Sampling Distributions

Assignment

G&W, Chapter 7

Terms You Should Know.

Sampling Distribution . . . . . .

Z Distribution . . . . . .

Sampling Distribution of Mean . . . . . .

Central Limit Theorem . . . . . .

Standard Error of the Mean . . . . . .

Parameter estimation . . . . . .

Point estimation . . . . . .

Interval estimation . . . . . .

Formulas and Symbols You Should Know.

μ . . . . . .

σ_M . . . . . .

$\frac{\sigma_X}{\sqrt{N}}$ . . . . . .

$\frac{M - \mu}{\sigma_M}$ . . . . . .

Computations you Should be Able to Perform

1. Given $\mu = 99$, $\sigma = 10$, and $N = 25$, what is the standard error of the mean for this distribution?

Concepts and Interpretation.

1. What is the standard deviation of the sampling distribution of means?

2. How is the sampling distribution of means distributed? Sketch what it looks like

3. What is the relevance of the Central Limit Theorem to the Sampling Distribution of the mean?

4. What is the difference between a *standard deviation* and a *standard error*?

5. Of what use are sampling distributions? Why do we need them?

Hypothesis Testing

Assignment

G&W, Chapter 8

Terms you should know.

Prediction . . . . . .

Postdiction . . . . . .

A priori . . . . . .

Post hoc . . . . . .

Hypothesis testing . . . . . .

Significance Level . . . . . .

One tailed test . . . . . .

Two-tailed test . . . . . .

Null Hypothesis . . . . . .

Alternative Hypothesis . . . . . .

Research Hypothesis . . . . . .

Alpha Level . . . . . .

Type I Error . . . . . .

Type II Error . . . . . .

Power . . . . . .

Effect Size . . . . . .

Practical vs Statistical Significance

Formulas and Symbols You Should Know

H_o . . . . . .

H_A . . . . . .

α . . . . . .

β . . . . . .

Concepts and Interpretation

1. Frank N. Sense had the notion that sniffing vanilla extract would make a person smarter. Frank was doing preliminary research on this notion and decided to set up an experiment to evaluate this notion. Help this person by answering the following questions.

   What is an appropriate research hypothesis?

   What should Ho be?

   What should H_A be?

   What kind of test should be used? One or two-tailed?

2. What is the relationship between the Alpha level in an experiment and the probability of a Type II error?

3. An experimenter sets the Alpha level for an experiment at .20.

   What impact would this have on the probability of a Type I error?

   What impact would this have on the probability of a Type II error?

4. Why is it more difficult to get significant results with a two-tailed test than with a one-tailed test?

5. Park D. Car and his twin brother Otto Car did separate studies of the differences between sleeping in the light of the moon. Park had a sample size of 10,183 and found significant differences ($p < .001$) in the dream state of people who slept by the light of the moon. Otto, with a sample of 22 did not find statistically significant results.

   a. How do you explain these differences?

   b. What do you suspect the true effect size to be?

   c. Which type of error may have been committed, Type I or Type II? (Why?)