**Module III: Single-Sample Tests**

Statistics for the Behavioral Sciences

•Why sample?

•Convenience sampling

•Includes volunteer samples

•Creates biased samples

•Random sampling

**•Random sample**

•Different ways to get a random sample

•Table, Excel, On-line

•How big of a sample do we want?

**•Law of large numbers**

**•Random sampling is rarely possible**

**•Convenience sample**

•If not random then convenience sample

•Limits generalizability of our findings

•Replication is especially important for

•Convenience samples

•but also for random samples

**•Random sampling**

•Does not always give accurate results

**•Probability**

•Inferential statistics

**•Hypothesis**

•Hypothesis testing

**The Scientific Method**

•A Hypothesis is

“A testable prediction derived from a theory.”

**•Hypothesis: Watching Star Wars causes aggression in 5-year olds.**

•In other words: Children who watch Star Wars become more aggressive.

•Hypothesis testing

•Compares two hypotheses

•Null hypothesis

•Research (alternative) hypothesis

**•Null hypothesis**

•Hypothesizes no difference between groups

•There is no difference in aggression between children who watch Star Wars and

children who don’t watch Star Wars

•Null is always assumed true until rejected

**•Research (alternative) hypothesis**

•Hypothesizes that there is a difference

•There is a difference in aggression between children who watch Star Wars and children

who don’t watch Star Wars

**•Research (statistical) decision**

•Note: Different than practical decision

•Note: Null is always assumed true

•No difference between group means

•Fail to reject the null hypothesis

•Difference between group means

•Reject the null hypothesis

•Never “accept the research hypothesis”

**•When writing a hypothesis statement:**

•Provide a difference statement

•Identify who/what is being measured

•Identify the measurement being used

•Briefly (not full descriptions) identify the populations (groups)

**•Terminology**

•Probability

•Likelihood of an outcome divided by all possible outcomes

•Probabilities are decimals (i.e., .25 or .50)

•Proportions are fractions (i.e., ¼ or ½)

•Percents are probabilities times 100 (i.e., 25% or 50%)

**•Probability of getting heads**

•Probability of rolling a 1

•Rolling a 1 or a 3 on a die (1/6 + 1/6 = 2/6 = .33)

•Picking a face card (4/52 + 4/52 + 4/52 = 12/52 = .23)

•“AND”

•Getting a boy and then a girl in two pregnancies

(½ x ½ = ¼ = .25)

•Rolling a “1” three times in a row

(1/6 x 1/6 x 1/6 = .0046)

**•Probability cont.**

•Independent trials

•Does not depend on the previous trial

•Coin, dice, children, etc.

•Dependent trials

•Playing cards without replacement

•Pulling names from a hat without replacement

**•Why do we care about probability?**

•Samples are probabilistic

•We infer samples to the population

•Samples do not always represent population

•Statistical tests are probabilistic

•Results are not exact, but rather a degree of confidence