Stats: Modeling the World

Chapter 19

Confidence Intervals for Proportions

Procedure for CIs… **PANIC**!!!

Use the PANIC acronym to help you remember all of the steps in a confidence interval.

P – define your **P**arameter
A – check your **A**ssumptions/conditions
N – **N**ame your interval
I – calculate your **I**nterval
C – write your **C**onclusion in Context.

Making an educated guess…

Rarely do we actually know information about our population.

Usually we:
- take a sample
- find a sample statistic to estimate the true parameter value. This value is often called a "point estimate"
- use that sample statistic plus or minus a bit of lee-way (called a Margin of Error) to build an "interval estimate"

However… there is a proper procedure/write-up we must do

P – define your parameter

Our parameter is the value for the population that we are trying to estimate.

Whenever we do a CI, we should start by stating our "goal".

For example:

We wish to estimate p, the true proportion of all pig rolls that land as a _____.

What is Confidence interval?

A <u>confidence interval</u> is a range (or an interval) of values used to estimate the unknown value of a population parameter .

A – check your assumptions/conditions

We must check some conditions to make sure the Normal model applies before we use it.

- Randomization/Representative sample
- Less than 10% of the population
- At least 10 successes and 10 failures

N – name your interval

When the conditions are met, we can proceed with a 1-proportion z-interval.

So what is the Confidence Level ?

Discuss and answer the questions on your lab…

What does the confidence level mean?

Approximately 95 out of 100 intervals generated by this process will capture the true population parameter (p or mu)

I – calculate your interval

sample proportion ± margin of error

$$\hat{p} + z^* \sqrt{\frac{\hat{p}(1-\hat{p})}{n}}$$

Please get out your formula sheets!!!

Critical Values: 90% =

95% =

99% =

How does Z* affect the MoE?

Important Note!!!

The "95% confidence" is about our method!!

NOT about our answer!!

Why? Because once we have an answer, we either captured the true value or not.. That's a probability of 1 or 0.

The 95% is about the LONG RUN! ☺

C – write your conclusion in context

Here's the general "recipe" for writing a conclusion for a confidence interval…

"Based on our sample, we are ___% confident that the true population _____ lies between _____ and _____."