

## ***Module 2***

### ***Psychology & Science***

#### ***Introduction***

##### **A. Answering Questions**

Scientific Method

Advantages

Experiment

##### **B. Descriptive Research**

Survey

Disadvantages

Advantages

Naturalistic Observation

Disadvantages

Advantages

Case Study

Disadvantages

Advantages

##### **C. Cultural Diversity: Use of Placebos**

Examples of Mind over Body

Conclusion: Testimonials and Placebos

#### ***Concept Review***

##### **D. Correlational Research**

Correlations

Correlation Coefficients

Disadvantage

Advantages

##### **E. Experimental Research**

Experiment

Conducting an Experiment: Seven Rules

Discussion

Advantages

Disadvantages

Choosing Research Techniques

Choosing Research Settings

##### **F. Research Focus: ADHD Controversies**

Controversy: Diagnosis

Controversy: Treatment

Controversy: Long-Term Effects

##### **G. Application: Ethics in Doing Research**

Concerns about Being a Participant

Code of Ethics

Role of Deception

Ethics of Animal Research

#### **Critical Thinking**

#### **Summary Test**

#### **Links to Learning**

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### **MODULE ENHANCERS**

#### ***A. Answering Questions: Scientific Method***

Active Learning Exercise: 2.1 Finding the Scientific Method

Discussion: How do psychologists go about describing human behavior?

Inquiries for Student Learning: Why is psychology considered a science?

#### ***B. Descriptive Research***

Discussion: Ask students if they have recently filled out a survey by telephone, mail, or in person.

Discussion: Case studies and testimonials are often used as the support for some pretty shaky medical procedures. Can you discuss some examples?

Study Question: How believable is a recent survey that reported that people never lie to their best friends? Why? What would you do if you wanted the answer to this question?

Study Question: Why do some people put more faith in testimonials than in scientific research?

Critical Thinking Question: Which method would you use to find out if caffeine improves memory? Why would it not be a good idea to take a survey to find out?

Inquiries for Student Learning: Why do people believe non-scientific claims that can even be harmful? For example, why do some people believe that vaccines can cause autism?

#### ***C. Cultural Diversity: Use of Placebos***

Discussion: Why do people think that large doses of vitamin C ward off colds?

Critical Thinking Question: Why do Americans think it strange that Asians use rhino horn as medicine? Given what we know about cough syrup, should we feel superior?

#### ***D. Correlational Research***

Active Learning Exercise: 2.2 Correlational Study or Experiment?

Discussion: What are superstitions? Why do they persist even though the evidence for them is shaky?

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Study Question: How would you explain the positive correlation (0.60) researchers found between drinking coffee and being sexually active after age 60? We can easily find examples of a misuse of correlation in the average Sunday supplement to the newspaper. You may want your students to look for examples and bring them to class. One I found was that there is a negative correlation between years of education and whether a woman is married. Does this mean that working on advanced college degrees is hurting a woman's chance for finding a marriage partner? (Perhaps women with advanced degrees delay marriage or choose not to marry. Perhaps some women who marry then quit school and don't get those degrees.)

### ***E. Experimental Research***

Active Learning Exercise:      2.3 In-Class Experiment  
   2.4 Designing a Scientific Experiment  
   2.5 Application of the Scientific Method

Discussion: Ask students what steps they would take to show the effectiveness of a newly developed seasickness pill. Would these same techniques work to discover whether ginger works as well? How would you know?

Study Question: How would you determine whether taking vitamin B reduces stress?

Critical Thinking Question: Which research techniques and settings would you use to study mental problems in the homeless?

### ***F. Research Focus: ADHD Controversies***

Discussion: Ask if anyone in class knows anyone who has been diagnosed with ADHD. Since there should be a huge number of volunteers for this, you might want to have a discussion about whether ADHD is over diagnosed and why that might happen.

Study Question: If you had a child who might have ADHD, what would you do?

Inquiries for Student Learning: How is ADHD diagnosed?

### ***G. Application: Ethics in Doing Research***

Discussion: When is deception acceptable in research?

Study Question: What are the issues involved in animal research? What about stem cell research? What are possible solutions to these ethical dilemmas?

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### ALE: ACTIVE LEARNING EXERCISES

Name	Type	#
Finding the Scientific Method	Group Activity	2.1
Correlational Study or Experiment?	Group Activity	2.2
In-Class Experiment	Demonstration	2.3
Designing a Scientific Experiment	Group Activity	2.4
Application of the Scientific Method	Group Project	2.5

### STUDENT PROJECT IDEAS

- Visit one of the psychology professors and describe the type of research he/she is conducting. Ask the professor the type of research methods (survey, case study, or experiment) he/she is using for data collection.
- Bring a survey from a magazine to class and analyze it for potential biases (wording, sample representation, and experimental bias).
- Write a research paper on how people form illusory correlations and perceive order in random sequences.
- Bring to class two journal articles: one showing a correlational study and the second showing an experiment (cause and effect). Compare and contrast them.
- Design an actual research study about a psychological topic that you can actually conduct during the semester. Do it, and present your whole project to the class as a PowerPoint presentation.

### MOVIE ASSIGNMENTS

#### *The Truman Show*

1. If we were conducting an experiment and were only studying Truman, what kind of study would that be? Why?
2. Would it be possible to conduct a naturalistic observation on Truman, considering his whole world is controlled by the television producers, much like the control over factors that could be found in a laboratory? Why or why not?
3. If given the opportunity, would you participate in an event where all of your actions could be viewed by millions of people, much like in the television series *Big Brother*? Why or why not?

The ethical considerations here are obvious. What do universities do to stop this kind of thing from happening in the real world?

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### ONLINE ASSIGNMENTS

1. Much psychological research is conducted through the Internet. Have students visit <http://psych.hanover.edu/research/exponnet.html>, a site that has dozens of lab and research experiments. Ask students to participate in any experiment. Then, have them write a paragraph about the nature of the experiment and their experience as an online participant. You might also discuss how they selected the study to participate in.

They will notice the initial disclaimers and releases. Ask them about the ethical issues involved in using subjects as well as the IRB process, which will be included in most of the introductory material before they agree to participate in the online study.

You can also discuss the advantages and disadvantages of actually conducting research on the Internet. How reliable are these data?

### WEB CONNECTIONS

<http://psych.hanover.edu/research/exponnet.html>

This site allows students to get the science lab experience by participating in a multitude of experiments on the Internet that are psychologically related. Experiments are organized by general topic area.

<http://www.vanguard.edu/faculty/ddegelman/amoebaweb>

You will use this site all semester. It is a reference list with links to every part of psychology, with current sources of information about research methods in psychology. It is often updated.

<http://www.psychdata.net/default.asp> or <http://www.surveymonkey.com>

These sites provide assistance in creating online surveys. There is an initial free trial for PsychData so students can create their own online surveys with help. The “basics” in SurveyMonkey are always free.

<http://www.learner.org/discoveringpsychology/methods/index.html>

This interactive site has a lot of information about how psychologists use the scientific method. Good detail and very user friendly.

<http://www.skepticity.com/index.php>

<http://www.theskepticsguide.org/>

Here are podcasts and links from skeptics. They show the value of the scientific method and ways in which people falsely believe based on other methods of discovering information. These are great sites to encourage critical thinking skills as well get as a real understanding of the usefulness of the scientific method and why psychologists use science rather than introspection. There are archives of old podcasts that can be used if there is a particular topic of interest. These are one-hour programs that would not be appropriate in a classroom, but can be assigned or used as part of an online course.

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### SUGGESTED VIDEOS AND FILMS

**Prisoners of Silence.** (1995). Public Broadcasting Service (PBS Video). URL: <http://www.pbs.org> 60 minutes.

Excellent for showing how testimonials can be proven erroneous with good experimental design. Fascinating footage of how a technique called facilitated communication (supposedly used to allow autistic children to speak by having an attendant guide the hands of an autistic on a keyboard) was shown to be false. Very good design elements and the logic behind them are demonstrated.

**Research Ethics.** (2008). Insight-Media. URL: <http://www.insight-media.com> 21 min.

Features vignettes that follow students through the process of creating research projects and examines ethical issues in reporting and conducting research.

**Understanding Research.** (2001). Annenberg/CPB Collection. URL: <http://www.learner.org> 28 minutes.

The second in Zimbardo's "Discovering Psychology" series, this video explores various methodologies, data collection, and statistical analysis.

### CRITICAL THINKING STUDY QUESTIONS AND POSSIBLE ANSWERS

**Question: Which method would you use to find out if caffeine improves memory?**

1. Need to Know: What specific information do I need to answer this question? I need to know the methods for answering questions: survey, case study, and experiment. I need to know the advantages and disadvantages of each method.

2. Defining Terms: Do I need to use my own words to define or review any terms? Do I know the advantages and disadvantages of each? I need to define each of the methods and list the advantages and disadvantages.

Survey: This is a way to get information by asking people directly to respond to a set of questions. This can be done in person, over the phone, or through the mail. An advantage is that you can easily get a lot of information relatively quickly, but it may be biased in accord with the beliefs and truthfulness of the respondents.

Case study: This is a way to get information by studying a particular individual in depth. You get a lot of information about one person, but this information may not apply to anyone else.

Experiment: This is a way to get information in a controlled environment so you can systematically manipulate treatments and measure their effects on behavior. You can identify cause-and-effect relationships, but information gained in a controlled environment may not apply in the real world.

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3. Identify Key Words: Which words in the question hold the key to the best answer? The key terms are “caffeine” and “improves memory.” Although you might get interesting stories using the survey approach, your data would not be particularly valuable: it would be distorted by error and bias. That is, the placebo effect might be strong in this case. If you used the case-study method, you would learn a lot about the relationship between one individual’s memory response and caffeine. But you would not know whether that information applied to anyone else. The best method of assessing cause-and-effect relationships (“Does caffeine cause memory improvement?”) is to do an experiment. You could have two groups of students tested on the same material. Before the test, one group would drink a cup of caffeinated coffee and the other would drink one cup of decaffeinated coffee. You would then compare their test performances. This method would provide the most accurate answer to this question.

### **Question: Why do Americans think it strange that Asians use rhino horn as medicine?**

Possible Answer: Belief is the most important factor in generating the placebo effect. In some Asian cultures, there is a strong belief that rhino horn is an aphrodisiac and a potent medicine. Therefore, there is a high incidence of rhino horn treatments available in those countries. In the United States, we hold no beliefs about the medicinal value of rhino horn and recognize it as a placebo. Therefore, we regard those who use rhino horn as strange! However, most Americans do not regard taking vitamin C as unusual because we believe it has medicinal value.

### **Question: Which research techniques and settings would you use to study mental problems in the homeless?**

Possible Answer: To decide on the best way of answering this question, let’s look at each of the methods at our disposal and assess their utility.

Questionnaires and interviews. We could interview people who live in homeless shelters or on the street about their mental conditions. We could also talk to people who work with the homeless, asking their opinions about mental illness and the homeless.

Standardized tests. We could administer tests designed to detect different kinds of mental illness to homeless individuals. This might give us information about the prevalence and type of mental illness in that population.

Laboratory experiment, behaviors. It would be impossible to do a true experiment on this question. You cannot randomly assign someone to homelessness or mental illness. It would be difficult to get homeless people to a laboratory setting. You could possibly assess the effects of treatments for mental illness on the homeless.

Laboratory experiment, physiological and genetic techniques. Again, it may be difficult to get homeless individuals to a laboratory. If you could, you might be able to compare brain structure and function in the mentally ill and the non-mentally ill homeless.

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### **INQ: INQUIRIES FOR STUDENT LEARNING**

#### **Question: Why is psychology considered a science?**

Possible Answer: Research conducted in the field of psychology follows the scientific method as a rule. Psychologists use the scientific method because, quite often, common sense proves to be false or contradictory under scientific scrutiny. For example, two commonsense phrases contradict each other: “birds of a feather flock together” and “opposites attract.” Which one is correct? Psychologists would rely on the scientific method instead of common sense to answer this question, and research shows that “birds of a feather flock together” is a more accurate portrayal of who you will make friends with or who you will fall in love with (someone similar to yourself in beliefs and interests). Students often confuse the subject matter of the natural sciences with the methodology of the scientific method. It is important to make this distinction clear.

#### **Question: Why do people believe non-scientific claims that can even be harmful? For example, why do some people believe that vaccines can cause autism?**

Possible Answer: Because we don’t understand science, people will accept claims that are based on correlation or testimonial evidence, even when scientific studies show that the conclusions from the data are false. In this case, a combination of correlational data (there were temporarily more children diagnosed just when the vaccines were being used), testimonials from parents who really believe that this is the reason their child was affected, powerful media presence that includes celebrities, and actual false data from companies that would financially benefit from having their versions of the vaccines preferred caused a lot of scared of parents to refuse to vaccinate their children. The harmful effects are starting to be seen as formerly rare diseases are now killing children. While there are many books to recommend on this topic, a good one is *Don’t Believe Everything You Think* by Thomas Kida.

#### **Question: How is ADHD diagnosed?**

Possible Answer: ADHD is diagnosed by utilizing several structured questionnaires administered to the child, parents, and teachers. In addition, the child is observed. Accurate diagnosis takes several meetings that involve the practitioner (psychologist, pediatrician, or psychiatrist) and input from several sources such as the practitioner, parents, teachers, and the child. It does not involve merely questionnaires, but can also involve the use of the Conners’ Continuous Performance Task. Unfortunately, diagnosis of ADHD does not always meet these criteria. Sometimes, diagnosis does not involve different sources, and the practitioner does not spend enough time observing the child or in discussion with parents, teachers, or other practitioners that have had contact with the child. The National Institutes of Health (NIH) has published a consensus statement for the diagnosis of ADHD to encourage practitioners to better recognize and diagnose ADHD. This consensus statement is available online at the NIH website ([www.nih.gov](http://www.nih.gov)): Diagnosis and Treatment of Attention Deficit Hyperactivity Disorder. NIH Consensus Statement Online 1998 Nov 16-18; 16(2): 1-37.



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### **SUGGESTED ANSWERS FOR CRITICAL THINKING IN THE TEXTBOOK: DOES BINGE DRINKING CAUSE LATER HEALTH PROBLEMS?**

1. The three major methods for answering questions are survey, case study, and experiment. In this study, researchers asked people questions about their drinking and physical health, so this study used the survey method.
2. Surveys cannot show cause-and-effect relationships but only correlations between events: teenagers who engaged in binge drinking had poorer physical health as young adults than those who were not binge drinkers. To show a cause-and-effect relationship, this study would have to be designed as an experiment in which an experimental group got one treatment (alcohol) while a control group got no treatment or a different treatment (no alcohol/placebo).
3. This is difficult to know for certain. It may be helpful to examine additional aspects of physical health (cholesterol level, family history) and health behaviors (diet, routine medical care).
4. Alcohol prevention programs should emphasize the immediate and long-term negative health consequences that result from adolescent binge drinking.
5. The advantage of this survey study is that it suggests an unexpected cause or explanation for why some young adults have poorer health (adolescent binge drinking). One disadvantage of this survey study is that it cannot identify cause-and-effect relationships.
6. If the adult believes that binge drinking during adolescence causes later health problems, he may behave in ways (worrying more, eating poorly) that cause the problems to occur. This error or bias is called the self-fulfilling prophecy.

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### **ACTIVE LEARNING EXERCISE 2.1**

#### ***Finding the Scientific Method***

**Purpose:** Application  
**Format:** Group Activity  
**Equipment:** Magazines  
**Class time:** 45 min.

**Purpose:** Students are most often exposed to research findings by reading magazines or newspapers, rather than scientific journals. This activity will help them identify components of the scientific method in short magazine articles and also the questions encountered when reading these abbreviated reports. The activity is designed to encourage discussion of why a person should or should not trust the reported results.

**Instructions:** This is a good group activity, although it can be done individually. Provide the students with some magazines or ask them to bring an article with them to class. Form small groups of students and provide each one with an article to analyze and large display paper and markers.

Each group should be given copies of the assignment sheet. Ask the group to write the answers to each of the items on the sheet. After a half-hour, ask each group to display its answer sheet. (Hanging them on the wall with tape is a good idea.) Each group should designate one member to present its answers to the rest of the class. Provide feedback for each group, and then summarize at the end of the exercise.

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### HANDOUT 2.1

#### ***Looking For the Scientific Method in the Popular Press***

**Instructions:** If you read the newspaper or magazines, you have most likely been exposed to the scientific method. Can you identify some components of the scientific method in these types of articles?

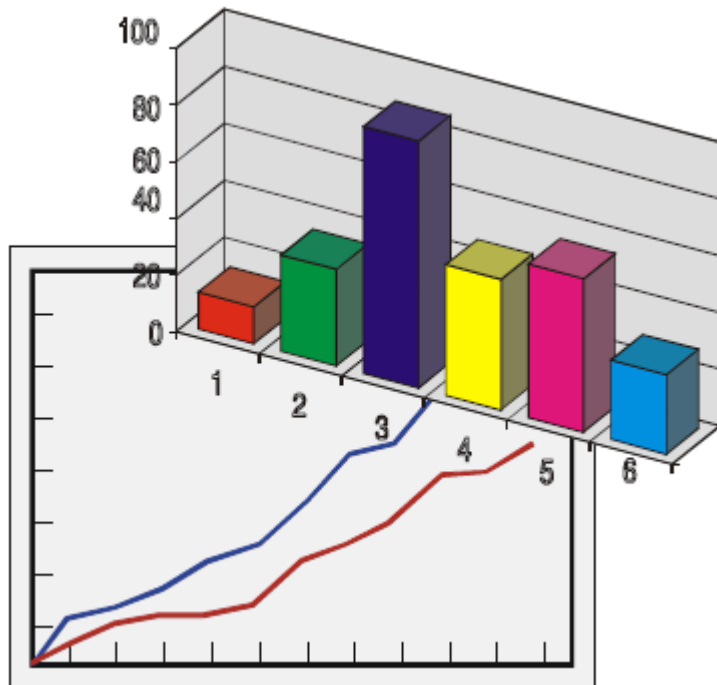
1. Find a magazine like *Psychology Today* or *Health* for this exercise. Most “personal interest” magazines normally have a number a short article “briefs” that report on recent research findings. Select one of these. What is the title of your brief? Where did you find it?
2. Write a very short abstract of the research described. Include each of the following:
  - The research question and hypothesis
  - The research method used. Is it a true experiment, a survey, an observation study, a correlation, or a case study? Can you identify any independent, dependent, or control variables? What research setting was used?
  - What data and/or data analysis was presented?
  - What conclusions are drawn? Do they appear to be valid based on the methodology and controls presented?
  - Was this an example of well-done research using the scientific method? Why or why not? How would the presentation have been different if you were reading about this research in a scientific journal?
3. The most common error in the popular press may be the use of correlational data to make cause-and-effect statements. Usually the article describes the work by simply saying that some researcher conducted the study and that a correlation was found. It then goes on to present conclusions that the original author probably did not (and would not) make about the significance of these findings. Magazine sections in newspapers are often good sources of this kind of distortion. Did this happen in the articles you found? Which conclusions are not clearly those of the researcher but are probably made by the author of the article?

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### ACTIVE LEARNING EXERCISE 2.2

#### *CORRELATIONAL STUDY or EXPERIMENT?*

Purpose: Application  
Format: Group Activity  
Equipment: Handout  
Class time: 30 min.



- Students often need lots of practice distinguishing a correlational study from an experiment, so following your presentation of correlational and experimental studies, distribute Handout 2.2.
- Students can do this exercise in groups or by themselves; groups of 3 or 4 are the most effective.
- Instruct students to do the worksheet first by themselves and then to check with the other students. If there is disagreement, they can refer to the text.

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### HANDOUT 2.2

#### *Correlational versus Experimental Studies*

Decide whether each of the four studies below is correlational or experimental. Then place it in the appropriate box. If the study is correlational, briefly describe how the variables are related and whether the correlation is positive or negative. List possible third variables or confounds that might also influence the results. If the study is experimental, briefly describe how Variable A is causing Variable B.

<b>Study 1</b> A Dartmouth study found that overweight young women (age 23) earned 6.4% less than their non-overweight peers. Additionally, they found that young men's earnings rose 2% for each 4-inch increase in height.	<b>Study 3</b> A psychiatrist from England found that wealthy women aged 35 to 59 had more frequent sex, experienced more orgasms, and reported enjoying sex more than women from poorer households.
<b>Study 2</b> An Australian study reported that MSG does not cause people to be sick, as previously reported. The researcher told subjects that he was studying ingredients in a new soft drink and fed them either MSG or a placebo in the drink. The same number and type of symptoms were reported in both the MSG and the placebo groups.	<b>Study 4</b> Despite popular belief, men are just as likely to "help" as women are. In fact, one study indicated they were more likely than women to engage in helping behavior. When confederate men and women were staged in a parking lot having apparently locked their keys in their car, 80% of the individuals who came over to see if they needed help were men. (The staging was done such that equal numbers of men and women would pass by.)

<b>Correlational</b> Why positive or negative?  Name three variables or confounding variables.	<b>Experimental</b> How does Variable A cause Variable B?
<b>Correlational</b> Why positive or negative?  Name three variables or confounding variables.	<b>Experimental</b> How does Variable A cause Variable B?

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### ACTIVE LEARNING EXERCISE 2.3

#### *In-Class Experiment*

**Purpose: Application**  
**Format: Demonstration**  
**Equipment: Figures**  
**Class time: 30 min.**

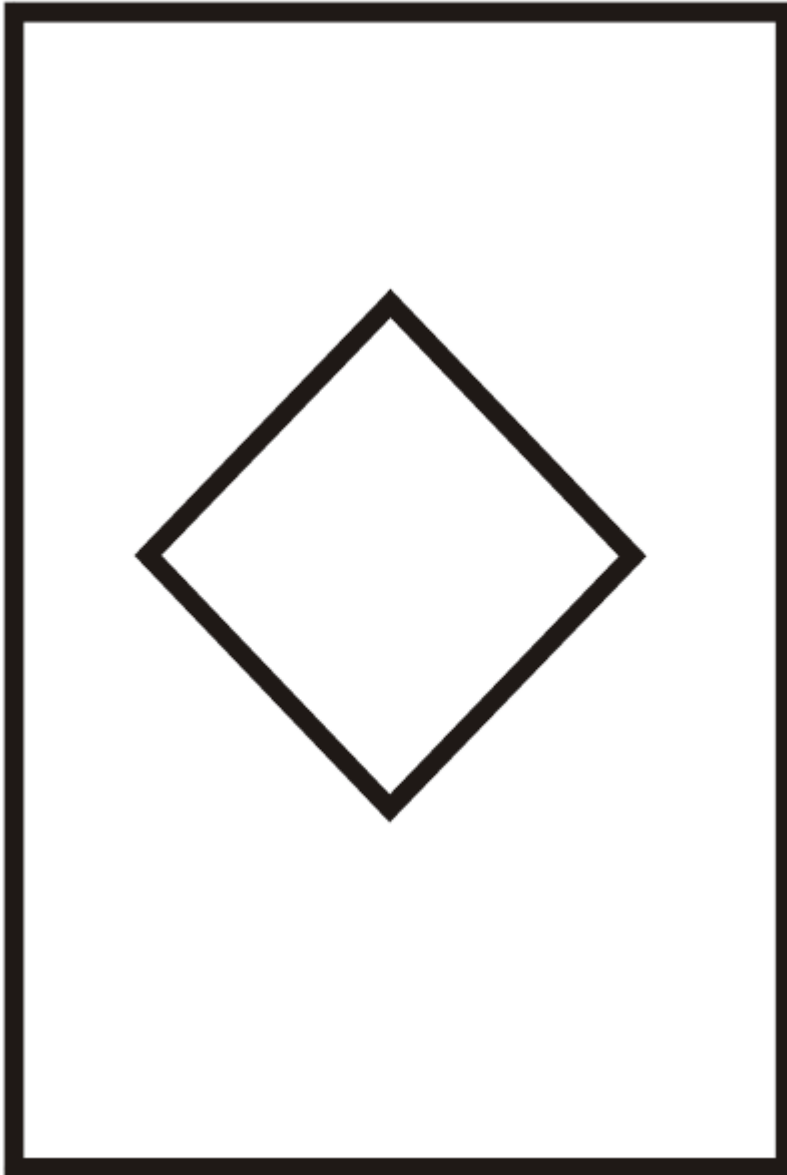
This is a good activity for you to use “clickers” if you have them.

1. Divide the class into two fairly equal groups. Name one Group 1 and the other Group 2. Tell all to get out a piece of paper to write on.
2. Tell Group 2 to close their eyes (or look down). Tell Group 1 to look at the first figure on the following page (present it for about 5 sec) and to write down (in words not pictures) what they saw.
3. Tell Group 1 to close their eyes (or look down). Tell Group 2 to look at the other figure on the following pages (present it for about 5 sec) and to write down (in words not pictures) what they saw.
4. Collect the data by drawing the chart below on the board. Tell the students that you are going to ask what they wrote down about what they saw in the very center of the figure.
5. Ask Group 1: "All those who wrote that they saw a diamond, raise your hands." Enter the data. "All those who wrote square raise your hands." Enter the data. "All those who wrote something else raise your hands" Enter the data.
6. Do the same with Group 2
7. The result will show that those who saw the first figure will be more likely to say diamond, while those who saw the second figure will be more likely to say square, even though the object in the center is exactly the same in both figures. The angle of the outside rectangle has caused them to name the inner object differently.
8. Use this experiment to talk about the steps in conducting an experiment variables, control, groups etc.,

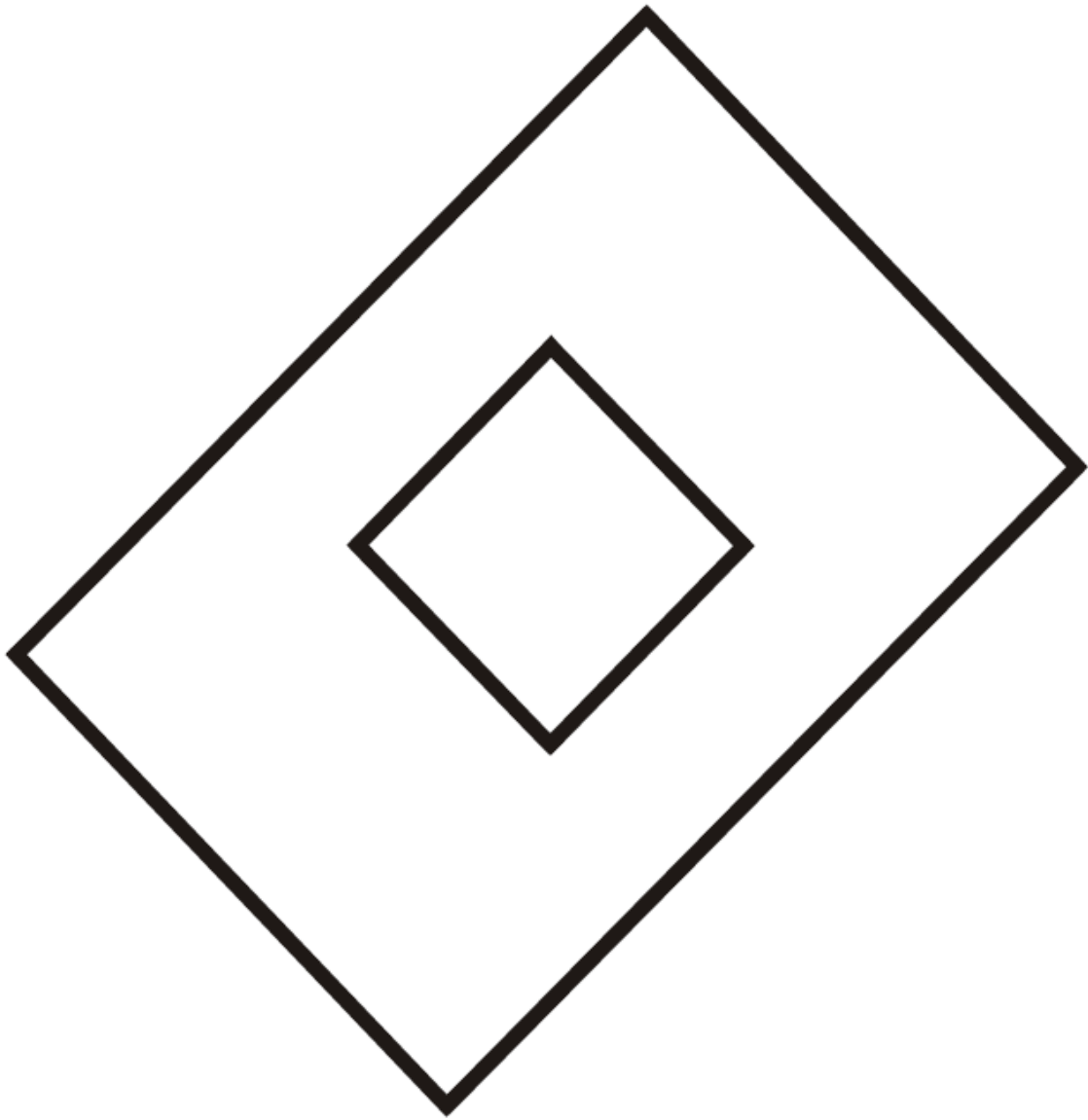
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	Group 1	Group 2
Diamond		
Square		
Other		

### ***Stimulus One***



***Module 2***  
***Stimulus Two***





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### **ACTIVE LEARNING EXERCISE 2.4**

#### ***DESIGNING A SCIENTIFIC EXPERIMENT***

<p><b>Purpose:</b> Application <b>Format:</b> Group Activity <b>Equipment:</b> Handout <b>Class time:</b> 50 min.</p>
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1. After you have completed your discussion on experimental design and controls, assign students to small groups of no more than four.
2. For a large lecture class, the students can turn in a written description of their group's design.
3. For a small class (25 to 60 students), you can use the entire class period and have one member of each group give a brief oral presentation on the group design. The other students can comment on the strengths and weaknesses of each design.
4. Each group is given a design problem and Handout 2.4. It is okay if more than one group gets the same design problem; it allows for interesting discussion. Allow 20 to 30 minutes for the class to design their experimental protocol. You should be available to students for help.

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### HANDOUT 2.4

#### **Sample Design Problems**

*You can choose from these design problems or make up new ones.*

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A teacher believes that listening to music while studying will increase students' retention. Design an experiment to test her theory. Does the kind of music matter? What can be done about this?  
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A new drug has been developed that is reported to prevent seasickness. Design an experiment to determine its effectiveness.  
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A motivational speaker claims that wearing red on the day of an exam "energizes" the brain and improves performance. Your psychology professor doubts that this is true. Design an experiment that would test whether the speaker is correct.  
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An English professor believes that students who have the opportunity to write their essays on word processors will produce better essays than those who write them out by hand. Design a study that tests the professor's belief.  
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An exercise physiologist counsels his clients to exercise in the morning rather than at night to facilitate weight loss. Design an experiment to test whether this is the correct advice.  
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A student insists that smoking marijuana does not interfere with his snowboarding skills. Design an experiment (in a laboratory) that would test for this. Why would you have trouble actually doing this?  
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Many parents assert that children "amp up" or "bounce off the wall" after they eat sugar. Design a study to determine whether this assertion is true. What do you need to do to run the study blind?  
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Your nurse friend insists that men are less likely than women to wash their hands after using a public restroom. Is this belief just a myth? Why is a survey not a good choice here?  
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Your women's studies class has a huge debate about whether young children still hold stereotyped views about what professions men and women can hold. How could you test this with access to several kindergarten classes?  
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Your friend insists that he can tell the difference between expensive bottled water and ordinary tap water. Design a study to test this assertion.

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### **Scientific Experiment Checklist**

✓ Do you need to define any terms for your experiment? If yes, define them here.

✓ What is your independent variable?

✓ What is your dependent variable?

✓ How will you select and assign your subjects to a group?

✓ What treatment will the experimental group be given?

✓ What treatment will the control group be given?

✓ What controls will you use in your experiment? Be sure to avoid experimenter bias.

✓ Is there anything you think you should control but aren't sure how?

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### **ACTIVE LEARNING EXERCISE 2.5**

#### ***APPLICATION OF THE SCIENTIFIC METHOD***

**Purpose:** Application  
**Format:** Group Project  
**Equipment:** Handouts  
**Class time:** Variable (more outside time)

One of the best ways students can learn about psychological research is by designing, conducting, and presenting their own research project. This project is especially useful for professors who want their students to do one or two larger projects during the semester. It is designed for groups of about four and helps to develop critical thinking skills for understanding the implications of these concepts. Students will be asked to report the results of their research in one of three ways to be determined by the instructor.

1. You will need 20-30 minutes to describe the project and to field questions. Additionally, a whole period should be devoted to your miniconvention, to present the results.
2. Distribute Handouts 2.5a and 2.5b to all students and have them form groups. Add due dates to the handout before distributing. Much of this project will be done on the students' time, so have them exchange phone numbers and times they are available for meetings.
3. When you discuss the presentation, give some creative examples: videotapes, posters with graphs, webpages, and so on.

#### ***How to Help Students Learn to Present Their Data***

It is important to give students feedback during the semester so that they know what they are doing is correct. It is also important for you to be sure that they are not doing harmful research. Ethics cannot be ignored here!

There are three good methods to give students the chance to share the results of their research:

- Class Poster Session
- Student Webpages
- Traditional Typed Paper with Verbal Presentation in Class

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Spend a bit of time in class explaining what happens in a poster session. Provide a section of a wall and some appropriate adhesive for displaying the posters. (A gum that won't mark painted walls is available in office supply stores.) Each group creates a poster and then the members take turns staffing their project and walking around the room to see the projects done by other students. Prizes can be awarded for best use of the scientific method, best presentation, most original idea, and most interesting finding. There can even be a higher level of competition that is college-wide if you wish.

Another method that students really love is to create webpages that describe their work. These pages should include graphics and color. There should be hot links to related webpages for reference. You can also create a class webpage where students can view the work of other students. After the first semester, you can refer students to these webpages to see the projects done by students in the previous classes.

Or, if you wish to take a more traditional approach, students could simply turn in a paper that reports their results. The best of these papers can be made available to students in later classes by keeping a library reserve file for them. Students will consider it quite an honor to be included in the library file, and your later classes will benefit from seeing well-done work.

Because the most difficult part of this project is creating the original research question and hypothesis, having access to previous student work can be very helpful. I always explain to students that real scientists don't pick ideas out of the sky—they build on earlier work. That is what they do when they extend other student work. By all means, help students as they try to narrow their focus and write a researchable question, but resist their pleas to do it for them. Prompt them to use their families, jobs, academic majors, pets, and hobbies as possible sources for good questions.

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### HANDOUT 2.5a

#### *Assignment: Outline of Project*

**This project will take much of the semester to complete. The steps are as follows:**

- Select a group to work with.
- Groups can be from 2-4 people. You should agree on a topic of interest to all of you.
- Investigate your topic.
- Look in the library for psychology journals; do an Internet search using keywords related to your topic, and read the section of the textbook that talks about this topic (out of order if necessary.)
- Write a research question about your topic.
- This should be something you don't know the answer to right now, but that you will actually be able to find out in the next two months.
- Write your hypothesis.
- What do you think you will find out, and why do you think this? Use your references to support the need for your research question and your hypothesis (prediction) about the outcome. Write the introduction to a research paper and hand it in to your professor.

**Date Due:** \_\_\_\_\_

- Design a research study to find the answer to your question.
- Create a survey, naturalistic observation study, or experiment that will test your hypothesis. Write the method section of your research study. Be sure that your method follows ethical guidelines for psychologists. Hand in the Introduction (rewritten if necessary) and Methods sections.

**Date Due:** \_\_\_\_\_

- Conduct the research.
- Collect the data. Do a simply data analysis. You may need to make tables or draw graphs of the findings. You will need to summarize them in some fashion.
- Write the Results and Discussion sections of the paper.
- The Discussion should include an analysis of whether your hypothesis was supported. If it was not supported, why do you think this happened?
- Write an abstract that describes the whole study in just a few sentences.
- Report your findings.
- You will either
- Write a paper presenting your research and do a verbal presentation, or create a webpage that presents the research, or present a poster in a class poster session.

**Date Due:** \_\_\_\_\_

## Module 2

### HANDOUT 2.5b

#### *Assignment: Psychology Research Project*

	Name	Phone Number
1		
2		
3		
4		

#### Preliminary Observations

##### **A** Field Observation

Think about what you already know about a psychological issue. Think about your family, job, pets, hobbies, or academic major. What don't you already know about it that you could actually find out in a few weeks?

Behavior

Specifically define the behavior you intend to test.

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##### Hypothesis

Write a research question and hypothesis. The hypothesis is your prediction about the answer to your question. Support your hypothesis.

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## **Module 2**

### **HANDOUT 2.5b (continued)**

#### **B** Background Research

Use the Internet or college library to find related research. Also, find one best scientific article specifically related to your hypothesis

Photocopy these two articles and bring them to class. The articles should be stapled to a cover sheet that includes all the names of members of your group and a brief explanation for your choice of articles.

On the basis of your limited literature search, refine your informal hypothesis into a formal hypothesis and include it on the cover sheet.

#### **C** Research Method

Write your descriptions of the following parts of your experiment on a separate page. This is to be handed into the instructor for approval before the experiment is conducted.

Basic description of how the study will be conducted. What method will you use?

Independent variable

Dependent variable

Method of recording data.

Controls

Debriefing method

#### **D** Data Collection

Using your experimental design as submitted and refined above, conduct your research. Photocopy all observer notes and data. These will be submitted on the day you present your results.

#### **E** Analysis & Interpretation of Data

This should include some simple statistical calculations such as means (look at the Appendix in the textbook for a discussion of statistics). Draw graphs or tables if appropriate. Also, you should include a discussion of what you think your findings mean (as opposed to what they are). Why do you think you found what you did? Can you explain why your study did or did not support your hypothesis?

What limitations to your study may have influenced the results? This report will also be submitted on the day of your presentation.



## ***Module 2***

### **F** Publication

In the official scientific community, researchers need to communicate their research findings. They present their findings at local and national conventions and/or by submitting a detailed description of their experiments, findings, and interpretations to refereed professional journals. If their project meets professional standards and is judged to contribute to scientific knowledge, it will be published.

We will be having a “miniconvention” for you to present your findings to your colleagues. Your written work will be due on this date.

Once research is published, it is often replicated and refined by other researchers. Good research often stimulates new questions and related research. This building block circular process is essential to the scientific method.

