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1. KNOWLEDGE EXERCISE: WHAT DO WE KNOW, AND HOW DO WE KNOW IT?

I. Write down 4 things that you know. Then, for each, write down how you know these things. Categorize your ways of knowing (i.e., Intuition, Authority, or Observation)

(A-D) Answers will vary depending on what the students report knowing.

II. Think of a piece of knowledge that you acquired using the method of:

Answers will vary depending on what the students report knowing

Intuition:

Authority:

Observation:

2. SCIENCE VERSUS PSEUDOSCIENCE EXERCISE

One of the goals of the course you are taking is to help you recognize the difference between scientific evidence and pseudoscience. Knowledge gained with the scientific method relies on carefully controlled studies that produce results that can be replicated. In addition, according to Lawson (2007), there are six common characteristics of pseudoscience:

- Use of imprecise, scientific-sounding language
- No evidence of continued research or new knowledge gained over time
- Reliance on anecdotes as evidence
- Reliance on authority endorsements, especially "false authorities" (i.e., people who claim to be authorities but do not have any real expertise in the area)
- Extraordinary claims without supporting evidence
- Evidence relies on confirmation rather than refutation

There are many advertisements presented in the media (e.g., TV, commercials, newspaper, and magazine ads) that rely on pseudoscience to advertise a claim or product. For this exercise, find such an advertisement and write a short paragraph that (1) describes the claim or product, (2) identifies any of the above elements of pseudoscience used in the ad, and (3) explains why the ad relies more on pseudoscience than science for its claims.

Answers will vary depending on what the students discuss

3. DESIGN A STUDY EXERCISE

Design a research study to answer one of the research questions below. Then answer the questions that follow about the study you designed.

Answers will vary depending on what the students decide to do
Choose a research question:
1) Does exposure to violence cause someone to be more violent?
2) Does having more money mean you are happier?
3) Does consumption of caffeine increase work productivity?

Consider what behavior(s) will be observed, how you can rule out alternative explanations of results, how your observations can answer the question
1) Which research question did you choose?
2) What are the operational definitions in your study?
3) What behavior(s) that you observe will answer the research question (i.e. how will you know the answer from the behaviors you are observing)?
4) What are some alternative explanations of those behaviors (other than the factor listed in the research question)?

4. NATURALISTIC OBSERVATION GROUP EXERCISE

Research Questions

1. Do people walking alone walk faster than people walking in groups of two or more?
2. Which campus building has more traffic (i.e., people going in and out) between classes?
3. Do more males or females hang out on the quad between classes?
4. Which entrance to the Student Center is used most often between classes, (e.g., 1st floor West entrance or 2nd floor East entrance)?

Research Procedures

(1) As a group discuss your research question and decide on a reasonable predicted answer to your research question. Be sure to record WHY you think this is the answer you will obtain.

(2) As a group discuss ways to use naturalistic observation of people on campus to answer your research question. Be sure to decide on the following:
   a) How long you will observe your subjects (no longer than 20 min)
   b) How you will observe the subjects UNOBTRUSIVELY
   c) What you will observe/measure
   d) How your observations will answer your research question (i.e., what observations do you expect if your prediction is correct?)
   e) Identify your Independent/Subject Variable and your Dependent Variable(s)

(3) Conduct your study and collect your observations.
Discuss what you found in your observations and how you would answer your research question based on those observations.

Prepare and present to the class:

a) Your research question and prediction (including why you made that prediction)

b) Your variables (identify if you have an independent or subject variable and your dependent variable)

c) Your method (how you obtained your observations)

d) The answer to your research question from your observations

e) Any limitations you found using this method to answer your question

Briefly discuss what worked well and what didn’t work well with your naturalistic observation. If you had it all over to do again, what would you do differently? Why?

Answers will vary depending on what the students decide to do

5. SURVEY RESEARCH EXERCISE

Answers will vary depending on what the students decide to do

Constructs:

(A) Friendliness
(B) Introversion
(C) Helpfulness
(D) Depression
(E) Intelligence
(F) Punctuality
(G) Flexibility
(H) Anxiety

Instructions:

1. As a group discuss your construct and some behaviors that might tell you how a person rates on the construct.

2. Decide on a measurement scale. Use closed-ended questions. Decide what categories you will use as responses. If you are using a Likert scale, be sure to define the range of responses and include anchors. Also discuss a way you might verify the reliability of your survey.

3. Write 10 items for your survey that assess your construct. Be sure to write questions as clearly as possible and using simple language. Be sure each member of your group has a copy of the complete survey with exact wording.

4. Administer your survey to someone you think is high on the construct and to someone you think is low on the construct. Compare their responses to your predictions about them.

5. Prepare to present to the class (in your group) at the next class meeting:

a) Your construct and some behaviors your group thought were related to the construct

b) A sample copy of the survey
(c) A summary of the responses you got and how well the responses matched your predictions about the people
(d) An overall evaluation of the validity of your survey
(e) A method for testing the reliability of your survey
(6) Elect someone from your group to present the information in (5) with the help of others in the group.

6. SCIENCE IN THE NEWS

Answers will vary depending on the article(s) the students find

Find an article in the newspaper that reports the results of some research (hint: check the science section). For that article try to identify as many “scientific method details” about the research that you can.

For example: What was the hypothesis for the research? What methodology was used (e.g., experimental, correlational, case study, etc.)? How were the participants obtained? What were the conclusions of the research? What were the limitations of the study?

How convinced by the study results are you? What questions about the research do you have? What other details were left out that you wish had been reported?

7. HOW TO READ EMPIRICAL JOURNAL ARTICLES

No answers required.

8. READING JOURNAL ARTICLES

EXERCISE — ASEFFI AND GARY (2003)

This exercise accompanies a reading of:


Please answer the following questions about the Assefi and Garry article (you must read through the article before you begin this assignment – the reference to the article is provided above and can be found in PsycInfo). For each question, indicate which section of the article (e.g., Introduction, Method, etc.) the information was in.

1. What is the research question?
   [Introduction] Does the mere suggestion of alcohol consumption (using alcohol placebos) affect memory performance and accuracy?
2. How did they answer the research question? (Hint: you should be able to answer this question by reading the Introduction of the paper)

[Introduction] Participants were asked to drink a beverage (tonic water). Half of the participants were told that the drink was tonic water, the other half were told that it was a vodka and tonic and asked participants to complete a memory task with misleading information.

3. Do the authors make a hypothesis? If so, what is it?

[Introduction]

H1) Participants who were told that they had consumed alcohol would be more likely to be mislead by false information

H2) There would be no difference on the neutral (no misleading information) items between those who were told they had consume alcohol versus soda water

4. What type of research method did the authors use?

[Method] Experimental. The researchers manipulated two independent variables.

5. Do you think the data collection method used in the study qualifies as naturalistic observation? Why or why not?

This study does not qualify as a naturalistic observation because the participants were tested within a laboratory setting, under specific experimental manipulation.

6. What was measured in the study and how was it measured? (Hint: Two things were measured – see the headings in the Results and Discussion section)

[Results and Discussion] The authors examined the extent to which participants were misled by information in the narrative (which they called the “misinformation effect”) and participant’s confidence in their memories for details of the event.

The misinformation effect was measured as number of correctly recognized responses as a function of implied drink type (“vodka tonic” vs. tonic water) and information accuracy (misleading vs. neutral).

The participants’ confidence was measured based on their ratings of confidence as a function of the levels of the two independent variables.

7. How was the influence of alcohol examined in this study? (Hint: read the Method section carefully)

Participants were told that they were consuming alcohol (or tonic water in the control condition). Additionally, the experimenters employed a number of other procedures to convince the participants that they were drinking alcohol (a weigh in, poured from a bottle labeled vodka, and rimmed vodka smelling limes). All participants received soda water, so the “effect of alcohol” is really the effect of thinking that one had consumed alcohol.
8. What was the difference between the “control items” and the “misled items”?

The slide show the crime that was later used as the basis of the memory test had a number of critical features. Within the narrative, half of these features were mentioned with misleading information about these critical features while the other half were neutral with respect to these features (e.g., if the slide show had a white candle, the misleading information would be “yellow candle” and the neutral condition would be “candle”).

9. What do the results shown in Figure 1 tell you about how social factors affect memory performance?

Figure 1 presents the results of the misinformation effect. The two bars on the left show no difference in accuracy on control items between participants who thought that they had consumed alcohol and those who thought that they had consumed soda water. The two bars on the right show that participants who thought that they had consumed alcohol were more effectively misled (i.e. made more mistakes on items with misleading information) than those who thought that they had consumed tonic water.

10. How did the “told alcohol” condition affect the subjects’ confidence in their memories?

Figure 2 presents the results of the confidence scores. In contrast to the results of the misinformation effect (see solution to the previous question), participants who thought that they had consumed alcohol were more confident in their answers in both the neutral (control) and misleading (experimental) conditions.

11. Based on the results what answer did the authors get to their research question?

The data supported both of the researchers’ predictions (see solution to question 3)

12. What is the main piece of information learned by this study?

The main finding of this study is that an alcohol placebo (i.e. a belief that you have consumed alcohol, even when you haven’t) can result in higher susceptibility to misinformation and also boost confidence in one’s memory; in essence, these data suggest that the implied consumption of alcohol can both decrease the accuracy, and increase the confidence in one’s memory.

13. Based on what was learned, what real world application does this study have?

Answers will vary here. Should mention the impact of social expectations on memory performance.


This exercise accompanies a reading of:

Please answer the following questions about the Mueller and Oppenheimer article (you must read through the article before you begin this assignment—the reference to the article is provided above and can be found on the Sage Student Site). For each question, indicate which section of the article (e.g., Introduction, Method) the information was in.

1. State the research question.
   Do differences in note-taking methods – laptop versus longhand – affect academic performance?

2. Discuss some of the past research regarding hand note-taking versus laptop note taking. Which is more advantageous to learning? (Hint: all researchers may not agree)
   Answers will vary. Should include that one explanation for differences as a function longhand versus typing performance relates to shallow processing (and/or verbatim note-taking) and distraction in computerized methods. May also include that these effects are sometimes limited to conceptual items, and less so to factual ones.

3. Do the researchers state a specific hypothesis? If so, what is it? If not, what is your hypothesis (or prediction)?
   The researchers do not directly state a hypothesis (though implied by “[…] three experiments to investigate whether taking notes on a laptop versus writing longhand affects academic performance […]”).
   Student hypotheses will vary, but should resemble the statement above.

4. Study 1: How did the researchers design the experiment to answer their research question (this can be found in the Method section).
   [Method] Before students arrived, the researchers set a table with either laptops or computers, depending on the condition. Otherwise, the researchers designed the experiment to mirror everyday learning scenarios. They asked the students to use usual note-taking practices while they were to watch one of five TED talks. Then, the students were taken to a lab to complete a difficult memory task (used as a distractor). Then, students responded to factual and conceptual questions about the TED talks.

5. What change in methodology did the researchers make from Study 1 to Study 2? Why?
   [Study 1 Discussion] In study 2, the researchers asked students to refrain from verbatim transcription in note taking. In Study 1, the researchers found that note-taking style (computer vs longhand) was directly related to performance. They also found that computer note-takers used more verbatim transcription than longhand note-takers; further analyses of their data suggested that verbatim note taking was one driving force (a.k.a. mechanism, mediator) of the differences in performance between computer and longhand note-takers.
   By instructing students not to use verbatim note-taking, the authors hoped to follow up their findings by controlling for transcription strategies (i.e. examining differences in methods when transcription is out of the picture).
6. Was the above change effective in answering their follow up question?

[Study 2 Results] A content analysis showed that the intervention was not effective at reducing verbatim transcription in notes. The researchers found the same pattern, and the magnitude of the differences between the laptop and longhand note-taking conditions became smaller when the instructions asked students to avoid transcription. However, these differences are unrelated to transcription.

7. What are some possible limitations of Study 2 and how did they design Study 3 to alleviate those limitations?

[Study 2 Discussion] Study 2 did not investigate the possibility that computer note-taking – which usually produces longer notes – could be more beneficial to students after an opportunity to study their notes. Study 3 added one week between the note-taking and testing phase and a new independent variable of study/no study before the testing phase.

8. Briefly summarize the main (and important) findings from Study 1, Study 2, and Study 3.

Answers may vary. Studies 1 and 2 found that longhand note-taking results in better test performance compared to computer note-taking. Study 3 found that longhand note-taking is more beneficial for long term learning when studied before retrieval or testing.

9. Overall, what do the results suggest for note taking?

Answers will vary. Should include that all three studies suggest that longhand note-taking results in significantly better exam performance; the third study suggests that the effects of longhand note-taking are enhanced when longhand notes are studied before testing.

10. What are some real world applications of this study and how can students use this information for their own learning?

Answers will vary.


This exercise accompanies a reading of:


Please answer the following questions about the Lee et al. article (you must read through the article before you begin this assignment—the reference to the article is provided above and can be found on the Sage Student Site).

For each question, indicate which section of the article (e.g., Introduction, Method) the information was in.
1. Explain why, specifically, the three stories utilized in Experiment 1 were chosen as modes of researching honesty in children for this experiment. How do these stories differ from each other in a way that can be accurately tested?

[Introduction] The experimenters chose these stories because parents and teachers regularly use them to promote honesty in children. The three stories use different methods to promote honesty; one promotes honestly in immediate negative consequence (Pinocchio’s nose grows immediately); one teaches that the consequences to lying are long-term (the boy who cries wolf lies so often that no one believes him when the wolf finally comes); the last teaches positive consequences of honesty (George Washington’s father rewards and commends him after he confesses to cutting down the cherry tree).

2. Explain the modified temptation-resistance task used in this experiment. Do you think this is a good task for measuring lying in children? Why or why not?

[Methods — Materials and Procedure] Participants played a game with the experimenter that required identifying a type of toy by the sound it made; the children sat with their back to a table, and the experimenter pressed a sound-toggle button on a toy. The children were asked to guess what the toy was. Then, the experimenter said that s/he needed to get a book from the car, placed a new toy on the table, and instructed the participant not to look at the toy. Then, the experimenter returned with a book and read the story that matched the condition. Afterwards, the experimenter asked the children if they peeked at the toy while the experimenter was gone.

Responses to the opinion portion of the question will vary.

3. What were the hypotheses for the three stories presented? Be sure to differentiate these predictions between the younger and older children.

The authors predicted that the cheaters who heard “the boy who cried wolf” would be more included than cheaters who heard the other stories to confess to cheating (due to the fatal consequences of lying in the story). They also predicted this effect would only be seen in older children because they have a better understanding of death. They expected that children who heard “Pinocchio” would be more likely to confess their cheating behavior across age groups, because the consequences of lying (in this case) involve public humiliation – something that should be relatable across age groups. They also predicted that “George Washington and the Cherry Tree” would be effective in promoting honesty across age groups because the story features the benefits of honesty.

4. Explain the purpose behind why “The Tortoise and the Hare” was used in this experiment.

The story “The Tortoise and the Hare” was told in the control condition, because it didn’t involve lying nor discussed the consequences.

5. The children in Experiment 1 were coded into three separate groups. What were these and how was this coding procedure conducted?

Non-Peekers, Peekers who lied (liars), and Peekers who confessed (confessors).
Peeking was operationalized as the presence or absence of a 90° head turn when the researcher was away. Peekers who confessed when the researcher asked, were coded as confessors; peekers who lied when the researcher asked were coded as liars.

6. Based on the results from Experiment 1, what answer did the authors get to their research question?

The researchers found that hearing “George Washington and the Cherry Tree” promoted honesty in children.

7. What was added for Experiment 2, and what was the purpose of adding this factor?

The authors changed the story slightly in Exp 2, because they hypothesized that the GW story promoted honesty by illustrating the benefits of honesty, rather than the implications of dishonesty. To test this, they added a new GW story condition but changed the classic ending to focus on the implications of lying.

8. Utilizing the results presented in Table 1 and Figure 1, answer the following questions:

a. How common was peeking behavior?
   Percentage of peekers ranged from 61-92% of subjects.

b. What variable was a significant predictor of peeking behavior in children?
   Age

c. What variable was a significant predictor of honesty in children who did peek?
   Condition

9. What did the results from the manipulation in Experiment 2 tell us about lying and honesty in children?

The results tell us that the stories that most effectively promote honesty illustrate the benefits of honesty rather than the consequences of dishonesty.

10. It is noted when discussing the limitations of the study that the researchers told the children to emulate the protagonist of each story. What sort of confound does this create in the results? What are some potential ways in which this could be changed to eliminate this confound?

   Responses will vary.

11. How does the information you learned in this article relate to previous concepts you may have learned in other psychology courses (e.g., positive reinforcement, positive punishment, negative reinforcement, negative punishment, classical conditioning, etc.)?

   Responses will vary.

12. The stories used in these experiments are models that represented the immediate negative effects of lying (Pinocchio/Negative George Washington), the delayed negative effects of lying (The Boy Who Cried Wolf), and the immediate positive effects of honesty (George Washington and the Cherry Tree). What might you predict the results to be if a story was included about the delayed positive effects of honesty? Why?

   Responses will vary.
14. Do you think influence from media (childhood movies, television shows, etc.), instead of childhood picture books, might be any more effective in promoting honesty? Why?

Responses will vary.

15. Is it possible to apply the results from this study to ages past childhood? For instance, if one were attempting to investigate how to promote honesty and reduce lying behavior in adolescents, how could this study be modified?

Responses will vary.

16. How might the results from this study apply to other moral conventions that we attempt to teach children (e.g., manners, bullying, hard work)? In what ways might the study have to be modified to investigate other moral conventions?

Responses will vary.


This exercise accompanies a reading of:


Please answer the following questions about the Roediger and Karpicke article (you must read through the article before you begin this assignment—the reference to the article is provided above and can be found on the Sage Student Site).

1. The research question addressed in this study is

   a) Of all study techniques, which is the best?
   b) Which study technique do students use most often?
   c) Which study technique is better: re-reading or recalling?
   d) Which information is better remembered: a story about otters or a story about the sun?

2. The researchers’ hypothesis in this study is

   a) Information about otters will be remembered better than information about the sun.
   b) Recalling information will result in better memory than re-reading the information.
   c) Re-reading information will result in better memory than recalling information.
   d) None of the above.

3. Learning condition in Experiment 1 was manipulated within-subjects. This means that

   a) all subjects received both the re-reading and recalling learning conditions.
   b) subjects only completed either the re-reading or the recalling learning condition.
   c) subjects did not receive either of these conditions in the study.
4. The main results of Experiment 1 were that
   a) recall for the otter passage was higher than recall for the sun passage.
   b) recall was higher when subjects recalled the passage than when they re-read the passage before the final test for all test delays.
   c) subjects recalled more about the passage they found more interesting.
   d) recall was higher when subjects recalled the passage than when they re-read the passage before the final test, but only for test delays greater than 5 min.

5. Experiment 2 as conducted to
   a) replicate the results of Experiment
   b) generalize the results of Experiment 1 to new passages.
   c) Examine effects of taking multiple tests between study and the final test.
   d) Both a and c.

6. The results of Experiment 2 showed that
   a) recalling the passages always resulted in better memory than re-reading them.
   b) repeated tests of the passages resulted in less forgetting over the 1 week delay than the other learning conditions.
   c) subjects recalled less information when the passages were changed.

7. The primary conclusion from this study is that
   a) people remember more about animals than other topics.
   b) recalling information will help you remember better than re-reading it over the long term.
   c) the best study technique for students seems to be re-reading their notes.
   d) all of the above.

12. LAB ASSIGNMENT: LIBRARY EXERCISE

1. How does an empirical journal article differ from a popular magazine article (e.g., an article in *Time* magazine)? Who is the intended audience of empirical journal articles in psychology?

An empirical journal article is considered a primary source; researchers write these to describe the procedures and results of a research study. Popular magazine articles are considered secondary sources, because they provide summaries of scholarly work written by other researchers. Empirical journal articles are written for other researchers in the field.

2. Describe how you might use PsycINFO to conduct a literature review on the topic of obesity stereotypes and biases. Describe the steps you would take to collect relevant articles for your literature review and what you might expect to find at each step.
The best way to conduct the search would be to use topic words as search terms for articles on those topics. The keywords may have to be searched for separately with a *combine* function used to look for articles that discuss all three topics. The number of articles found for each keyword on its own would be large, but combining the searches would reduce the number. If the number is still too large after combining the searches, you can focus on more recent articles and/or exclude articles that are not peer-reviewed articles from a journal.

3. Using PsycINFO, find an article authored by Larry L. Jacoby that was published in 1991, and then write the APA-style reference for the article below.


4. Using PsycINFO, find a recent article (2005-2010) that examines the relationship between violence on TV and violent behavior in children. Write the APA-style reference for the article below.

Answers will vary depending on what articles the students locate.

13. LEARNING CHECK – BASICS OF PSYCHOLOGICAL RESEARCH

1. Give an operational definition for “hungry.”
   Answers will vary. Answers include:
   - Time since last meal
   - Number of stomach growls in 1 hour

2. Give an example of a hypothesis that can be made from the theory “sleeplessness causes depression”
   Answers will vary. Answer should include some form of “people who get limited sleep are more depressed than people who do not”.

3. What is the difference between a data-driven hypothesis and a theory driven hypothesis?
   A data-driven hypothesis is a prediction based on existing and/or published data. A theory-driven hypothesis is not guided by existing data, and is instead is based on ideas or observations.

4. What is the purpose of conducting a literature review when conducting a research study?
   A literature review helps you identify what is already known about a topic, and what questions remain unanswered.

5. In what ways does naturalistic observation differ from other data collection techniques?
   Naturalistic observation is unobtrusive, unsystematic, and occurs in everyday environments; data collection is systematic and occurs in a controlled setting (e.g. a laboratory).
6. Psychologists use which method of knowing in learning about behavior?
   a) logic
   b) authority
   c) observation
   d) intuition

7. Which of the following is NOT a key element of an experiment?
   a) control
   b) an independent variable
   c) naturalistic observation
   d) causal explanations

8. The best synonym for a theory is
   a) A prediction
   b) An explanation
   c) A bias
   d) An independent variable

   A study was conducted to learn about the social interactions of elementary-aged schoolchildren. The children were observed during recess for a 6-month time period. Results showed that as age of the children increased, they were more likely to have verbal interactions with their peers.

9. The study described above is an example of the ______________ research method.
   a) experimental
   b) naturalistic
   c) case study
   d) correlational

10. The study described above employs the use of which data collection method?
    a) archival data
    b) naturalistic observation
    c) experimental data
    d) interviews

11. Which of the following was a dependent variable in the above study?
    a) age
    b) observation time
    c) social interaction
    d) a and c
    e) b and c
    f) none of the above
12. In which section of a journal article would you find a listing of the raw data?
   a) Introduction
   b) Method
   c) Results
   d) None of the above

14. RESEARCH DESIGN EXERCISE

For the research questions below, design a study to answer the question using the research design specified. Be sure to describe any variables you would include in the study, as well as any operational definitions needed. Responses may vary slightly in content and detail. Example responses below.

1. Does watching violence on TV cause violent behavior? (experiment)
   Randomly assign participants to watch violent television or non-violent television, and measure violent behavior afterwards.
   IV: Watch Violent Action Film or Children’s Cartoon Movie
   DV: Number of yelling or hitting behavior in the four hours after watching the movie.

2. Do people who play video games have better hand–eye coordination in other tasks? (correlational)
   Ask participants how frequently they play video games, and assess their hand eye coordination. Then, analyze the relationship between frequency of play and coordination.

3. Does divorce in families negatively affect children? (case study)
   Find a family that has experienced a divorce. Then, interview and observe the child(ren) in the family.

4. Are smoking and lung cancer related? (quasi-experiment)
   In a large and random sample of people, assess the smokers’ and non-smokers’ history of lung cancer.

5. Does studying with background music improve test scores? (experiment)
   Randomly assign one group of students to study with music, and assign the another group to study without music. Then, analyze difference in test scores between groups.

6. Are there fewer helping behaviors in large cities? (correlational)
   Use city records to find the population of a city, and measure the frequency of helping behaviors in the city/ies of interest. Operationalization of “helping behaviors” will vary. Possibilities include:
   o Amount of money donated to charity
   o Number of bus-seats given to the elderly
   o Number of doors held for other walkers in a public venue
7. Are color and mood related? (correlational)
   Study the relationship between hue/color wavelength and mood

8. Are caffeine and work productivity related? (quasi-experiment)
   Ask a random sample of participants about their caffeine consumption. Then, compare differences in productivity (e.g. work performance, number of completed tasks, etc) between people who report consuming caffeine and those who do not.

9. Does watching violence on TV cause violent behavior? (correlational)
   Have a random sample of participants complete a survey including a count of TV viewing hours over a finite period (e.g. 7 days) of time, and a recalled count of yelling and hitting behaviors over the same time period.

10. Do people who play video games have better hand–eye coordination in other tasks? (experiment)
    Assign a random sample of participants to one of two conditions: Video game play, and video game watch. Assign each group to the same schedule of play, and measure their success in a hand-eye coordination task.

15. DESIGN AND DATA COLLECTION EXERCISE

   For each study description below, identify the data collection technique and the research design that were used. [...see full excerpts in text]

   a) Researchers (Bartecchi et al., 2006) were interested in the effects of a new law banning smoking in public places on health. […]
      Data collection technique: Archival Data
      Research design: Quasi-experiment

   b) To evaluate the validity of a newly created survey measure of college students’ satisfaction with their major, a researcher (Nauta, 2007) […]
      Data collection technique (there is more than one in this study): survey/questionnaire and archival data
      Research design: correlational study

   c) Researchers (Assefi & Garry, 2005) were interested in the effects of the belief that one has consumed alcohol on cognition. […]
      Data collection technique: Systematic observation
      Research design: Experiment
16. IDENTIFYING AND DEVELOPING HYPOTHESES ABOUT VARIABLES

Finding and developing research ideas takes practice. One source of some research ideas is our common wisdom. This exercise has you practice developing commonly held beliefs into testable research ideas. Listed below are 10 statements that are common pieces of cliché advice (many of which you may have heard at some point in your life). Pick two of the clichés, and turn them into testable research ideas.

<table>
<thead>
<tr>
<th>Absence makes the heart grow fonder.</th>
<th>Experience is the best teacher.</th>
</tr>
</thead>
<tbody>
<tr>
<td>All work and no play make Jack a very dull boy.</td>
<td>An apple never falls far from the tree.</td>
</tr>
<tr>
<td>Good fences make good neighbors.</td>
<td>He who laughs last, laughs longest.</td>
</tr>
<tr>
<td>Ignorance is bliss.</td>
<td>A rose by any other name still smells as sweet.</td>
</tr>
<tr>
<td>Opposites attract (relationships).</td>
<td>An apple a day keeps the doctor away.</td>
</tr>
</tbody>
</table>

For each of the clichés that you select:

- Identify a potential research method that may be used to investigate the idea
- Identify the relevant variables and specify how the researcher might manipulate and/or measure the variables
- Identify other variables that might be relevant (e.g., to control or measure)

Responses will vary.

17. EXPERIMENTS EXERCISE

Imagine that you were a participant in an experiment where you were asked to eat cookies and rate how much you liked each cookie on a scale from 1 to 5, where higher ratings mean higher liking of the cookie. You are asked to eat an Oreo cookie and rate it and then eat a Chips Ahoy cookie and rate it. For this experiment, answer the questions below.

1. What is the independent variable (IV)? What are the levels of the IV?
   - IV: Cookie Type
   - Levels: Chips Ahoy vs. Oreo

2. Was the IV manipulated between-subjects or within-subjects? How do you know?
   - Within-Subjects. Participants were asked to eat one type of cookie, and then the other.
3. What is the dependent variable (DV)? What operational definition was used in the experiment?

   DV: Rating of how much each participant liked each respective cookie.

4. What scale of measurement was used for the DV?

   Ordinal

5. The IV was bivalent. Explain how you can make it multivalent.

   We can make the IV multivalent by adding another level to the IV. (e.g. oreo vs. chips ahoy vs. vanilla wafer)

6. Change the cookie experiment into a factorial experiment. Explain what you would need to add and what conditions you would have in your factorial experiment.

   Responses may vary slightly, but should include the same components (2 IVs).
   To make this a factorial design, we need to add another independent variable. For instance, we might investigate both the “liking” of each cookie, and how that rating changes when each cookie is paired with milk.
   Example:
   IV: Cookie Type (Oreo vs. Chips Ahoy)
   IV: Milk (with milk vs. without milk)

7. Do you think the cookie experiment has more internal validity or external validity? Explain your answer.

   This study has more external validity than internal validity. The subjects tasted both cookies, one right after the other. The carry-over taste from one cookie could influence a participant’s rating of the next one. In everyday life, people are likely to have carry over tastes when eating cookies too (e.g. eating a cookie after dessert). So, while the internal validity of this study is lower due to this possible confound, it demonstrates high external validity.

8. What is the independent variable in the Roediger and Karpicke (2006) study? What are the levels? How does this IV connect with real-world situations?

   The IV was the study method – participants were randomly assigned to recall as much as they could right away (quiz-yourself condition), or re-read a studied passage (re-reading condition). This experiment systematically tested everyday study habits to test their effectiveness.

9. What was their dependent variable? How was it operationally defined?

   To operationalize “effectiveness” of a study method, Roediger and Karpicke (2006) measured the percentage of correct information recalled from the passage.

10. Why does the Roediger and Karpicke (2006) study show that the read-test study technique causes one to remember better? Why don’t the sample survey data below show that the “read over your notes” technique listed most often causes better test scores?
Surveys can’t tell us about causality because we can’t rule out alternative explanations. It could be, for instance, that students who read over their notes to study (and report doing so on the survey) may not do very well in their coursework. Alternatively, the students who took this survey may have been in different subjects, learning topics of varying difficulty. The Roediger and Karpicke (2006) study holds other variables constant with the goal of isolating the effect of study method, and their effects on material retention and memory.

18. INDEPENDENT AND DEPENDENT VARIABLES EXERCISE

Part 1: Identifying Independent (IV) and Dependent variables (DV)
Remember that an independent variable is manipulated, while a dependent variable is measured and may changed as a result of exposure to the independent variable.

1. Jury decisions are influenced by the attractiveness of the defendant.
   IV: Attractiveness
   DV: Jury decision/verdict

2. A drug company is advertising a new drug that helps people recover from jet lag faster. You are skeptical, so you conduct an experiment to test their claim. In your experiment, 100 people are flown from San Francisco to Tokyo. During the flight, half the participants are given the drug company’s new drug. The other half of the participants are given a placebo (i.e., sugar pill) during the flight. Six hours after they land, all participants are asked to rate how sleepy and disoriented they feel.
   IV: Jet-Lag drug vs. Placebo
   DV: Sleepiness and disorientation after the flight

3. Vohs and Schooler (2008) conducted a study to investigate the effect of beliefs about free will on behavior. Thirty college students participated in their study. Participants were randomly assigned to read one of two paragraphs taken from the same book. One of the paragraphs suggested that scientists believe that free will is an illusion. The other paragraph discussed consciousness and did not mention the topic of free will. All participants were then asked to complete a set of math problems, presented one at a time on a computer screen. Participants were asked to complete each problem. They were also told that the computer program had an error such that the answers to some of the problems may appear with the problem and that they should try to solve the problems on their own (they could make the answer disappear by pressing the space bar when the problem appeared). The researchers measured the number of times the participants pressed the space bar as a measure of cheating behavior (more presses means less cheating).
   IV: Read paragraph about consciousness on free will VS not free will.
   DV: Number of times the participant chose to hide the answer (i.e. not cheat when given the opportunity)
19. IDENTIFYING VARIABLES FROM ABSTRACTS

1. Find the abstract for each of the following articles (either in PsycINFO or in the journal):
   - Ferreira, V. S., & Humphreys, K. R. (2001) in *Journal of Memory and Language*

2. Include a copy of these abstracts with your lab exercise.

3. Try to identify as many of the following as possible based on the abstract:
     a) Who were the participants (e.g., kids, college students, etc.)
        
        **From the abstract:** Experiment 1 reports the results of 6 participants. Experiment 2 examined 64 participants. The abstract doesn’t report information about the participants used in Experiments 3 and 4.
        
        **From the article:** Experiment 1 tested 6 students (who were paid for participation). Experiment 2 tested 64 participants recruited from psychology courses. Experiment 3 tested 6 students & Experiment 4 tested 96 students. None of the participants were in more than one of the experiments.
        
     a) independent and dependent variables
        
        The paper describes four different experiments in which participants were given lists of task names to remember and lists of stimuli on which to perform the tasks. Experiment 1 compared task span and traditional memory span (so the IV was task type). Experiment 2 was similar to Experiment 1 except that the participants were unpracticed (again the IV was task type). Experiment 3 examined memory spans for lists that were either consistent or varied with practice (the IV is consistency of the lists with practice). Experiment 4 manipulated the number of task switches (the IV was the number of task switches). The DV in all of the experiments was number of correctly recalled items.
        
        From the article: There were additional variables in the studies described in greater detail in the article. In addition to tasks (there were actually three levels of this variable: task span (perform), memory span (recall), and a control (single task). The researcher also manipulated list length. In addition to accuracy measures, the researcher also examined reaction times as a function of list position. The remaining experiments also are more complex than described in the abstract.

     b) main results
        
        The results suggest there is no trade-off between storage of information in long-term memory and task switching.

     c) implications of the results
        
        The results are interpreted as supporting some theories of executive control over others.

   - Ferreira, V. S. & Humphreys, K. R. (2001) in *Journal of Memory and Language*
     a) Who were the participants (e.g., kids, college students, etc.)
        
        From the abstract: This abstract doesn’t give this information. It only refers to “speakers.”
From the article: There were four experiments. Each experiment tested 48 native English speakers recruited from the University community. Participants were given either course credit or payment.

b) independent and dependent variables

From the abstract: The experiments used a task designed to create speech errors in which different elements exchange with other elements (e.g., “trucked the park”). The elements were nouns and verbs in phrases like “______-ed the ________.” Pronounced stress patterns used on the words reveal whether the word is a Noun (e.g., REcord) or a verb (e.g., reCORD). So the IV appears to be Type of Word, and the DV is what is said in the task (in particular when errors are produced)

From the article: The experiments employed an error elicitation task. Speakers heard pairs of words (e.g., “tape record” and were asked to say the words in the phrase “______ed the ______.” In some conditions the participants were instructed to insert the words in the same order (REPEAT condition) or in the switched order (SWAP condition). The dependent variables were the number of stem exchanges and stress shifts (or segment substitution in Exp 4) in the errors that participant produced.

The independent variables were word type and direction of instruction (swap versus repeat). The three levels of word type were

1) stress shifting words (e.g., REcord-reCORD)
2) Noun-verb control words (stress doesn’t change between N/V forms, e.g., comment)
3) Noun-adjective control words (when suffixed with –ed, cannot be verbs, e.g., talent)

c) main results

Nouns that were produced in verb positions (speech errors) were produced as verbs

d) implications of the results

The results were counter to the predictions of standard accounts of language production, supporting a view in which morphological processing in strongly influenced by syntactic information.


a) Who were the participants (e.g., kids, college students, etc.)

The abstract doesn’t indicate much information about who the participants were.

The article does detail this information. 41 students, ranging from 17 to 31 years of age. They were recruited from the local university community.

b) independent and dependent variables

Participants controlled a moving dot on a computer screen either alone or in a pair (with another participant). This is one of the IVs (with 2 levels). At some point the moving dot disappeared, and the participant had to report where they thought that the dot had vanished. The accuracy of their estimate was the dependent measure.

The article: the article identifies an additional IV in the experiment. The researchers also manipulated how much of an impact a button press had on the movement of the dot. This added another dimension to the quality of control that the participants had on the behavior of the dot
c) main results
Participants were better able to estimate where the dot vanished as a function of how much control they had over the dot (the more control, the better the estimates).

d) implications of the results
The results have implications for theories about localization of error. In particular the data suggest that action-planning factors need to be included as well as stimulus and cognitive factors.

20. IDENTIFYING VARIABLES FROM EMPirical ARTICLES

Please answer the following questions about the variables used in the Sayette et al. study (you will need to read the article to answer most of the questions – the reference to the article is provided above and can be found on the Sage Student site)

1. The purpose of the Sayette et al. (2009) study was to investigate the effect of alcohol on mind wandering (i.e., lapses of attention to a task). Based on the purpose and title of the article (and without reading the article), what do you think the independent and dependent variables in this study were?
   IV: Alcohol consumption (either present/absent or amount)
   DV: mind wandering measured as lapses of attention to a task

2. After reading the article, can you state the authors’ research question using the conditions in their study?
   Does alcohol consumption increase mind wandering (self-reported and reports from a prompt) compared with a placebo?

3. What was the primary independent variable in the study? How was it manipulated (i.e., what was the researchers’ operational definition of “alcohol”)?
   Consuming alcohol or consuming a placebo (similar drink that smelled of vodka, but did not contain vodka)

4. What were the dependent variables in the study (i.e., how did the researchers operationally define “mind wandering”)? How were they measured?
   Amount of mind wandering reported by self and when prompted

5. What results were found in a comparison of the independent variable groups for each dependent variable? In other words, for which dependent variables were there group differences and which group had a higher mean score on each dependent variable?
   The alcohol group reported more “zoning out” when prompted than the control group, but no difference was found between groups for the self-reported “zone outs”

6. Overall, what did the authors learn from this study?
   Alcohol increases mind wandering that the person is not aware of.
21. INTERNAL AND EXTERNAL VALIDITY EXERCISE

For each Abstract below, evaluate the internal and external validity of the study (remember, that in many studies, the higher one is, the lower the other is). Also identify two or three issues that could threaten the internal validity of the study.

Responses will vary.

1. There is evidence suggesting that children’s play with spatial toys (e.g., puzzles and blocks) correlates with spatial development. Females play less with spatial toys than do males, which arguably accounts for males’ spatial advantages; children with high socio-economic status (SES) also show an advantage, though SES-related differences in spatial play have been less studied than gender-related differences. Using a large, nationally representative sample from the standardization study of the Wechsler Preschool and Primary Scale of Intelligence–Fourth Edition, and controlling for other cognitive abilities, we observed a specific relation between parent-reported frequency of spatial play and Block Design scores that was invariant across gender and SES. Reported spatial play was higher for boys than for girls, but controlling for spatial play did not eliminate boys’ relative advantage on this subtest. SES groups did not differ in reported frequency of spatial play. Future research should consider quality as well as quantity of play, and should explore underlying mechanisms to evaluate causality. (Jirout & Newcombe, 2015)

2. Although self-rated personality traits predict mortality risk, no study has examined whether one’s friends can perceive personality characteristics that predict one’s mortality risk. Moreover, it is unclear whether observers’ reports (compared with self-reports) provide better or unique information concerning the personal characteristics that result in longer and healthier lives. To test whether friends’ reports of personality predict mortality risk, we used data from a 75-year longitudinal study (the Kelly/Connolly Longitudinal Study on Personality and Aging). In that study, 600 participants were observed beginning in 1935 through 1938, when they were in their mid-20s, and continuing through 2013. Male participants seen by their friends as more conscientious and open lived longer, whereas friend-rated emotional stability and agreeableness were protective for women. Friends’ ratings were better predictors of longevity than were self-reports of personality, in part because friends’ ratings could be aggregated to provide a more reliable assessment. Our findings demonstrate the utility of observers’ reports in the study of health and provide insights concerning the pathways by which personality traits influence health. (Jackson, Connolly, Garrison, Leveille, & Connolly, 2015)

3. We showed that anticipatory cognitive control could be unconsciously instantiated through subliminal cues that predicted enhanced future control needs. In task-switching experiments, one of three subliminal cues preceded each trial. Participants had no conscious experience or knowledge of these cues, but their performance was significantly improved on switch trials after cues that predicted task switches (but not particular tasks). This utilization of subliminal information was flexible and adapted to a change in cues predicting task switches and occurred only when switch trials were difficult and effortful. When cues were consciously visible, participants were unable to discern their relevance and could not use them to enhance switch performance. Our results show that unconscious cognition can implicitly use subliminal information in a goal-directed manner for anticipatory control, and they also suggest that subliminal representations may be more conducive to certain forms of associative learning. (Farooqui & Manly, 2015)
22. LEARNING CHECK – EXPERIMENTAL DESIGNS

1. A psychologist is interested in the effect of peer pressure on risk-taking behaviors of college students. The psychologist designs an experiment to determine this effect where 200 students (who volunteer to serve as participants) are randomly placed in one of two situations. In each situation, five participants sit in a room with four other people. The four other people are actually confederates of the experimenter (i.e., they are part of the experiment), and their behavior is determined before the experiment begins. Half of the participants witness the four other people in the room leaning back in their chairs (a behavior that involves the minor risk of falling over backward in the chair). The other half of the participants also witness the four confederates leaning back in their chairs but are further encouraged by the confederates to exhibit the same behavior (e.g., they tell the subjects that leaning back is more comfortable, fun). The behavior of each participant is observed to determine whether they do or do not lean back in their chair during the experiment. For each group, the number of participants (out of five) who lean back in their chairs is recorded.

   a. List any independent variables in this study and the levels of each one.

      The IV was the encouragement/non-encouragement of the risky behavior (leaning back in the chair).

   b. What is the dependent variable and how is it being measured?

      The dependent variable is the number of participants who lean back in the group. Experimenters will measure the behavior by observing and keeping a record.

   c. What type of experimental design is this (e.g., bivalent, multivalent, or factorial)?

      Bivalent

2. Explain why an experiment typically has higher internal validity but lower external validity than other research methods.

   Answers will vary.

3. A research methods instructor wants to know if having students conduct their own research study as part of the course increases their understanding of major concepts in the course. To investigate this, she gives two sections of her course a pretest on the course concepts. She then gives one section a research study assignment for the course but does not give this assignment to her other section. At the end of the semester, she gives a posttest to both sections on the course concepts and compares the difference in the pretest-posttest scores as a measure of learning for the two sections of her course. The section with the research study assignment shows more learning. Explain why the instructor cannot be sure that the research study assignment caused more learning in this study.

   Answers will vary.
23. ETHICS EXERCISE

Pretend that you and your lab group are members of the Institutional Review Board (IRB). Read each research proposal below and evaluate the study for adherence to ethical principles of research conduct. Think about and answer the questions below to help you evaluate each study. Make suggestions, where possible, on how to improve the study to meet ethical guidelines.

a) Does the study have scientific merit? How will society or the subjects of the study benefit?

b) Does the study place subjects at risk for either physical or psychological harm? If it does, what aspects of the study cause this risk? Can you suggest less risky procedures that would still provide the researcher with the same information?

c) Will subjects read and sign a consent form? If not, is there enough information given to the subjects to provide informed consent?

d) Does the study use deception? If it does, will the subjects be fully debriefed? Can you think of a way for the researchers to answer the research question without using deception?

e) Can the participants reasonably refuse to participate or withdraw during the study? If not, what part of the study appears to be coercive?

f) Will the subjects’ data be kept confidential?

g) Do you have any other concerns about the study? If so, what are they?

[See full excerpts in manual]

24. ETHICS EXERCISE PAPER

Download and read the following article:


Responses will vary.

Questions to answer about the article:

1. Summarize the research question, the basic procedure used, and the results of the research.

2. What ethical issues did the researchers need to address for the human participants in this study?

3. What ethical issues did the researchers need to address for the nonhuman subjects in this study?

4. Even though all of the participants were in the same study (Experiment 2), the researchers face different ethical issues with the two groups. Compare and contrast the ethical issues of the two groups of participants.
25. SAMPLE CONSENT FORM

No answers required.

26. LEARNING CHECK – ETHICS

1. Explain what is involved in obtaining informed consent from a research participant.
   Must inform subjects of their rights and what the study will entail before subjects give their consent for participation.

2. How does the informed consent process differ for participants who are young children?
   For children, must obtain consent (as described above) from child’s parent/guardian and must obtain assent from the child in language they can understand.

3. Explain what it means for a researcher to conduct a “risk-benefit analysis.”
   The researcher must assess the risks and benefits of the study (reducing risks where possible) and determine that the benefits outweigh the risks in order for the study to be ethical.

4. Explain what the purpose of an institutional review board (IRB) is.
   The IRB is an objective group of reviewers of research conducted at an institution to ensure that research meets ethical guidelines.

5. Describe some differences in ethical guidelines for human and nonhuman subjects.
   Non-human subjects are kept in facilities that must be humane, clean, and otherwise meet or exceed USDA regulations; human subjects can come and go as they please.
   Human subjects can verbally withdraw from an experiment if they are uncomfortable, but nonhuman subjects can’t. Therefore, researchers have to take extra precautions to maintain humane and careful treatment of nonhuman subjects.

6. An instructor is interested studying the use of cell phones in his classroom. He wants to have a teaching assistant record the number of times he sees students using their cell phones during class time. Describe some ethical issues that the instructor will need to consider before conducting this study.
   Responses will vary.

27. SUBJECT SAMPLING EXERCISE

Interpreting Poll Results: A Sampling Methodology Exercise

Responses will vary.

1. Find a report about a poll from a newspaper or the internet ((e.g., http://people-press.org/) and summarize the main findings.

2. Discuss how the respondents were sampled.
3. Discuss the strengths and potential weaknesses of the sampling method used in the study.

4. How is your interpretation of the results affected by the sampling method used?

28. DESCRIPTIVE STATISTICS EXERCISE

Instructions: Below are data from a fictional two-factor experiment. Compute mean and standard deviation for each condition according to the instructions given. In addition, compute the marginal means for both factors.

Dr. Readalot conducted a study examining the effectiveness of different kinds of studying. He had students study either for 5 hours the night before the test (crammed study) or for 1 hour each of the five nights prior to the test (distributed study). Additionally, he was interested in whether the kind of material being studied (and tested) would interact with the method of studying (math or vocabulary). He tested five participants in each of the four conditions. The test score (in percentage correct) for each participant is presented in the table below. Follow the instructions given below the table.

<table>
<thead>
<tr>
<th></th>
<th>Math</th>
<th>Vocabulary</th>
<th>Marginal means for type of studying</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Crammed</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crammed</td>
<td>87</td>
<td>90</td>
<td></td>
</tr>
<tr>
<td></td>
<td>65</td>
<td>84</td>
<td></td>
</tr>
<tr>
<td></td>
<td>72</td>
<td>72</td>
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</tr>
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<td></td>
<td>73</td>
<td>78</td>
<td></td>
</tr>
<tr>
<td></td>
<td>53</td>
<td>76</td>
<td></td>
</tr>
<tr>
<td><strong>M = 70</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>SD = 12.41</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Distributed</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Distributed</td>
<td>88</td>
<td>98</td>
<td></td>
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<td></td>
<td>75</td>
<td>89</td>
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<td>82</td>
<td>79</td>
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<td></td>
<td>75</td>
<td>84</td>
<td></td>
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<tr>
<td></td>
<td>80</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td><strong>M = 80</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>SD = 5.43</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Marginal Mean for type of material</strong></td>
<td><strong>75</strong></td>
<td><strong>85</strong></td>
<td></td>
</tr>
</tbody>
</table>
29. GRAPHING EXERCISE

A study has been conducted to compare men and women on the likelihood of seeking counseling for a psychological problem. A survey was completed by 1,000 men and 1,000 women to determine the number of each group suffering from anxiety or depression. The survey also asked if the respondent had sought counseling for his or her anxiety or depression. The mean values below indicate the percentage of those reporting one of the psychological problems who also sought counseling.

<table>
<thead>
<tr>
<th></th>
<th>Anxiety</th>
<th>Depression</th>
</tr>
</thead>
<tbody>
<tr>
<td>Men</td>
<td>35</td>
<td>15</td>
</tr>
<tr>
<td>Women</td>
<td>20</td>
<td>55</td>
</tr>
</tbody>
</table>

1. Complete the line graph below by including a point in the graph for each mean value given above. Be sure to connect lines for each gender.
2. Re-create the graph above as a bar graph using a software package such as Excel. If using Excel, type in the means and variable levels as given above into a new worksheet, highlight what you have typed, and choose Insert Chart. Under Chart Type, you can choose a bar graph. Chart Options allow you to label the axes and axis scales and fonts.

3. Describe, in your own words, the results displayed in the graphs.

The graphs depict an interaction between gender and help-seeking for psychological

30. CORRELATIONS AND SCATTERPLOTS EXERCISE

1. Josie conducted an honors research project in which she measured IQ scores and number of hours spent watching TV per week for several students. Her results are shown below. Each pair of numbers represents one student. The IQ score is shown first, and the number of hours of TV watched per week is shown next (for both variables, a higher score means more).

   a. On the graph show, plot the data points for each student. Label each axis of the graph to indicate the variable plotted.
   b. Below the graph, identify the relationship as either positive, negative, or no correlation.
   c. Estimate the numerical correlation value \( r \) as a number between -1.0 and + 1.0. Write your \( r \) estimate below the graph.
2. Each pair of variables below has a known relationship. Use common sense to determine what type of relationship likely exists between the variables.

Responses will vary.

a. The number of times per day you smile at other people and the number of times per day others smile at you
b. The number of hours per day a person studies and the number of exams per semester a person fails
c. The number of gallons of water a person drinks in a week and the number of close friends the person has.
d. The number of alcoholic drinks a person has each week and the person’s GPA.

31. INFERENTIAL STATISTICS EXERCISE

Part 1: Making Hypotheses

For each study described below, state the null hypothesis. Then review the results for the study and decide what your decision (accept or reject) should be with regard to the two hypotheses. Remember, you should NEVER accept a null hypothesis.
Study 1

Alternative Hypothesis: Anxiety increases lying in children.

   a) Null hypothesis: The population of children with anxiety induced will lie less than or equally often as the population of children without anxiety (control).

Study 1 Results: A study compared 50 children who were placed in an anxiety-inducing situation with 50 children in a control group. They were then asked about their behavior and number of inaccurate responses was recorded. Inaccurate responses did not differ for the two groups.

   b) retain
   c) reject
   d) Type II error

Study 2

Alternative Hypothesis: People are more likely to help a stranger if there is no one else around than if they are in a group (i.e., the bystander effect).

   a) Null hypothesis: The population of people driving with others is less likely than or equally likely to help a stranger than the population of people driving alone.

Study 2 results: A situation was set up on a busy highway where someone needed help with her car. Researchers observed 100 cars drive by and counted the number of people who stopped and whether they were alone or with other people in the car. People driving with others stopped

   b) reject
   c) accept
   d) Type I error

Whenever we reject the null hypothesis, what does this tell us about the independent variable?

When we can reject the null hypothesis, we can infer that the independent variable does have an effect on the DV.

Part 2: Inferential Statistics

Study 3

A behavioral psychologist conducts an experiment to determine whether operant conditioning techniques can be used to improve balance in people who consider themselves “clumsy.” She recruits 50 participants, each of whom responds yes to the question “Do you consider yourself clumsy?” on a pre-experimental questionnaire. Half the participants are given a balance task (stand on one foot with your arms in the air) with time they can balance recorded. They are then excused and asked to return 3 weeks later. The other half of the participants are given 3 weeks
of operant training during a balance exercise. In this training, the participants are asked to perform the balance task described above. Each time they can beat their previous balance time, they receive $10. After the 3-week period, all participants are asked to perform the balance task again. Alpha is set at .05. The members of the Training Group can balance for an average of 25 seconds. Members of the Control Group (who did not receive the training) can balance for an average of 24.3 seconds. When the inferential statistical test is conducted on these data, \( p = .08 \).

1. What is the IV for this study? The DV?
   - IV: training group (balance training vs. no training – control)
   - DV: balance ability as measured by amount of time subject can balance

2. What is the alternative hypothesis?
   - Alternative hypothesis: The “clumsy” population that has training can balance longer than the “clumsy” population without training.

3. What is the null hypothesis?
   - The “clumsy” population that has training cannot balance as long as or can balance equally long as the “clumsy” population without training.

4. What population is being tested in this study?
   - The population is self-reported “clumsy” people

5. Is the difference observed in the study statistically significant? Why or why not?
   - No, \( p > .05 \)

6. Based on your answer to (5) above, what decision should be made about the null hypothesis?
   - Retain the null hypothesis

7. In the context of this experiment, what \( p \) is the probability of?
   - \( p \) is the probability that the that training is not helpful (i.e. null hypothesis is true)

**Study 4**

Some have claimed that children of divorced parents are not as well adjusted as children of parents who are married. To test this idea, you set up a study with two groups. One group consists of 100 children who have divorced parents. The other group consists of 100 children who have married parents. Each child in the study is asked to complete the Social Adjustment Scale for Children (SASC). Higher scores on the scale indicate better social adjustment.

1. Does this study contain an independent variable? Why or why not?
   - There is no true independent variable, because the researcher did not assign the children to the divorced parents and married parents groups. Instead, this is a quasi-independent variable.

2. What dependent variable is measured in this study?
   - The dependent variable is social adjustment as measured by score on the SASC.
3. What is the null hypothesis for this study?

   The null hypothesis is that the population of children of divorced parents are as well-adjusted or better adjusted (have equal or higher SASC scores) than the population of children of married parents.

4. What is the alternative hypothesis

   The alternative hypothesis is that the population of children of divorced parents are less well-adjusted (have lower SASC scores) than the population of children of married parents.

   The results indicate a mean difference of 10 on the SASC scale between the two groups of children. With alpha set at .05, \( p = .02 \).

5. What decision should be made with regard to the null hypothesis?

   reject the null hypothesis

6. Describe one possible source of bias that could be present in this study causing the results that were observed.

   Because subjects were not randomly assigned to the groups, more poorly adjusted children could be in the divorced parents group by chance causing the results that were found.

32. INFERENTIAL STATISTICS AND ANALYSIS EXERCISE

Listed below are 10 statements that are common pieces of cliché advice (many of which you may have heard at some point in your life). Pick two of the clichés, and design a study to test each one following the example provided below.

<table>
<thead>
<tr>
<th>Absence makes the heart grow fonder.</th>
<th>Experience is the best teacher.</th>
</tr>
</thead>
<tbody>
<tr>
<td>All work and no play make Jack a very dull boy.</td>
<td>An apple never falls far from the tree.</td>
</tr>
<tr>
<td>Good fences make good neighbors.</td>
<td>He who laughs last, laughs longest.</td>
</tr>
<tr>
<td>Ignorance is bliss.</td>
<td>A rose by any other name still smells as sweet.</td>
</tr>
<tr>
<td>Opposites attract (relationships).</td>
<td>An apple a day keeps the doctor away.</td>
</tr>
</tbody>
</table>

Example: Laughter is the best medicine

   

   Tails (circle one): One-Tailed

   Null Hypothesis: Within the population, laughter is not the best medicine (is worse or as good as without it).
Alternative Hypothesis: Within the population, laughter is the best medicine.

Independent Variable: Laughter (presence vs. absence), Time health is measured (start and end of study).

Dependent Variable: Physiological and Psychological Health

Details: Between-Subjects, Within-Subjects, or Mixed?

Why?: Laughter should be done between-subjects to avoid order effects. Time is a within-subjects variable because all subjects will receive the measures twice.

Analysis Plan

<table>
<thead>
<tr>
<th>Analysis Plan</th>
<th>Why?</th>
</tr>
</thead>
<tbody>
<tr>
<td>One Sample t-test</td>
<td>This is a factorial design with two IVs, so you need a two way ANOVA</td>
</tr>
<tr>
<td>Paired samples t-test</td>
<td></td>
</tr>
<tr>
<td>Independent samples t-test</td>
<td></td>
</tr>
<tr>
<td>One-way ANOVA</td>
<td></td>
</tr>
<tr>
<td>Two-way ANOVA</td>
<td></td>
</tr>
</tbody>
</table>

Responses will vary depending on the clichés that students choose.

33. HYPOTHESIS GENERATION EXERCISE

For each of the following research descriptions:

a) Write out the null and scientific (alternative) hypotheses
b) Indicate whether a one-tailed or two-tailed statistical test should be performed
c) Identify the dependent variable and the scale used to measure it

1. IQ scores for the general population form a normal distribution with mean of 100 and a standard deviation of 15. However, there are data that indicate that children’s intelligence can be affected if their mothers had German measles during pregnancy. Using hospital records, a researcher obtained a sample of schoolchildren whose mothers all had German measles during their pregnancies. The researcher wants to test whether the children in the sample have an average IQ lower than that of the general population.

   a) Null Hypothesis: Children of mothers who had German measles while pregnant will not have lower IQ scores than the general population.

   Scientific Hypothesis: Children of mothers who had German measles while pregnant will have lower IQ scores than the general population.

   b) Indicate whether a one-tailed or two-tailed statistical test should be performed

   Because the hypothesis includes a predicted direction, a one-tailed test is needed.

   c) Identify the dependent variables and the scale used to measure it.

   The dependent variable is intelligence, and the researchers are using an IQ test to measure it.
2. Suppose we think that listening to classical music will affect the amount of time it takes a person to fall asleep. An experimenter randomly assigns participants to one of two groups. Both groups of participants are asked to spend two nights sleeping in the researcher’s laboratory. On the second night, one group goes to sleep listening to classical music, while the other goes to sleep in silence (the first night is used to allow the participants a chance to become accustomed to sleeping while wearing the sleep-monitoring equipment). The researcher measures the time span between when the lights are turned off and the onset of stage 2 sleep.

a) Null Hypothesis: Listening to classical music will not affect the amount of time it takes a person to fall asleep.

Scientific Hypothesis: Listening to classical music will affect the amount of time it takes a person to fall asleep.

b) Indicate whether a one-tailed or two-tailed statistical test should be performed: The prediction is non-directional, so a two-tailed test should be used.

c) Identify the dependent variables and the scale used to measure it: The dependent variable is the length of time a participant takes to fall asleep, and the researchers measure this by counting the time from the lights turn off to the beginning of stage 2 sleep.

3. A developmental psychologist believes that a new technique can help kids learn math skills faster than the current technique. He measures math skills of two groups of fifth graders using a standardized math skills test (higher scores on the test correspond to stronger math skills). For one group of kids, the psychologist uses the new technique. For the other group, he uses the standard math curriculum.

a) Null Hypothesis: The new technique will have no effect on the speed at which kids learn math skills.

Scientific Hypothesis: The new technique will increase the speed at which kids learn math skills.

b) Indicate whether a one-tailed or two-tailed statistical test should be performed: a one-tailed test should be performed because the hypothesis includes a predicted direction.

c) Identify the dependent variables and the scale used to measure it: The psychologist was interested in math skills, as assessed by a standardized math test.

4. A psychologist examines the effect of chronic alcohol abuse on memory. The researcher obtains a sample of alcohol abusers and finds that the group averaged a mean score of 47 on a standardized memory test. In comparison, scores on the memory test are normally distributed around a mean of 50 (standard deviation of 6) for the general population. Is there evidence for memory impairment among alcoholics?

a) Null Hypothesis: There will be no difference on memory scores between alcohol abusers and the general population.

Scientific Hypothesis: The alcohol abusers will score differently on the memory test than the general population.

b) Indicate whether a one-tailed or two-tailed statistical test should be performed: A two-tailed test is most appropriate, because there is no stated direction of the prediction.

c) Identify the dependent variables and the scale used to measure it: The dependent variable is memory performance, as measured by a score on a standardized memory test.
5. On a vocational interest inventory that measures interest in several categories, a very large standardization group of adults (i.e., a population) has an average score of 22 (higher scores represent greater interest). A researcher would like to determine if scientists differ from the general population in terms of writing interests. The researcher administers the test to a random sample of scientists (selected from the directory of a national science society). The test scores on the literary scale for the scientists are compared to those of the general population to examine the question of whether scientists differ from the general population in their writing interests.

1. Null Hypothesis: Scientists and non-scientists will show no difference in their writing interests.
Scientific Hypothesis: Scientists and non-scientists will report different writing interest.
2. Indicate whether a one-tailed or two-tailed statistical test should be performed: This prediction is non-directional, so we would perform a two-tailed test.
3. Identify the dependent variables and the scale used to measure it: the dependent variable is literary interest, as measured by scores on the literary scale.

34. STATISTICS WITH EXCEL EXERCISE

No responses required.

35. LEARNING CHECK – STATISTICS

1. Define the concept of sampling error.
Responses will vary slightly. Example answer: Sampling error is the error that results from sampling an unrepresentative subset of a population
2. What two types of errors can be made during hypothesis testing? Describe how each error is made.
Type 1 Error: Rejecting the null hypothesis when it is true (false positive)
Type 2 Error: Failing to reject a null hypothesis when it is false.
3. What two descriptive statistics are most important in calculating an inferential statistic?
Mean and Standard Deviation
4. Determine the mean and mode for the data set listed below:
{5,6,3,5,6,4,3,3}
Mean: 4.38
Mode: 3,5,6
5. Suppose a study had been conducted to compare adolescent boys and girls on their dating experiences. Fifty 15-year-olds reported the number of times they had romantic
involvement with someone else in the past 6 months, where romantic involvement was operationally defined as dating, sexual contact of any sort, or conversing with someone they were romantically interested in. Boys reported a mean number of 25 incidents, and girls reported a mean number of 14.5 incidents. A statistical test was conducted to compare incident scores for the two groups.

a. What is the null hypothesis for this study? What is the alternative hypothesis? Adolescent girls will report the same mean number of romantic incidents as adolescent boys.

b. What is the appropriate statistical test for comparing boys and girls on this measure? Independent samples t-test.

c. The statistical test gave a $p$ value of .013. Assuming alpha = .05, what decision should be made with regard to the null hypothesis? Fail to reject the null hypothesis.

6. A researcher wants to know if connecting a smell to studied information aids memory. Subjects are asked to study a list of words. For one group, a distinctive smell (different flowers, soap, etc.) is presented with each word. For the other group, no smells are presented with the words. The researcher finds that the group that receives the smells recalls 75% of the words, and the group without smells recalls 69% of the words.

a. What is the null hypothesis for this study? What is the alternative hypothesis? There will be no difference in memory recall between the group that studied the list with scents and the group that studied it without scents.

b. What is the appropriate statistical test for comparing memory for the two groups? Independent samples t-test.

c. Suppose that all subjects had received smells with half of the words presented and no smells for the other half of the words they saw. In this new design, what would be the appropriate statistical test to use? Dependent (paired) samples t-test.

d. The statistical test gave a $p$ value of .09. Assuming alpha = .05, what decision should be made with regard to the null hypothesis?

36. BIAS AND CONTROL EXERCISE

For each study description below, list possible confounding variables that might be present in the study based on the description provided.

See full passages in text. Responses will vary.

1. A researcher wanted to determine whether different forms of exercise improve memory and problem-solving skills, with the hope of helping treat elderly people with cognitive impairments. […]
2. Tsapelas, Aron, and Orbuch (2009) recently conducted a study to examine the effects of boredom on marital satisfaction. Participants included 123 couples. [...] 

3. A social psychologist is interested in studying the effect of the size of a group on problem solving. She conducts the experiment in her two Introductory Psychology courses. [...] 

For each description below, read the description of the study and then answer the questions about the sources of bias and how to control for them. 

Responses will vary.

4. I want to conduct an experiment to determine the effect of instructional mode on learning. I have students learn material either in a computer-based interactive environment or by reading a traditional text. [...] 

5. I have designed an experiment to learn how attention processes operate in search tasks. I present participants with a display that contains letters placed in random positions on a computer screen. The participants’ task is to find a colored X among a field of other letters. Participants are to report the color of the X when they find it on the screen [...] .

### 37. FACTORIAL DESIGN EXERCISE

1. Consider the following data from a factorial-design experiment. The DV was “% of participants who offered help to a stranger in distress.”

<table>
<thead>
<tr>
<th>Number of bystanders</th>
<th>Gender of Stranger</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
</tr>
<tr>
<td>0</td>
<td>30</td>
</tr>
<tr>
<td>10</td>
<td>10</td>
</tr>
</tbody>
</table>

a) What is the design of this study (e.g. 2 x 2, 2 x 3).

2 (0 bystanders vs. 10 bystanders) x 2 (male vs. female)

b) List the independent variables of this study, and list the levels of each.

   Number of bystanders (0, 10)
   Gender of stranger (male, female)

c) Sketch a graph of the results of the study. Fill in the names and levels of the IVs.
The researchers in this study were interested in how social situations can influence stress-induced eating. They grouped subjects according to self-reported stress-induced eating habits: consistently eating more (hyperphagics) or eating less (hypophagics) when stressed. Each subject was then exposed to one of three social situations: (1) a social inclusion condition, where subjects were told that a confederate partner had approved of a video they had made answering some questions and was looking forward to meeting them, (2) a neutral condition, where they were told their partners could not meet them because their partners had to cancel their participation, or (3) a social exclusion condition, where they were told that their partner had decided not to meet them after viewing their video. Subjects were then given an ice cream taste test and the amount of ice cream consumed was measured.
1. What is the independent variable in this study and what are its levels?
   The researchers manipulated the social situation of the participant: the levels were inclusion, exclusion, and control.

2. The researchers also included a subject/attribute variable in this study. What was this subject variable? How were subjects classified on this variable?
   They grouped subjects into two groups by their self-reported stress-eating habits (hyperphagics and hypophagics).

   The results of the experiment are displayed in the graph below:

   ![Graph showing ice cream consumption by social condition and eating phagic group](image)

3. Does this graph indicate a main effect of social condition? Explain your answer.
   No – the graph does not indicate significant differences by social condition.

4. Does this graph indicate a main effect of eating phagic group? Explain your answer.
   No – the graph does not indicate significant differences by phagic group.

5. Does this graph indicate the presence of an interaction? If so, describe the interaction.
   Yes—the significant differences reported on the graph are within social conditions by phagic group (i.e. differences by condition are only evident when comparing phagic groups within conditions.)

For this exercise, download the article referenced below (it can be found on the Sage Student Site):


1. Describe the study. Make sure to include the following information:
   - What is/are the dependent variable(s)?
     The dependent variable was perceived self-similarity with the trustee.
   - What is/are the independent variable(s)?
     The independent variable was the trustworthiness of the trustee (whether transfers were reciprocated), and the time of the similarity assessment (before vs. after the game)
   - For each independent variable, how many levels does it have?
     Both IVs have two levels: trustworthy/untrustworthy, before/after the game
   - For each independent variable, is it manipulated between or within groups?
     Within groups
   - How many total conditions are there in the study?
     2

2. What are the hypotheses for each independent variable (main effect predictions)?
   Game performance will influence perceived similarity to the trustee.

3. What is the hypothesis for the interaction?
   Subjects will perceive the trustworthy trustee as more physically similar to them than the untrustworthy trustee.

4. Describe the pattern of results seen in the graph. Does the pattern suggest that an interaction is present? If so, describe the interaction; if not, describe why the pattern does not indicate an interaction
   The results in the graph suggest an interaction, because there is a change in the magnitude of the difference before (compared to after) the trust game.

5. What do the statistical outcomes in the Results section tell you about the main effects and interaction? (Note: this question should only be answered if downloading article and reading the Results section was assigned).
   The results tell us that there were condition differences in post-game PSE (higher perceived similarity in the trustworthy condition than untrustworthy condition) when controlling for initial trustworthiness.

6. What do these results tell us about the hypotheses for this study?
   The results tell us that a person is more likely to think that a trustworthy person physically resembles us more than an non-trustworthy person.
The following data sets are from a factorial design study examining the effects of group and individual therapy over two different lengths of time. For each data set, determine what effects (both main effects and the interaction) are significant. For simplicity, assume that the data are ideal, meaning that any difference between means is a significant difference—no sampling error. Make a bar graph of each significant effect and provide a verbal description of the effect.

### Table 1

<table>
<thead>
<tr>
<th>Length</th>
<th>Group</th>
<th>Individual</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 week</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>6 weeks</td>
<td>500</td>
<td>500</td>
</tr>
</tbody>
</table>

Main effect of length, no main effect of therapy type, no interaction.
Table 2

<table>
<thead>
<tr>
<th>Therapy Type</th>
<th>Length</th>
<th>Group</th>
<th>Individual</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 week</td>
<td>300</td>
<td>700</td>
</tr>
<tr>
<td></td>
<td>6 weeks</td>
<td>200</td>
<td>400</td>
</tr>
</tbody>
</table>

Main effect of length, main effect of therapy type, interaction between therapy type and length

Table 3

<table>
<thead>
<tr>
<th>Therapy Type</th>
<th>Length</th>
<th>Group</th>
<th>Individual</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 week</td>
<td>100</td>
<td>400</td>
</tr>
<tr>
<td></td>
<td>6 weeks</td>
<td>400</td>
<td>100</td>
</tr>
</tbody>
</table>
No main effect of length, no main effect of therapy type, interaction between therapy type and length.

![Bar Chart](chart.png)

### Table 4

<table>
<thead>
<tr>
<th>Length</th>
<th>Therapy Type</th>
<th>Group</th>
<th>Individual</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 week</td>
<td></td>
<td>250</td>
<td>100</td>
</tr>
<tr>
<td>6 weeks</td>
<td></td>
<td>250</td>
<td>400</td>
</tr>
</tbody>
</table>

Main effect of length, no main effect of therapy type, interaction between therapy type and length.
41. SPECIALIZED DESIGNS EXERCISE: DEVELOPMENTAL

Below are the reference and an adapted abstract of a published research paper.

6. Identify the kind of specialized developmental design that was used in the study.

7. Identify the variables (e.g., dependent, independent, and quasi-independent, and control) that were studied.

8. What are the advantages of using this specialized design?

9. How could you redesign the study using a different specialized developmental design? What would the advantages and disadvantages of using this alternative design?
1. I want to design a study to determine the effects of age on quantity of social interaction. I will measure how many friends each of my participants reports they speak to on a given day. I will use three groups of participants: 8- to 10-year-olds, 12- to 15-year-olds, and 17- to 18-year-olds. Thirty participants will be in each group. I am using a cohort-sequential design.

   Answers will vary.

2. I want to conduct a study to determine at what age (if any) an instructional technique given to 2nd, 5th, and 9th grade classes improves learning. The instructional technique will be used for 6 months in each class. Describe how I would design this study as a cross-sectional design. What type of design should I use if I want to measure learning? What will my dependent variable be in this design?

   Between-subjects design. Dependent variable should assess learning, but responses will vary slightly.

3. You want to conduct an experiment to determine the effect of running on verbal ability. You ask participants to run 1 mile and then state all the words they can in a 30-second period. List two confounding variables that you should consider controlling for in this experiment and how you might control for them in the design.

   Answers will vary.

4. For each design type listed below, state one advantage and one disadvantage of using that design:
   i. Within subjects design
   ii. Longitudinal design
   iii. Small n design

   Answers will vary.

5. Describe how you would conduct an interrupted time series design to determine the public’s trust of politicians changed after September 11, 2001.

   Answers will vary.

6. How do discrete trials and baseline small n designs differ?

   Answers will vary.

7. Suppose you are a school psychologist working in an elementary school. A teacher has come to ask for your help with a student who has been disruptive to her class by consistently getting out of her seat, talking without raising her hand, and refusing to work on activities with a group. You propose a reward system for the student such that she receives a sticker for each time she is exhibiting appropriate classroom behavior (e.g., staying in her seat for a segment of the class, talking after raising her hand, work cooperatively with a group in an activity). She can then redeem a set number of stickers for small prizes from her parents (e.g., small stuffed animals). Describe how you might implement this reward system for the student in an A-B-A design to determine if it is effective in increasing appropriate classroom behaviors for her.
APA Style Exercises

59. CREATING REFERENCES

For the PsycINFO references listed below, rewrite each one in APA style.


60. APA STYLE QUIZ

Choose the correct answer for each question that is consistent with APA style guidelines.

(1) c
(2) d
(3) c
(4) a, c, d
(5) c
(6) d
(7) a
(8) a
(9) c
(10) b
61. APA STYLE EXERCISE

There many errors – major ones include:

Title Page – no running head goes at top (but opposite case – Running head: SURVIVAL EFFECT)
– Effect spelled wrong in title – no authors or affiliation – short title should match title

Abstract – too many procedure details (room size) – need more results info – effect still spelled wrong

Introduction – title of paper goes at top – indent paragraphs – obviously, needs more discussion of concepts and background studies – use all authors on first citation (not et al.)

Method – use Participants (not Subjects) – write out number for 23 – day or week irrelevant
– how many were assigned to each condition? – some awkward writing – no need to indicate wall color or carpet color – reference in Materials not APA style – size of paper not relevant
– describe Procedure in Procedure section – use s for seconds and min for minutes.

Results – indicate what is in Table 1 in complete sentence – statistics not reported in APA style – missing dfs – state alpha and DV – statement about results being significant not appropriate reporting style

Discussion – need more and don’t indicate that experiment was designed well because results were significant – don’t use “prove”

Table 1 – not quite APA style – no bold in title and all should be double-spaced – goes AFTER references

References – reference not APA style