

What needs to go into the Data Analysis section of your proposal (week #10)

How will the collected data be analyzed to answer your research question? Where appropriate, which statistical tests will be used to evaluate your hypotheses? Justify your choices by comparing to previously published research.

1. How are you going to express your data and units (example: mean height of students will be expressed in centimeter)... others: %, totals numbers, etc.
 - Results for “x” will be expressed as mean +/- SEM, etc
2. What correlation method(s) will be used to compare the strengths and relationships between your dependent/ independent variables. Give ranges for correlation, etc...
3. What statistical test will be used to assess the significance of the data (t-test, Chi Sq, ANOVA, etc).
4. What is your p-value for significance ($P < 0.05$, $p < 0.001$, etc)
 - The null hypothesis will be rejected if $p < 0.05$.

Common statistical tests (week #10)

1. Chi square Test

Determines if certain dependent categorical characteristics (behavior) in two or more samples are different from each other. Example: What is the relationship between gender (M or F) and college majors (Chem, Bio, Math, Environ, etc)?

2. Student' t-Test

Test whether the averages (means) of a certain measured variable of two groups are different from each. Example: do cows given growth hormone have a higher rate of milk production than cows fed with no hormone?

3. ANOVA (or Analysis of Variance) is a test applied to compare samples among more than two and up to any manageable number of groups Example: the best concentration of hormone (none, low, medium, high) for milk production in cows?

4. Regression and Correlation

- a. Correlation coefficient -- how strong two variable correlate with one another ranges from -1 to 0 or +1 to 0 BUT DOES NOT TELL you the exact relationship between variables. (see board)
- b. Linear regression – tells you the exact mathematical relationship between two variables, but Not strength (see board)

Choosing the right statistical test (week #10)

- **P-values**: The probability that an event is random OR the probability that the Null hypothesis CANNOT be rejected.
- **Statistical test** determine if an event is random/significant by determining the p-value.
- Choice of statistical test depends on 1) whether your dependant variable is **categorical** (ex, classification) **or continuous** (measured number) and 2) the number of groups you have.
 - With **Categorical** variables we usually record the frequency (mode) of various classifications for the independent variables. Example: gender of students in this class versus college majors.
 - With **Continuous** variables, there is equality of intervals in the measurement (a measured number) and we usually determine the “mean”. Example: the heigh, age, and cholesterol levels of male/female students at FGCU..
- TAKE OUT YOUR PROPOSALS (in groups of three)
 - Determine if your data set(s) are categorical or continuous
 - Determine how many groups you have : one, two, three, etc
 - Control vs Drug (two groups)
 - Hormone concentrations (Low, medium, high,) vs growth rate, death rate, tumor size, etc

Choosing the right statistical test (week #10)

VARIABLE TYPE

# of GROUPS	Categorical	Continuous
ONE	Binomial test or CHI Square Test	t -test
TWO	CHI Square Test	t -test
THREE or MORE	CHI Square Test	Analysis of variance (ANOVA)
Correlation Method	Contingency table (contingency coefficient)	Correlation Coefficient Linear Regression

As a group

- *** Determine the statistical test(s) and correlation method(s) for your proposal.
- *** Write your Data Analysis section (include unit of expression, correlation, statistical tests, and p-value)
- *** Follow examples of relevant research papers that you used for justification of your methods and/or introduction.