who score between 6 and 10 will be termed high self-monitors.
2. Compute and compare the percentages of high and low self-monitors who fall into each of the three smoking categories.
3. Use a chi-square test (see page D-46) to see if this difference is significant.
4. If you like, you can also subdivide your sample by gender and analyze the two groups separately to see if there is a stronger relationship between the variables in one gender or the other.

Discussion Questions:

1. Does your sample seem to be composed mainly of high or low self-monitors?
2. What can you conclude about the relationship between smoking and self-monitoring?
3. What other behaviors might be related to what kind of self-monitor someone is?

Self-Monitoring Scale

Directions: The statements below concern your personal reactions to a number of different situations. Consider each statement carefully before answering. If a statement is true or mostly true as applied to you, write "**T**" in the space; if a statement is false of mostly false, put an "**F**" in the space.

1. ____ Even when I am not enjoying myself, I often pretend to be having a good time.

2. ____ My behavior is usually an expression of my true inner feelings, attitudes, and beliefs.

3. ____ In different situations and with different people, I often act in very different ways.

4. ____ In groups of people, I am rarely the center of attention.

5. ____ I may deceive people by being friendly when I really dislike them.

6. ____ I have never been good at games like *Charades* or improvisational acting.

7. ____ I can look anyone in the eye and tell a lie with a straight face (if for a good reason).

8. ____ I find it difficult to imitate the behavior of other people.

9. ____ I sometimes appear to others to be experiencing deeper emotions than I actually am.

10. ____ I rarely seek the advice of my friends to choose movies, books, or music.

11. Which of the following best describes how often you smoke cigarettes?
    a) Never
    b) Occasionally
    c) Daily

12. What gender are you?
    a) Female
    b) Male

Chapter 12 – Psychological Disorders

Researchers have documented that there is often a stigma associated with seeking treatment for psychological problems (Page, 1977). In this experiment, students explore whether people would be more hesitant to become involved romantically with someone with a mental disorder than a physical disorder.

Research Question: Do people have different attitudes about people who suffer from mental disorders than they do about people who suffer from physical disorders?

Method:

1. Formulate a hypothesis.
2. Choose a sample.
3. Randomly assign participants to one of two conditions: *mental disorder* or *physical disorder.*
4. Tell participants that you are interested in how people make decisions about potential romantic partners on the basis of limited information.
5. Give them each the appropriate bio for T. Cooper (see the following pages), and ask them to answer the questions at the bottom.
6. After collecting the materials, debrief the participants.

Data Analysis:

1. Find the mean score for each condition.
2. Use a *t* test (see page D-45) to see whether the means are significantly different.

Discussion Questions:

1. Do your results suggest that people are biased against either group?
2. What problems result from people fearing that seeking psychological help will reflect badly on them?
3. How might you further explore the attitudes people hold about psychological treatment?

T. Cooper – Short Bio

Directions: Assume that T. Cooper is the sex and age that you would most prefer in a romantic partner. After reviewing the information provided, please answer the questions at the bottom of the page.

Long-Term Goals: "To marry and have a family. To build a successful career in which I enjoy some financial success but, more important, to give something back to my community."

Hobbies and Interests: Travel, skiing, country-western dancing

Attractiveness Rating (Based on a 10-point scale): 6.5

Health: Brief stay in a mental hospital for anxiety (2001); otherwise excellent

Favorites: Color = Red Animal = Cat Food = Italian

Personal Statement: "I am looking for a long-term companion, someone I can share my life with, both the good times and the bad."

Directions: Having read a little bit about T. Cooper, please answer the following questions.

1. How appealing do you think T. Cooper is as a potential romantic partner?

1	2	3	4	5	6	7
Extremely Unappealing						Extremely Appealing

2. How interested would you be in meeting T. Cooper?

1	2	3	4	5	6	7
Extremely Uninterested						Extremely Interested

3. How likely do you think it is that you would become involved with T. Cooper on a long-term basis?

1	2	3	4	5	6	7
Extremely Unlikely						Extremely Likely

T. Cooper – Short Bio

Directions: Assume that T. Cooper is the sex and age that you would most prefer in a romantic partner. After reviewing the information provided, please answer the questions at the bottom of the page.

Long-Term Goals: "To marry and have a family. To build a successful career in which I enjoy some financial success but, more important, to give something back to my community."

Hobbies and Interests: Travel, skiing, country-western dancing

Attractiveness Rating (Based on a 10-point scale): 6.5

Health: Brief stay in a hospital for diabetes (2001); otherwise excellent

Favorites: Color = Red Animal = Cat Food = Italian

Personal Statement: "I am looking for a long-term companion, someone I can share my life with, both the good times and the bad."

Directions: Having read a little bit about T. Cooper, please answer the following questions.

1. How appealing do you think T. Cooper is as a potential romantic partner?

1	2	3	4	5	6	7
Extremely Unappealing						Extremely Appealing

2. How interested would you be in meeting T. Cooper?

1	2	3	4	5	6	7
Extremely Uninterested						Extremely Interested

3. How likely do you think it is that you would become involved with T. Cooper on a long-term basis?

1	2	3	4	5	6	7
Extremely Unlikely						Extremely Likely

Chapter 13 – Treatment

Although most therapists are eclectic (they draw on a number of theoretical perspectives), some adhere strongly to a particular perspective. Although most people probably do not pay much attention to such orientations when choosing a therapist, they may find some far more compelling than others. This descriptive data collection allows you both to gather information about which perspectives people find most appealing and also to gauge their receptivity to the idea of therapy, in general.

Research Question: What therapeutic orientations do people find most attractive?

Method:

1. Select a sample.
2. Distribute and collect the attached survey.

Data Analysis:

1. Find the mean score for each therapist.
2. You may run *t* tests (see page D-45) between all the possible pairs of doctors to see if any differ significantly.
3. Find the mean score across all the doctors to get an indication of how receptive your subjects are to therapy.

Discussion Questions:

1. Which orientation is reflected by each therapist? (The answers are below.)
2. Do some orientations seem to be more popular than others and, if so, which ones?
3. How open to the idea of therapy did your subjects seem?

Dr. A *adheres to a biomedical orientation and is most likely a psychiatrist since s/he intends to prescribe medication.*

Dr. B *is a cognitive psychologist as evidenced by the emphasis s/he places on how people think.*

Dr. C *is a humanistic therapist. S/he sees his or her role as supporting clients so that they can do what it takes to help themselves.*

Dr. D *follows a psychoanalytic perspective as suggested by his/her interest in early memories and the unconscious.*

Selecting a Therapist

Directions: Assume that you have been suffering from depression for the past month and friends and family are urging you to seek help. All the therapists below have come highly recommended. They each hold a doctorate in their field and have years of experience. Please read the description of how each therapist views depression, and then answer the question that follows.

Dr. A
Depression is most likely to be caused by an imbalance of chemicals, serotonin in particular. For most patients, the most effective and efficient therapy involves medication. I would like to begin by prescribing Prozac and monitoring its effect.

Assuming you were suffering from depression, how likely would you be to go see Dr. A?

1	2	3	4	5	6	7
Extremely Unlikely						Extremely Likely

Dr. B
Depression is a result of how you think about your world. Depressed people tend to blame themselves too much for the negative events in life and take too little credit for the positive ones. In therapy, I would work with you to change the way you think to make your thinking healthier and more optimistic.

Assuming you were suffering from depression, how likely would you be to go see Dr. B?

1	2	3	4	5	6	7
Extremely Unlikely						Extremely Likely

Dr. C
Depression occurs when people lose sight of the purpose of their lives and, as a result, feel a sense of hopelessness. People have the ability to heal themselves. As a therapist, my role is to support clients unconditionally and help them find their own path to happiness and fulfillment.

Assuming you were suffering from depression, how likely would you be to go see Dr. C?

1	2	3	4	5	6	7
Extremely Unlikely						Extremely Likely

Dr. D
The depression someone experiences as an adult is usually tied to earlier life events that have been repressed into the unconscious. I would begin by asking about your early memories and your family. I would also want to hear about your dreams because dreams often shed light on the contents of the unconscious. The purpose of analysis is to reveal these early traumas and, only then, to work to resolve them.

Assuming you were suffering from depression, how likely would you be to go see Dr. D?

1	2	3	4	5	6	7
Extremely Unlikely						Extremely Likely

Chapter 14 – Compliance Strategies

One widely used compliance strategy is called the foot-in-the-door approach. Research has shown that people who agree to a small initial request (the foot) will be more likely to comply with a subsequent, much larger request than people who are only asked the second request (Freedman & Fraser, 1966). In this project, you can test out the efficacy of the foot-in-the-door approach while raising money for a charity you deem worthwhile.

Research Question: Will the foot-in-the-door technique result in larger donations than asking for donations without using a foot?

Method:

1. Formulate a hypothesis.
2. Select a sample.
3. Choose a charity to support. The charity should be extremely popular with your population, because you want virtually everyone to agree to sign a petition in support of it. In addition, before beginning your data collection, you must contact the charity and let them know you will be using their name and collecting money for them.
4. Create a petition for students to sign indicating their support of your charity; this is the foot.
5. Randomly assign participants to the *Foot* or *No Foot* group.
6. Script out what you will say to participants in both groups; scripts should differ only in that the former will include a request for people to sign a petition.
7. People in the *Foot* condition should first be asked to sign the petition. Afterwards, pull out an envelope or container and ask people to donate some money to the charity. If possible, you may want to keep track of how much they donate.
8. People in the *No Foot* condition will simply be asked to donate to the charity.
9. In both conditions, you must keep track of how many people comply or do not comply with the request(s).

Data Analysis:

1. Compute the percentage of people in each condition that donated money. You might also want to compute the mean amount of money donated by each person.
2. You can use a chi-square test (see page D-46) to determine if a significantly greater percentage of people in the experimental group donated money.
3. You can use a *t* test (see page D-45) to determine if the amount of money donated in the two conditions differed significantly.

Discussion Questions:

1. What variables might affect how well the foot-in-the-door approach works?
2. Why would this technique work?
3. Charities use the foot-in-the-door technique all the time. How/where else have you seen this method used?
4. Under what circumstances is it ethical to use such approaches? Incidentally, it bears mentioning that you must donate the money you collected to the charity you told people about.

Chapter 14 – Conformity

Students are always fascinated with Asch's (1955) conformity research. This activity enables them to use a similar design to test the conformity of their peers. The results are merely descriptive although it is easy to complicate the design to test hypotheses about conditions under which people are most likely to conform or about which groups of people are most likely to conform.

Research Question: Will people conform to incorrect answers given aloud by their peers?

Method:

1. Train three students to act as confederates by reviewing the procedure and the answers they are to give to the questions (see next page).
2. Choose a population of students who do not know the confederates, and decide on a way to select participants (for example, every tenth person to walk by a certain place).
3. Approach one prospective participant at a time and deliver your scripted introduction ("Hi, I'm _____ . Those people over there [point to confederates] are helping me with a social studies project for school, and I need just one more person. Would you be willing to help?")
4. Escort your subject to the group so that he or she is standing at one end of the group.
5. Deliver your instructions (For example, "My project is on politics. I need to ask five questions, and I'd like you to answer one at a time." Ask, "Will you go first?" and then gesture to the first confederate. To limit confounding variables, it is important that your confederates always answer in the same order.)
6. After your first confederate agrees, take out your sheet of questions and ask them one at a time. Pretend to note each person's answer; of course, you only need to record the subject's.

Data Analysis:

1. Tabulate the percentage of people who conformed on each of questions 3–5.
2. Average the above numbers to find the percent of questions on which people conformed.
3. Calculate the percentage of subjects who conformed on at least one question.

Discussion Questions:

1. Asch found that approximately 70% of participants made at least one error and that errors were made approximately one-third of the time. How do your findings compare to Asch's? What might explain the differences?
2. Did people make more errors on some of the questions than others and, if so, what might explain the differences?
3. Under what circumstances are people most likely to conform and why?

Question and Answer Script

Directions: Notice that the confederates will answer the first two questions correctly. These are relatively easy questions, so the subjects will generally have the sense that they are correct. The answers given to questions 3 and 4 are incorrect; in fact, there is no South American country called Carazuena and, as far as I know, no political figure named Roger Chokeberry. However, these are fairly difficult questions. Although subjects may not know the answers, they will probably not disagree with the confederates. Question 5 is different because not only is the given answer false, but it is a question to which many subjects will know the correct answer *(Franklin D. Roosevelt).*

Experimenter: Before becoming President, what was George W. Bush's job?

Confederate 1: He was governor of Texas.

Confederate 2: Governor of Texas.

Confederate 3: Governor of Texas.

E: Who was in command of the Union forces at the end of the Civil War?

C1: I think that was Grant.

C2: Yes, Ulysses Grant.

C3: Hmm, Grant.

E: Who was the first Chief Justice of the Supreme Court?

C1: That was Roger Chokeberry.

C2: Uh, yes, Roger Chokeberry.

C3: Chokeberry.

E: Which South American country did the President most recently visit?

C1: Carazuena?

C2: It was Carazuena.

C3: Carazuena.

E: Who was the President of the United States during most of World War II?

C1: Herbert Hoover.

C2: Hoover.

C3: Hoover.

Data Analysis Appendix

Although there are many sophisticated computer statistics programs on the market, most high school students do not have access to them. Many basic statistical functions, however, can be performed using Microsoft Excel. Below is a description of how to use Excel to perform the only three tests necessary to do all the research projects in this guide.

***t* Test: Used to determine if the scores of two nominal groups are significantly different on a continuous variable.**

1. Enter the data into a spreadsheet; it is easiest to use a separate column for each variable.
2. Click in the cell in which you would like your answer to appear.
3. Click on the function key, f(x).
4. Select the "Statistical" category. A list of choices will pop up.
5. Scroll down and select TTEST.
6. A box will pop up. Put one set of numbers into "array 1" and the other into "array 2." To do that, you can either highlight the cells you want or indicate the range of data by listing the first cell followed by a colon and then the last cell (for example, A1:A10). Enter "2" into the tails box and "2" into the type box.
7. Again, once all the data is in, the answer appears on the worksheet; clicking "OK" puts the answer in the box you selected.

This answer is a *P value*. Generally, *P values* of less than .05 are taken to indicate statistically significant results.

If you would like to display your findings graphically:

1. First calculate the mean (arithmetic average) of each group. You can either repeat the above procedure but choose AVERAGE instead of TTEST or compute the average yourself.
2. Enter the average of each column under the column.
3. Highlight the two averages and click on the chart button on the menu (it looks like a bar graph).
4. Select the "column" option from the "Chart type" box and follow the directions to complete the graph.

Pearson Correlation: Used to determine the correlation coefficient between two continuous variables.

1. Enter the data into a spreadsheet; it is easiest to use a separate column for each variable.
2. Click in the cell in which you would like your answer to appear.
3. Click on the function key, f(x).
4. Select the "Statistical" category. A list of choices will pop up.
5. Scroll down to PEARSON and select "OK."
6. The next window asks you for two "arrays." Put the data from each of the two variables you are correlating in one of the boxes. To do that, you can either highlight the cells you want or indicate the range of data by listing the first cell followed by a colon and then the last cell (for example, A1:A10).

7. As soon as you enter data in both array boxes, the answer appears on the worksheet. Selecting "OK" will enter the answer in the cell you selected.

This answer is a *correlation coefficient*. Correlation coefficients range from −1 to +1. The closer the value is to 0, the weaker the correlation. Positive and negative 1 are equally strong correlations. Negative values indicate inverse relationships, while positive values correspond to direct relationships.

If you would like to display this information graphically:

1. Highlight the two columns of data.
2. Click on the chart button on the menu (it looks like a bar graph).
3. Select the "scatter plot" option from the "Chart type" box.
4. Once you have completed your scatter plot, you can add regression line (the line of best fit) by clicking on the chart and choosing "Add Trendline" from the Chart Menu.

Chi-Square Test: Used to determine if your observations of the frequency of two nominal variables differ significantly from the values that would have been expected based on chance.

To perform a chi-square test, you first have to enter the "Observed Values" and "Expected Values" into a spreadsheet. It may be easiest to demonstrate with an example.

Let's assume you are doing the perception research (Chapter 4, Optical Illusions Project) to see if teens and adults see the old woman/young woman illusion differently. Pretend your sample consists of 30 people, 20 who are teens and 10 who are adults. Table 1 illustrates the actual data collected, also known as the observed values. Of the 20 teens, 17 saw the young woman and 3 saw the old lady. Among the 10 adults, 6 saw the young woman and 4 saw the old lady.

Table 1. Chi-square observed values

	Young Woman	Old Lady	Total
Teens	17	3	20
Adults	6	4	10
Total	23	7	30

Table 2 shows the expected values. Notice that the numbers in the *Total* rows remain the same. The numbers in the other four cells are then apportioned based on what you expect would occur if the two groups, teens and adults, did not differ. Since there are twice as many teens in the sample, you would expect them to see twice the number of both images. To obtain the expected values, simply multiply the total in each column by the group's ratio in the sample. For instance, to obtain the number 15.33, I multiplied 23 by .67 (20/30).

Table 2. Chi-square expected values

	Young Woman	Old Lady	Total
Teens	15.33	4.67	20
Adults	7.67	2.33	10
Total	23	7	30

Once you put this data into a spreadsheet, you can ask the computer to calculate a *P value* to determine if the two groups differ significantly. To do so:

1. Click in the cell in which you would like your answer to appear.
2. Click on the function key, f(x).
3. Select "Statistical category." A list of choices will pop up.
4. Scroll down to CHITEST and select "OK."
5. Click in the "actual_range" box and highlight the observed values on your spreadsheet.
6. Click in the "expected_range" box and highlight your expected values.
7. The answer appears in the box and if you choose "OK" will appear in the cell you selected.

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