


Study Considerations – Review


- Accumulation of Evidence
 - Hypothesis (Thesis Statement)
 - Theory
 - Law
 - Model
- Variables
 - Independent
 - Dependent

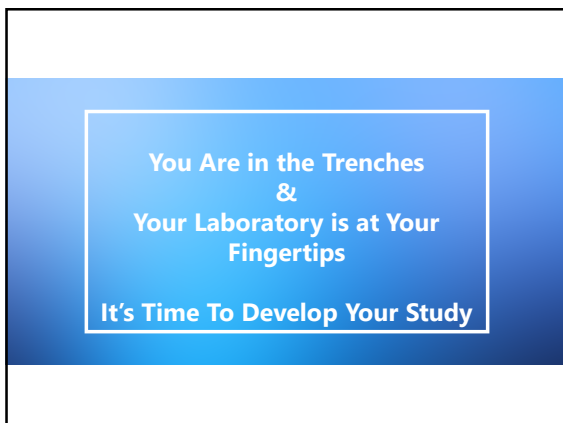
There is always a Control.

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Types of Studies – Review

- Qualitative vs. Quantitative
- Laboratory vs. Clinical
- Pilot run (example given)
- Single-Blinded vs. Double Blinded

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Starting and Brainstorming about Topics

1. What are your experiences?
2. What are you curious about?
3. Have you read an unbelievable claim that you want to prove/disprove?
4. Is there a common process or treatment you use that can be a constant in your study?
5. How difficult will it be to take measurements?

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Background Research

- PubMed (www.pubmed.com)
- Google Scholar
- Students
- Dermatologists (website publications)
- Scientists
- Your peer networks/contacts

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Experimental Design Considerations

What is the goal?

- Testing of a product
- Testing of an ingredient
- Understanding phenomena

Who are the target subjects?

- Women vs. men
- Young vs. mature
- Problematic vs. non problematic

Who/what is the control?

- Subject
- Product
- Technique

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Essential Questions that MUST be Answered

- Who?
- Where?
- What?
- How?
- When?
- Why?

Required when writing a procedure (instructions) for your study.

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Experimental Design Considerations

What is your hypothesis or thesis statement?

1. What question do you want to answer?
2. What do you want to prove/disprove?

Why is the study important?

1. Why should anybody care?
2. How extensive is the impact?

When will the study start and how long will it last?

1. Is it convenient to the participants?
2. Does the time of year or month need to be considered?
3. Is the durational period important?

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Experimental Design Considerations cont.

How will the study be carried out?

- Measured observations
- Equipment or instrumentation needed
- Try not to change behavior (unless it is a part of the goal)

Where will the study take place?

- Local, regional, national or global
- Location of needed activity
- Consideration of a controlled environment

Who will be involved in the study?

- Execute of activity and why
- Ideal participants
- Evaluation measurements
- Ideal collaborators

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Collaborators

- | | |
|-------------------------|--------------------|
| • Universities | • Industry Leaders |
| • Students | • Statisticians |
| • Professors | • Scientists |
| • Beauty Industry Peers | • Epidemiologists |
| • Dermatologists | • Hospitals |

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Collaborators

Contract Research Organizations (CRO)

- Provides research support services to pharmaceutical, biotechnology and medical device industries
- Clinical trial facilitators
- Subcontractors of specialized staff (study dependent)
- Management of most study activities i.e. site selection, participant enrollment, IRB approval and regulatory agency approval

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Collaborators (CRO)

Clinical Research Laboratories, Inc. (CRL)

www.crl-inc.com

- Located in New Jersey where there are vast regional opportunities in cosmetology research
- Long history of partnering with cosmetic companies
- Likes to publish their own research
- Would like to extend their database of hair professionals – especially those who have access to diverse clientele

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Statistics: Overview

Statistics: a branch of mathematics dealing with the collection, analysis, interpretation, and presentation of masses of numerical data. (Merriam-Webster)

N = number of data values in a sample set.

The t test: compares one variable (hair strength) between two groups.

A t-test asks whether a difference between two groups' averages is unlikely to have occurred because of random chance in sample selection. A difference is more likely to be meaningful and "real" if:

- 1) the difference between the averages is large,
- 2) the sample size is large, and
- 3) responses are consistently close to the average values and not widely spread out (the standard deviation is low).

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Definitions

Mean: $\bar{X} = \frac{\sum X}{N}$

\bar{X} (sometimes call the X-bar) is the symbol for the mean.

Σ (the Greek letter *sigma*) is the symbol for summation.

X is the symbol for the numeric value of one data point.

N is the symbol for the total number of data points in one set.

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Definitions

Standard Deviation (s):

$$s = \sqrt{\frac{\sum (x - \bar{x})^2}{N - 1}}$$

a measure of the variability (dispersion or spread) of any set of numerical values about their arithmetic mean.

\bar{x} (sometimes call the X-bar) is the symbol for the mean.

Σ (the Greek letter *sigma*) is the symbol for summation.

x is the symbol for the numeric value of one data point.

N is the symbol for the total number of data points in one set.

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Definitions cont.

Student's t test: uses statistical methods based on comparisons of small sample sizes (usually $3 \leq N \leq 100$).

Paired Student's t test: two sample sets are NOT randomly compared because the second sample set is the same as the first after some treatment has been applied.

<http://graphpad.com/quickcalcs/ttest1.cfm>

<http://www.physics.csbsju.edu/stats/t-test.html>

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Possible Study Topics:

1. Is Product A better at doing 'X' compared to Product B?
2. Are there any benefits to "inversion" techniques?
3. Do hair steamers really work?
4. Do the use of weaves influence scalp health?
5. Do hair vitamins work at all? If so:
 - Which ones work best? If subject dependent (they work with some people and not others):
 - What are the factors that impact why/how they work?

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