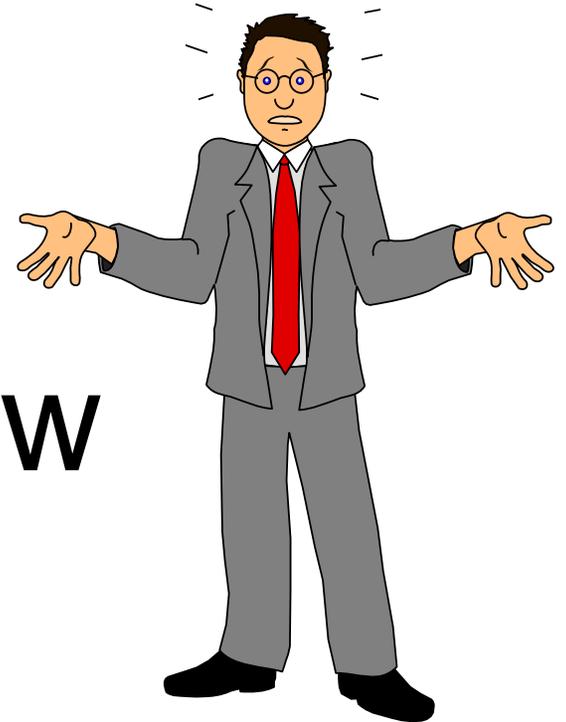
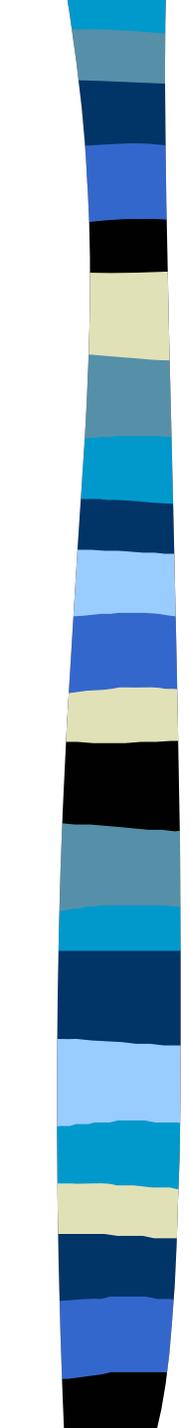


Inferential Statistics

T-Test

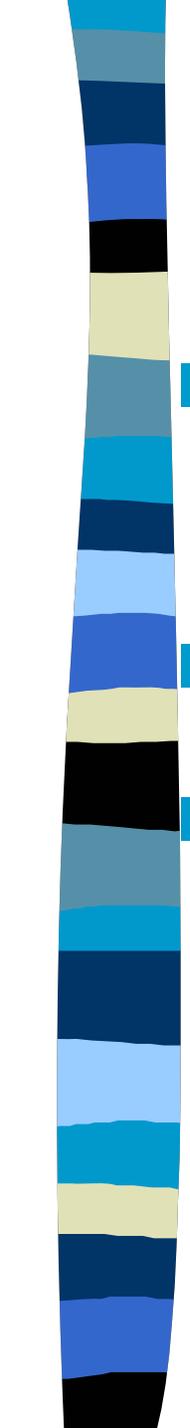
Dr. Lynne Ostrow





Definition of “Inferential”

- drawing conclusions from sample to population
- sample should be representative

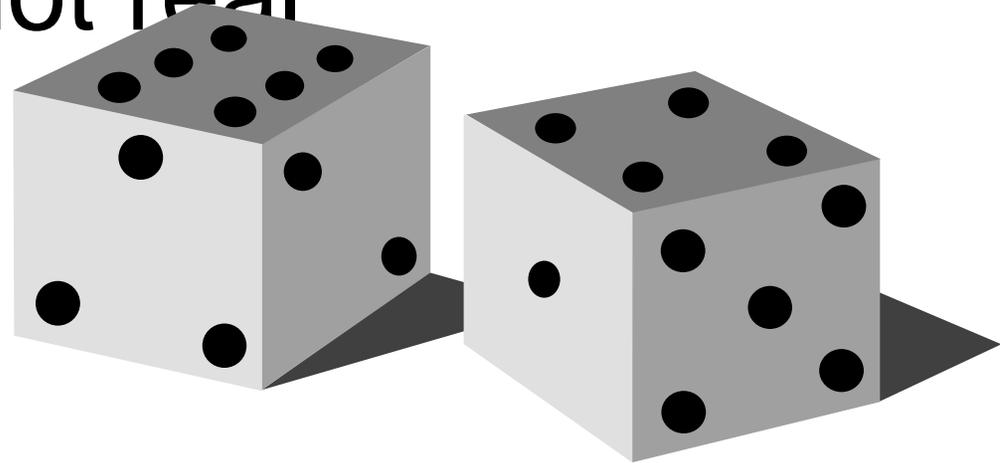


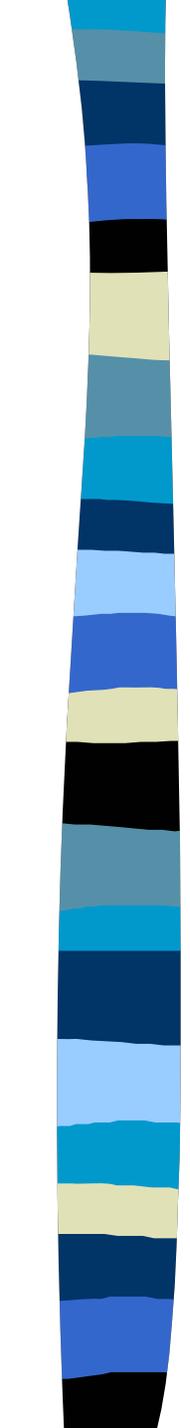
Hypothesis Testing

- objective criteria used to accept or reject null hypothesis (H_0)
- Null -tested by statistics
- Hypothesis made about population values

Decisions about Null

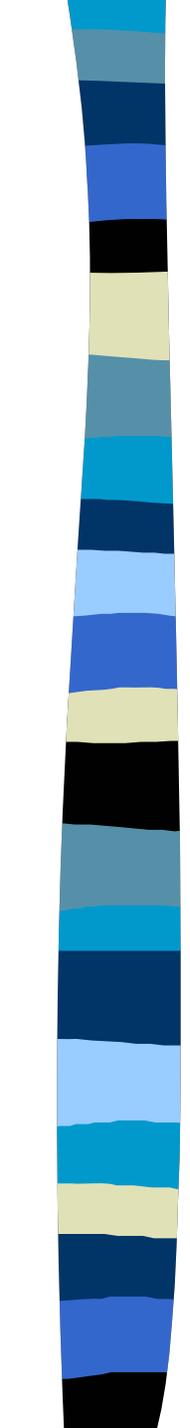
- 1. No relationship exists between the variables
- 2. Any relationship found is due to chance, not real





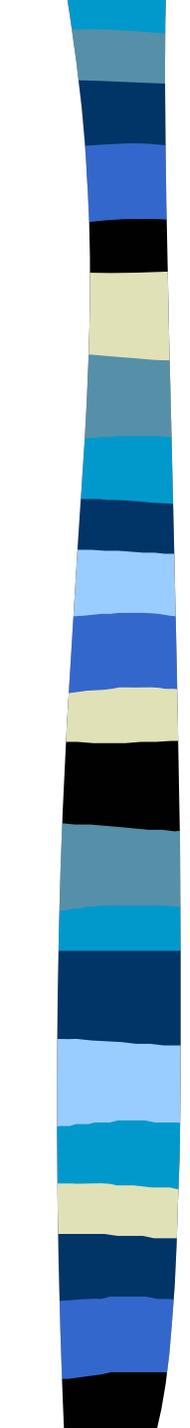
What (H_0) Says

- In the population, there is no difference between the values of variables (Means are equal)



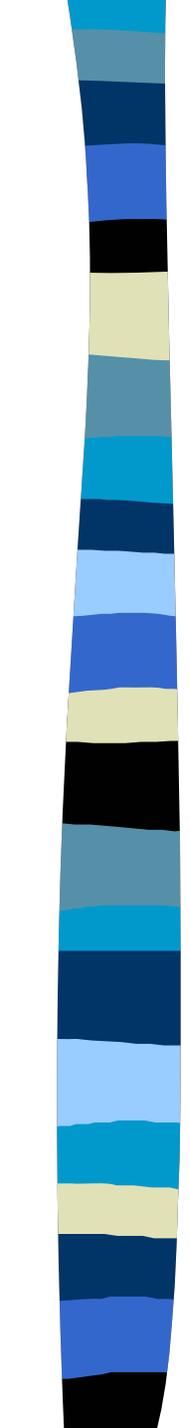
Null con't

In the population, there is no
relationship
between variable A and B



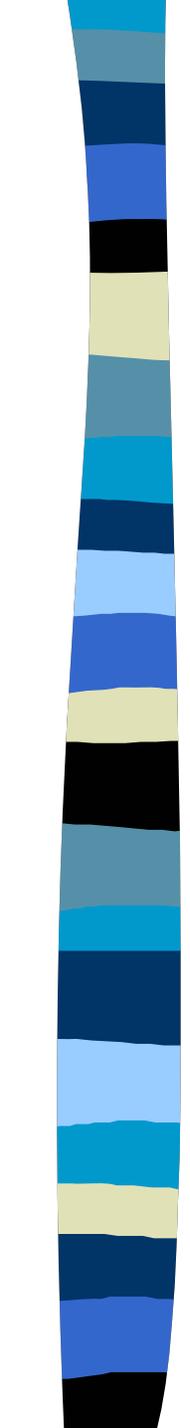
Probability

- Essential for understanding inferential statistics
- means of predicting
- “p “ signifies probability



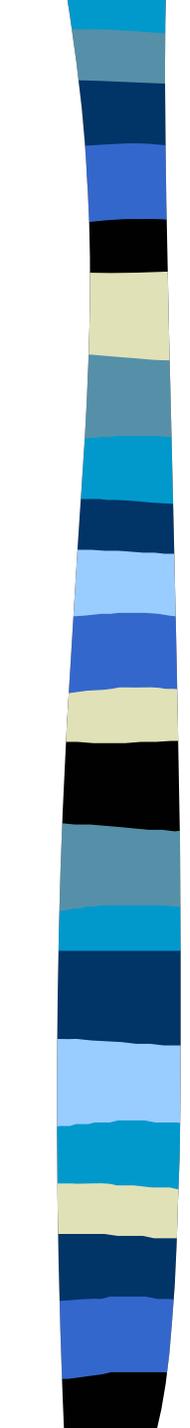
Problem

- What is probability of getting heads when you flip a coin?
- What is probability of rolling a “4” with a die?
- What is probability of not rolling a “4” ?



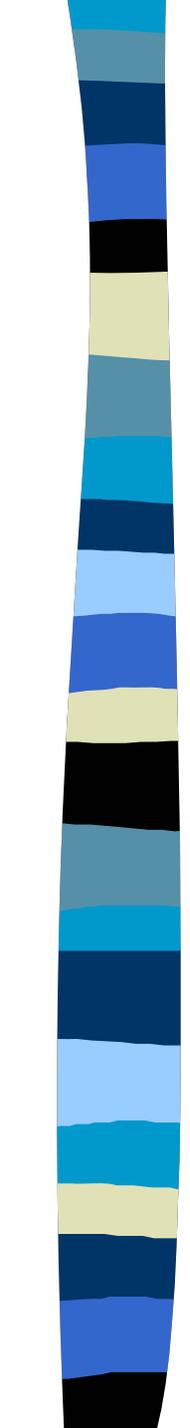
Confidence levels

- In order to establish whether an outcome is statistically significant
- level of confidence is probability level in which the H_0 can be rejected with confidence and research hypothesis accepted with confidence



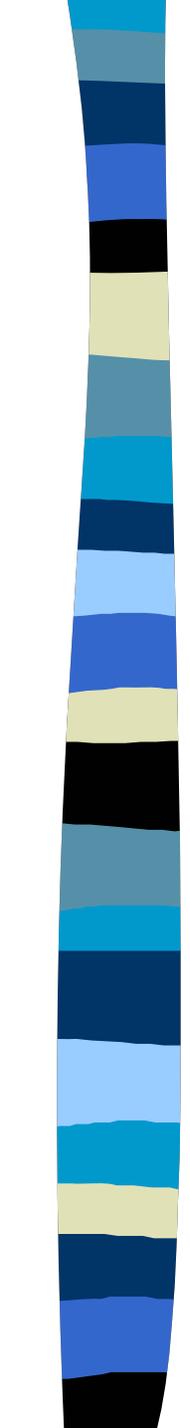
Level of Significance

- Level of confidence
- $p=.05$ used in most nursing studies: decision rule
- 5x/100 we are willing to make a Type I error



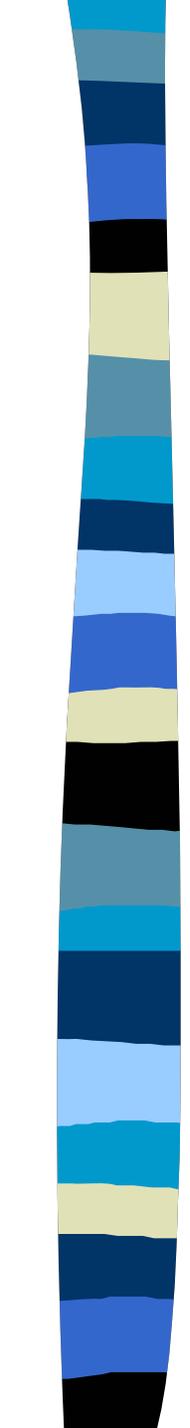
Type I Error

- Need to make a decision how likely our observed differences are real or due to chance
- Type I error-rejecting the null when it is true



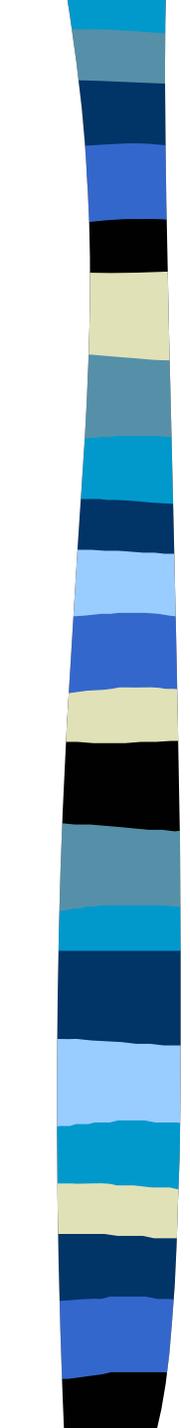
Type II Error

- Accepting the Null when in fact, it was false
- Too stringent level of significance (p value)



Types of Inferential Stats

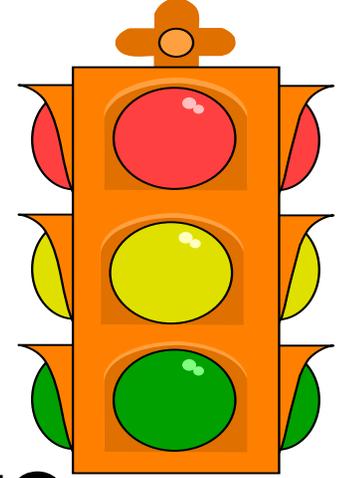
- 1. Parametric
- major ones used
- robust
- if sample size large, use
- DV at I/R level of measurement



Types Con't

- 2. Nonparametric (< powerful)
- use when assumptions of normal distribution not met
- perhaps, with small sample size
- nominal, ordinal level of measurement

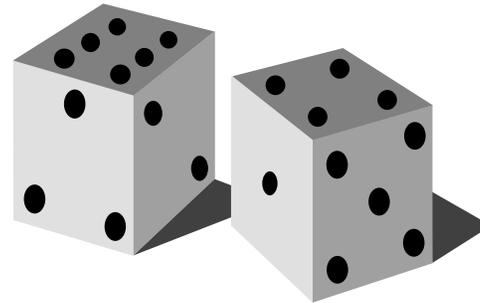
Statistical Significance

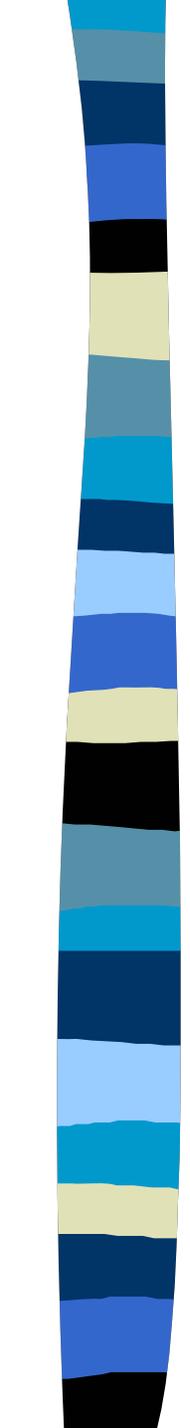


- findings not likely due to chance
- probably real differences between means or groups

Non-Significant Results

- observed differences or relationships could be due to chance fluctuations





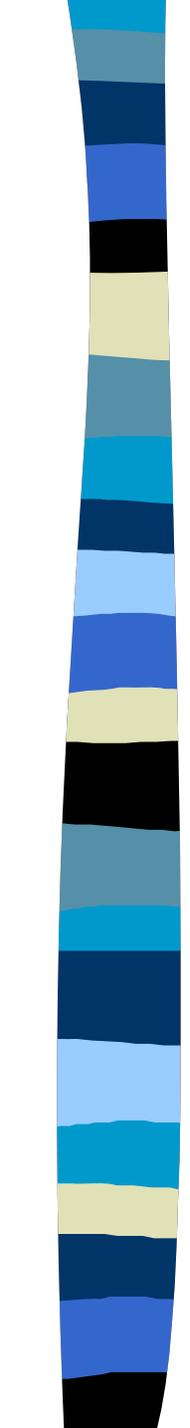
Overview of Hypotheses Testing

- 1. Choose statistical test
- 2. Select level of significance
- 3. Compute statistic
- 4. Calculate degrees of freedom
- 5. Compare results to tabled value

Computerized Statistics

- All you need to do is choose statistic
- computer does all other steps for you!!!!!!





Common Inferential Stats

- T-Test - compare means of **two** groups
- interval/ratio level of measurement
- independent samples t-test
- dependent or paired samples

T test Example

■ IMA Group

■ 4

■ 3

■ 6

■ 8

■ 5

■ $M = 5.2$

■ S.V Group

■ 6

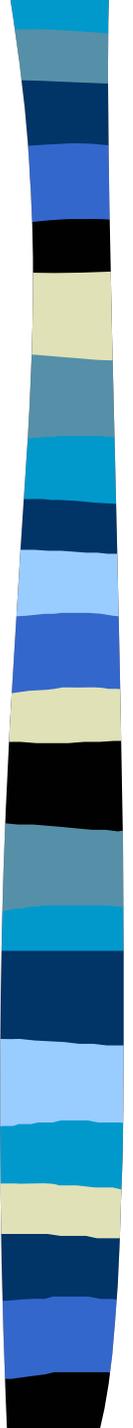
■ 5

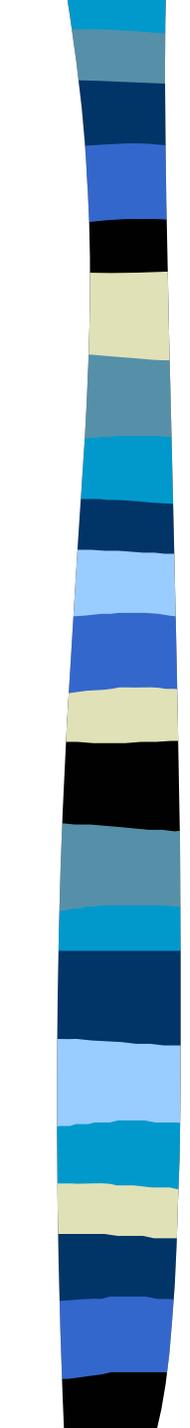
■ 8

■ 7

■ 10

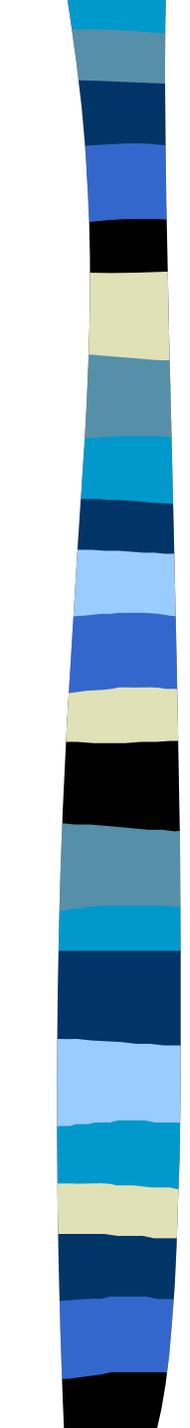
■ $M = 7.2$





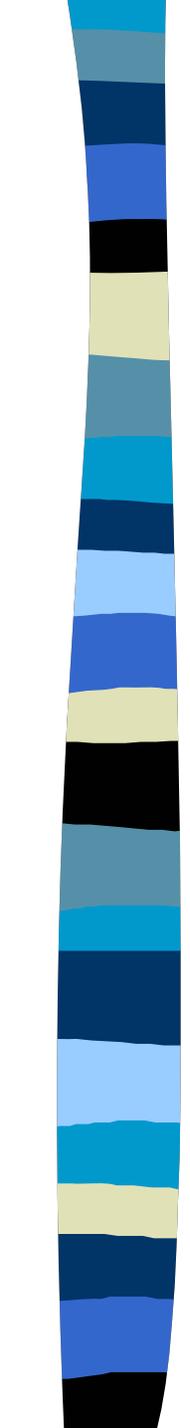
Common Types

- ANOVA -analysis of variance
- more than 2 means to compare or more than 2 testing of means
- interval/ratio level of measurement



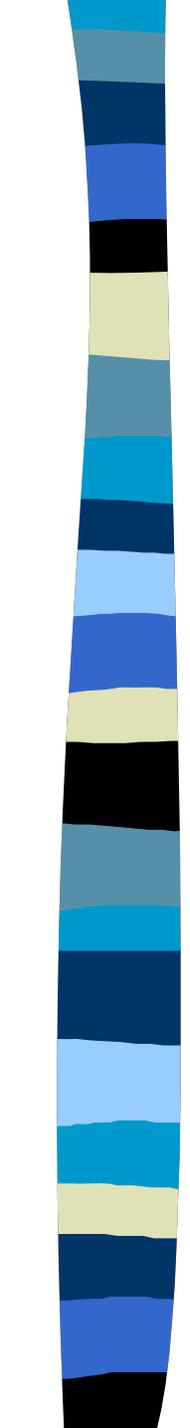
Common Types

- Chi-square (χ^2) - testing hypothesis about number of cases that fall into various categories
- nominal/ordinal level of measurement



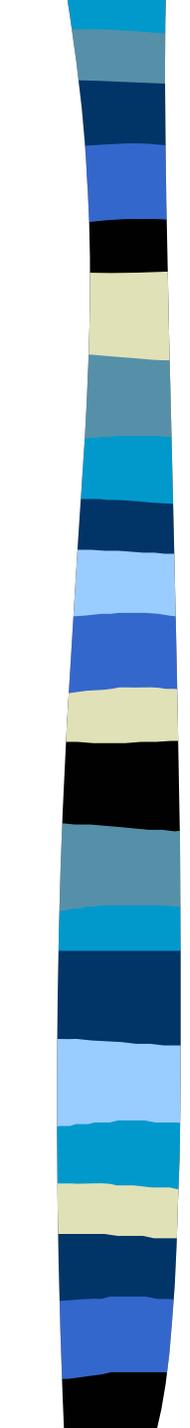
Summary

- Descriptive stats summarize measures of central tendency and variability
- Inferential determine how likely it is that results based on sample are the same in population
- Must know level of measurement of variables to choose correct



Summary

- Parametric and non-parametric two types of statistics requiring analysis of assumptions
- Pearson r , t tests and ANOVA examples of parametric
- Pearson r measure relationship or association between 2 variables



Summary

- T test determines if there is a significant difference between 2 group means
- ANOVA determines if there is a significant difference between 3 or more means
- X^2 non-parametric statistic to assess relationship between 2 categorical variables

