

## Statistics 101 – Homework 6

**Due Monday, March 1, 2010**

Homework is due on the due date at the end of the lecture.

**Reading:** February 22 Chapter 11  
February 24 – March 1 Chapters 12 & 13

### Assignment:

1. Do the following problems from the text, *Intro Stats*, 3<sup>rd</sup> Edition. If you have an earlier edition of the text, check with someone who has the 3<sup>rd</sup> Edition to make sure you do the correct problems.
  - a) Chapter 11 – problems 7, 8, 15, and 21.
  - b) Chapter 12 – problems 3, 4, 7, 10, and 23.
  - c) Chapter 13 – problems 1, 2, 7, 9, 10, and 12.
2. CBS News/New Your Times conducted a public opinion survey between February 5<sup>th</sup> and 10<sup>th</sup>, 2010. 1,084 randomly selected adults from across the United States were contacted and asked the question, “Do you approve or disapprove of the way Barack Obama is handling his job as president?” 46% of the people contacted said they approve, 45% said they disapprove, and 9% were unsure.
  - a) Identify the population.
  - b) Identify the population parameter of interest.
  - c) Identify the sample.
  - d) Are the percentages given in the description sample statistics or population parameters? Explain briefly.
  - e) Identify the sampling method, including whether or not randomization was employed.
  - f) Identify any potential sources of bias you can detect and any problems you see in generalizing to the population of interest.
3. For this problem the population consists of those students in Stat 101 who completed the questionnaire at the beginning of the semester. Turn in the JMP output for a), b) and c).
  - a) Open the JMP data table HeightGender\_S10.JMP, which is on the course web site. Use Tables – Subset and select Random – sample size: 44, to select a random sample of 44 students from the population. For your sample:
    - What is the sample proportion of females?
    - What is the sample mean height?
  - b) Open the JMP data table HeightFemale\_S10.JMP, which is on the course web site. Use Tables – Subset and select Random – sample size: 24, to select a random sample of 24 females. For your sample:
    - What is the sample mean height?
  - c) Open the JMP data table HeightMale\_S10.JMP, which is on the course web site. Use Tables – Subset and select Random – sample size: 20, to select a random sample of 20 males. For your sample:
    - What is the sample mean height?
  - d) Combine your sample means from b) and c) to come up with a sample mean height for the combined sample of males and females. How does this compare with your sample mean height in a)?

4. The following is excerpted from a Des Moines Register article that appeared Sunday, November 8, 2009.

**Older technique for heart bypass tests better than ‘off-pump’ method.**

It seemed like a great idea – doing bypass surgery while the heart is still beating (off-pump), sparing patients the complications that can come from going on a heart-lung machine (on-pump). Now the first big test of this method has produced a surprise: Bypass has fewer problems and is more successful than the old way (on-pump).

The study involved 2,203 patients at 18 Veterans Affairs medical centers. About half were randomly assigned to bypass surgery with a heart-lung machine, half without. A month after surgery, there was no difference in the number of deaths or other complications in the groups. But a year later, the off-pump group had worse outcomes. About 10% either had died, had a heart attack or needed another bypass or procedure to open a blocked artery, compared with about 7% of the on-pump group.

- a) Why is this study an experiment and not an observational study?
  - b) What is the response variable? Is this variable categorical or numerical?
  - c) What are the treatments?
  - d) Is there replication within the experiment? Explain briefly.
  - e) Is there randomization in the experiment? Explain briefly.
5. The following is excerpted from an article in the Des Moines Register on October 10, 2009 with additional information from *The British Journal of Psychiatry* article where the results were published.

**Can excess of candy put a kid on path to violence?**

Children who eat too much candy may be more likely to be arrested for violent behavior as adults, new research suggests.

The results come from the British Cohort Study which enrolled more than 17,000 children born in 1970 and followed them for about four decades. Specifically, data from age 10 when the children were asked how frequently they ate candy and from age 34 when self-report of violent offending behavior was collected. Overall, 69% of respondents who were violent by the age of 34 had reported that they ate candy nearly every day at age 10. Only 42% of those who were non-violent at age 34 had reported that they ate candy nearly every day at age 10.

- a) Why is this study an observational study and not an experiment? Explain briefly.
- b) Is this a prospective or a retrospective study? Explain briefly.
- c) What is the explanatory variable? Is it categorical or numerical?
- d) What is the response variable? Is it categorical or numerical?