

**Assignment #1 — Due Friday, September 16 by 4:00 P.M.**

Turn in homework to your TA's mailbox using this sheet as the cover page.

Fill in your name and also circle the *lecture section in which you are registered* and circle the *discussion section you expect to attend* to pick up this assignment.

**Name:**

**Lecture 1 (Hanlon).**      **311:** Tu 1:00 - 2:15pm      **312:** Th 8:00 - 9:15am      **313:** We 1:00 - 2:15pm

**Lecture 2 (Larget).**      **321:** Tu 1:00 - 2:15pm      **322:** We 2:30 - 3:45pm      **323:** We 1:00 - 2:15pm

Please answer the following questions.

1. For each of the following settings (i) identify the variable(s) in the study; (ii) for each variable tell its type (numerical-continuous, numerical-discrete, categorical-ordinal, or categorical-nominal); (iii) identify the observational unit; and (iv) give the sample size.
  - (a) A paleontologist measured the width (in mm) of the last upper molar in 36 specimens of the extinct mammal *Acropithecus rigidus*.
  - (b) The birth weight, date of birth, and the mother's race were recorded for each of 65 babies.
  - (c) A physician measured the height and weight of each of 37 children.
  - (d) During a blood drive, a blood bank offered to check the cholesterol of anyone who donated blood. A total of 129 persons donated blood. For each of them, the blood type and cholesterol levels were recorded.
  - (e) A biologist measured the number of leaves on each of 25 plants.
  - (f) A physician recorded the number of seizures that each of 20 patients with severe epilepsy had during an eight-week period.
  
2. This problem refers to the *USA Today* article "Are grandparents safer drivers than mom and dad?" and the *Pediatrics* article "Grandparents Driving Grandchildren: An Evaluation of Child Passenger Safety and Injuries", both of which appeared in July, 2011. Links to these articles are on the course web page where this assignment was found.
  - (a) Read the *Pediatrics* article and find a description of how the data was collected for this study. Describe the *sampling units* (objects that are sampled) in this sample. What is the sample size? What is the primary response variable associated with each sampling unit? What are some other variables that are measured?
  - (b) The *Pediatrics* article draws conclusions about the population from which the sample is drawn, but is not explicit in describing this population. Provide a description of a population for which it is reasonable to generalize the results of this study.
  - (c) The *USA Today* article paraphrases the results from the *Pediatrics* article as follows.

Kids may be safest in cars driven by grandma or grandpa instead of mom or dad, according to study results that even made the researchers do a double-take.

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Previous evidence indicates that car crashes are more common in older drivers, mostly those beyond age 65. The study looked at injuries rather than who had more crashes, and found that children's risk for injury was 50% lower when riding with grandparents than with parents.

Find and quote a passage in the *Pediatrics* that summarizes the results of the study that compares the risk of injury to children when grandparents or parents drive. Is the *USA Today* summary an accurate report of the findings of the *Pediatrics* article? Consider the process by which data was sampled in your answer.

- (d) Is it accurate to conclude on the basis of this research that children are less likely to be injured when driven by grandparents than when driven by parents? If not, how can the statement be modified to provide a more accurate interpretation of the results? Careful reading of the material immediately before and in the conclusion of the *Pediatrics* article and consideration of the sampling process can help address this question.
  - (e) How might you collect data if wanted to address the question of whether or not grandparents drove more cautiously when they had grandchildren in the car than when they did not?
3. Search for an article published in an academic journal that (1) is on a biological topic, (2) you think is interesting, and (3) uses statistics. We are looking for a genuine research article (in an academic journal accessible electronically through the UW library), not an article in the popular press (such as a newspaper or news magazine or a personal or company web site). One approach is to search for an article using a search engine like Google, and then find the article through the library. Another approach is to browse a journal such as *Science*, *Nature*, *Genetics*, *Evolution*, *The American Journal of Botany*, or something similar. Before choosing your article, scan the questions below. You must choose an article that allows you to answer these questions (e.g. your article must have a graph in it).

Once you have found an article that matches the criteria, please answer the following questions *in a typed report*.

- (a) Provide a citation for the article.
  - (b) Describe the sample of individuals (units) for which data is collected. Describe how this sample was selected.
  - (c) Report one scientific question that your article addresses.
  - (d) What results does the article include regarding the scientific question?
  - (e) Select one graph from the article. What variables are graphed on each axis? What does the graph illustrate?
  - (f) Identify two variables that are measured by the authors, one a response variable and one an explanatory variable, if applicable. What are the units of measurement? Are the variables summarized with statistics? If so, what are the values of the statistics? Classify each variable as either categorical or numerical, as either experimental or observational, and as either explanatory or response.
  - (g) Identify a method of statistical analysis used by the authors and report a given result.
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