AP Statistics

Summer Assignment 2009-2010

Mrs. Carolyn Lamson (carolyn.lamson@fcps.edu)

PLEASE PICK UP A COPY OF THIS BOOK

FROM MRS. LAMSON IN ROOM 30.

Book: Huff, Darrell. (1954). *How to Lie with Statistics.* New York: W.W. Norton

Assignment: **READ** the book listed above and answer all questions in the packet. However, you should read through packet prior to starting this assignment as the assignment requires you to utilize other sources (newspapers, magazines, journal articles, or possibly the internet).

This summer assignment is due on the first day of class (Tue, Sept 8 or Wed, Sept 9)

All answers should be written in **black** ink (skip between questions) or they may be **typed** (12 pt font double-spaced).

For your information, the majority of questions follow in the same order of your reading so you may find it easier to answer the questions as you read then waiting to start after finishing the book. However, this is totally up to you. I hope that you enjoy the book. Yes, it is a book from the 1950s but its contents are still relevant in today's world. This book will serve as a stepping stone for discussion in this course. Feel free to contact me should you have any questions. You may do so via email (carolyn.lamson@cox.net) or by phone (703) 913-4950.

Introduction and Chapter 1

1. List as many sources of **sample bias** as you can that are mentioned in Chapter 1 and provide an example of each.

2. What is the advantage of a **stratified random sample** and what difficulties does it pose, according to this chapter?

3. On Page 26, the author suggests that most polls are biased in the direction of the *Literary Digest* error.

    a. What incident does this refer to?

    b. That incident took place during (and arguably because of) the Great Depression. Are the lessons learned from that still relevant for us today? Why?

    c. In what direction is that bias?

Chapter 2

4. Chapter 2 begins with an illustration in which someone is snobbish about an income of $15,000 a year. Why did the author choose such a small income figure when it seems that a much higher one would fit the context better?

5. Summarize Chapter 2 in a few sentences.

6. When we see an average reported, what do we need to ask besides which kind of average is being used? Why?

7. Which kind of "average" would best describe the height of students at our high school? Why?

8. Which kind of "average" (statisticians call all three "measures of central tendency") would give me the best way to compare the performance of two classes of a required math course? Why?

Chapter 3

9. We have learned that a proper sample of only 1,000 individuals form the entire population of the United States can give us results with only a 3% margin of error (assuming p = .5, at a 95% confidence level). When, then, does the author suggest that a sample of over a thousand can be much too small in some situations?

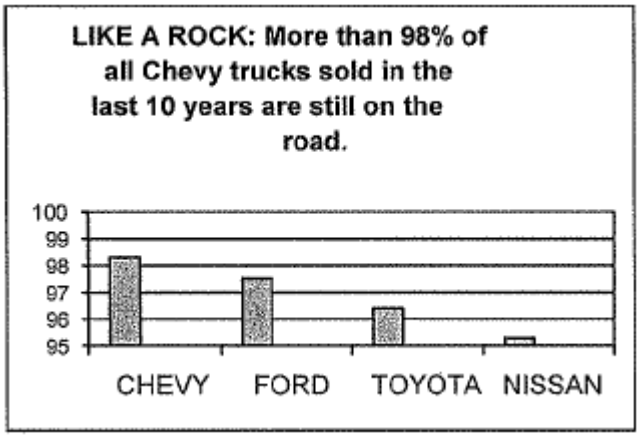
10. How can the graph of the advertising agency's business be misleading when the graph clearly shows such an upward trend?

11. When reviewing scholarship applications, I was given a table that listed the GPA of each applicant. What other information do I need in order to evaluate these applicants' academic performance?

Chapters 4 – 6

12. The author suggests that some reported differences may not be real differences at all and others, even though they can be shown to be real differences, should still be ignored. Explain how each of these situations can arise and give an example of each.

13. Here is a reproduction of a Chevy ad that appeared a few years ago.



The scale was printed in white on a gray background, so you had to be looking at it to notice it. If you didn't notice the scale, what percent would you assign to the Nissan? Redraw this graph using a scale from 0 to 100. How would your version look as an ad?

14. Why is that making one picture twice as tall as another picture graph leaves an impression that one quantity is eight times as big?

15. Find an example of a misleading graph in a newspaper or magazine. This should be cut out and included in your work. Be sure to cite the reference.

Chapter 7

16. What is a semi-attached figure?

17. Name as many general strategies from this chapter as you can for using the semi-attached figure. (I count roughly half a dozen.)

Chapter 8

18. What does *post hoc* mean?

19. List several kinds of correlation that might lead to post hoc reasoning.

20. The chapter also warns against the dangers of extrapolation. What is one example the author uses in that discussion?

21. Name two variables that you suspect would have correlation if we collected data, but for which a cause and effect relationship does not exist. (Hint: think of a common causal factor first, then select your two variables.) Be creative and make it as outrageous as possible. Or simply think of two variables that have trends in the same direction without regard to the causes.

22. Comment briefly on each of the following reports.

    a. **Teen drug use linked to truancy**
    Press Association
    Tuesday July 29, 2003

    Truants are more than five times as likely to take drugs than other schoolchildren, according to research published today. The survey found that 35% of pupils who had ever played truant admitted they had taken drugs in the last month, compared with just 6% who had not skipped at school. The study of 10,000 schoolchildren aged 11 to 15 also found that truants were far more likely to regularly drink alcohol and smoke.

    b. **Low self-esteem 'shrinks brain'**
    By Pallab Ghosh
    BBC Science Correspondent
    November 20, 2003

    People with a low sense of self worth are more likely to suffer from memory loss as they get older, say researchers. The study, presented at a conference at the Royal Society in London, also found that the brains of these people were more likely to shrink compared with those who have a high sense of self esteem. Dr. Sonia Lupien, of McGill University in Montreal surveyed 92 senior citizens over 15 years and studied their brain scans. She found that the brains of those with low self-worth were up to a fifth smaller than those who felt good about themselves. These people also performed worse in memory and learning tests.

    c. **Winning World Cup lowers heart attack deaths**
    April 16, 2003
    Reuters

    Winning soccer's World Cup not only lifts a nation's spirits, it lowers the death rate from heart attacks, doctors said on Tuesday. During the 1998 World Cup when France defeated Brazil in the final, deaths from heart attacks in men and women dropped on the day of the match, which was watched by 26 million French TV viewers. Instead of about 33 deaths a day in the five days before and after the match, 23 men died of a heart attack on match day. There were also fewer deaths in women but the decrease was not as significant.

d. Church Attendance Boosts Immunity
Article from Parade Magazine, 1997

Going to church may be good for the body as well as the soul. In a study of 1700 older Americans, researchers at Duke University Medical Center found that those who attended religious services had stronger immune responses. About 60% of the men and women surveyed attended religious services at least once a week. Blood tests showed that regular attendees were less likely to have high levels of an immune-system protein involved in age-related diseases.

Chapter 9

23. Who do you think are the people who are most likely to **statisticulate,** and for what purposes?

24. Why are percentages so often a source of **statisticulation?**

Chapter 10

25. As we look to see who is offering a statistic for our consumption, what should we look for?

26. If a respectable organization is cited as a source of a statistic, what do we still need to consider about that authority?

27. The example of the survey on prices during the Korean War brought out what can be a subtle way in which a sample can be biased. What is that source of bias and what is the name we give to samples likely to be biased in that manner?

28. What are some of the many critical things that are commonly missing when a statistic is reported in the media?

Adapted from worksheets created by Mike Bryant at Santa Maria High School.