

Homework 10

Due Monday, April 27

Ch 19 # 1-4, 5a, 7, 9, 11, 31, 45, 47 (you'll want to use SPSS for #7 onward)

Ch 13 # 1-5, 9, 11, 28, 31

Ch 20 # 1, 3, 5, 9, 11, 13, 17, 31, 33, 41, 43

SPSS Project: Fatal Automobile Crashes

The source for data in these problems is the U.S. Dept. of Transportation Fatality Analysis Reporting System

Problem A. Drunk Drivers

Use the file MO_2003_accidents, which contains a record for every fatal automobile accident in Missouri for 2003.

Find the mean number of people involved (NUMBER_PERSON_FORMS) and number of drunk drivers involved (NUMBER_DRINKING_DRIVERS) per fatal crash in Missouri in 2003, and give 95% confidence intervals for both numbers.

Problem B. Striking Vehicles

Use the file MO_2003_vehicles, which contains a record for every vehicle involved in a fatal automobile accident in Missouri for 2003.

- a. The variable TRAVELSPEED gives the speed at the time of accident for each vehicle, in miles per hour. Special codes 98 and 99 are used when the speed is unknown or missing. Recode these to "System Missing" so they will be omitted from the analysis. Make and print a histogram of TRAVELSPEED. Is it normal? Do you think it's reasonable to use t-tests with this data?
- b. A vehicle with a 1 or a 3 in VEHICLE ROLE is a striking vehicle – the car that struck the other car or obstacle. Define a new variable STRIKING, using the ANY() function.

Explore how speed varies between STRIKING and non-STRIKING vehicles. State and carry out a hypothesis test that these two groups have a difference in speed.

- c. State and carry out a hypothesis test that NUMBEROFDEATHS is different for the striking and non-striking groups.

Problem C. Police Chases

Use the file MO_2003_accidents.

- a. Nationwide, about 0.76% of all fatal crashes involved police chases. Formulate a hypothesis test to see if the proportion is different in Missouri. Use the SPSS Binomial test to carry it out. (A police chase is indicated by a 20 in the RELATED_FACTOR1_ACCIDENT variable)
- b. Do you expect this proportion to be higher in St. Louis than in the rest of the nation? Formulate a hypothesis test and use the SPSS Binomial test to carry it out. (St. Louis has a 7080 for it's CITY variable)
- c. The SPSS Binomial test works in any binomial setting, but the by-hand techniques of the textbook require \hat{p} to have an approximately normal distribution. Would the tests in parts (a) and (b) be safe to do with the by-hand normal approximation techniques?