

Stat 101 HW #8 – Due Thursday November 6, 2008

- Halloween?** A May 2000 Gallup poll found that 38% of a random sample of 1012 adults said that they believe in ghosts.
 - Find the margin of error for this poll if we want 90% confidence in our estimate of the percent of American adults who believe in ghosts.
Hint: Look up the value that leaves 5% on each side of the normal from the web site.
 - Explain what that margin of error means.
 - If we want to be 99% confident, will the margin of error be larger or smaller? Explain.
 - Find that margin of error.
- (19-27) Only child.** In a random survey of 226 college students, 20 reported being “only” children (with no siblings). Estimate the proportion of students nationwide who are only children.
 - Check the conditions (to the extent you can) for constructing a confidence interval.
 - Construct a 95% confidence interval.
 - Interpret your interval.
 - Explain what “95% confidence” means in this context.
- Only children again.** In our survey, I asked the question of how many siblings *you* have. (Hint: change the variable *Sibs* to *Nominal* and when you get the distribution, JMP will show the percentage of each category.)
 - Check the conditions for constructing a confidence interval.
 - Construct a 95% confidence interval.
 - Interpret your interval.
 - Explain whether you think the two surveys (the one in #2 and ours) are “compatible”. (In a few chapters we’ll find a more powerful method for testing whether two different sample proportions can be estimating the same proportion).
- Videos.** Go watch these two clips about confidence intervals. In one of them, the presenter says something that isn’t correct. In the other the presenter writes something that isn’t correct. See if you can identify the mistakes.

<http://www.youtube.com/watch?v=7PgTRvYoeCE>

<http://www.youtube.com/watch?v=sxrp9An2d74&feature=related>

5. **(20-2) More Hypotheses** Write the null and alternative hypotheses you would use to test each of the following situations.
- In the 1950s only about 40% of high school graduates went on to college. Has the percentage changed?
 - 20% of cars of a certain model have needed costly transmission work after being driven between 50,000 and 100,000 miles. The manufacturer hopes that redesign of a transmission component has solved this problem.
 - We field test a new flavor soft drink, planning to market it only if we are sure that at least 60% of the people like the flavor.
6. **(20-6) Origins and (20-8) Cars** (These two go together).
7. **(20-10) Candy**
8. **(20-12) Got milk?** In November 2001 The Ag Globe Trotter newsletter reported that 90% of adults drink milk. A regional farmers' organization planning a new marketing campaign across their multi-county area polls a random sample of 750 adults living there. In this sample, 657 people said that they drink milk. Do these responses provide strong evidence that the 90% figure is not accurate for this region? Correct the mistakes you find in a student's attempt to test an appropriate hypothesis.

$$H_0: \hat{p} = 0.9$$

$$H_a: \hat{p} < 0.9$$

SRS, $750 > 10$

$$\frac{657}{750} = 0.876; \quad SD(\hat{p}) = \sqrt{\frac{(.88)(.12)}{750}} = 0.012$$

$$z = \frac{0.876 - 0.94}{0.012} = -2$$

$$P = P(z > -2) = 0.977$$

There is more than a 97% chance that the stated percentage is correct for this region.

9. **(20-26) 2006 Football** During the 2006 season, the home team won 136 of the 240 regular-season National Football League games. Is this strong evidence of a home field advantage in professional football? Test an appropriate hypothesis and state your conclusion. Be sure the appropriate assumptions and conditions are satisfied before you proceed.
10. **(20-30) Jury.** Census data for a certain county show that 19% of the adult residents are Hispanic. Suppose 72 people are called for jury duty and only 9 of them are Hispanic. Does this apparent under-representation of Hispanics call into question the fairness of the jury selection system? Explain. Compute both the exact Binomial P-value from the *Surfstat* website and the Normal approximation P-value. How different are they?