

Gathering Data

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Goals:

- Methods;
 - Variables (Independent, Dependent, Control, Random, Confounding);
 - Threats to Internal Validity;
- Assigning Participants to Conditions;
 - Within Subjects Design;
 - Between Subjects Design;
 - Counterbalancing;

[DISCUSSIONS] Variables



Why do we need to care about “variables”?

In the real world, experiments are complex studies that involve multiple factors and variables which have direct correlation with the outcome of the experiment. In order to have a valid and valuable result from the experiment we must select what conditions to control and how.

Experimental Methods



Can instructors' pace make difference in how attentive the students are?

What's Manipulations & Measures?

Manipulations: Instructor's Pace

Measure: Attentive of the Students

Manipulations: Instructor's Pace

Measure: Attentive of the Students

[DISCUSSIONS] Variables



What Are Potential Independent Variables:

- Control Variables?
- Random Variables?
- Variable Randomized Within Constraints?
- Confounding Variables?

Manipulations: Instructor's Pace

Measure: Attentive of the Students

[DISCUSSIONS] Variables



Why are independent variables important? And what are their purpose?

Examples:

"....To help illustrate your evaluation plan, include a sketch of a graph showing what your results might look like. This graph should clearly show your independent variable(s) (x-axis) and dependent variable(s) (y-axis) are, and what effect you expect to find. The bars (or lines or...) of the graph should be your best guess of what you expect to find..."

Manipulations: Instructor's Pace

Measure: Attentive of the Students

[DISCUSSIONS] Random Variables



Example : This can be as simple as randomly selecting the participants of an experiment.

Would we want to deterministically control all of the parameters of an experiment? Why?

Dilemmas Among Generalisms, Precisions, and Realisms!

[DISCUSSIONS] Variables

Manipulations: Instructor's Pace

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What's the dependent variables?

[ASIDES] Variables

Manipulations: Instructor's Pace

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And how can we measure the student attentive?



[DISCUSSIONS] Variables



Does total control leads to poor generalizations?

"The whole discussion about control variables brings me to question the "need for controlling any variables at all". Why do you need it? You can't predefine all cases initially and hence won't be able to figure out all the control variables at play. Wouldn't just controlling the independent variables to sufficient? - I like how the author advises on randomization. That whole section of the paper will definitely help me think about by user study." --Swathi Hoysala

"One important point that Martin makes is that the more you try to control the experiment, the less generalizable your results are going to be. While this is true, and the same sentiment was echoed in the McGrath reading about methodologies (4/24), I argue that this is not necessarily always bad." --Tamara Zubatiy

Manipulations: Instructor's Pace

Measure: Attentive of the Students

[DISCUSSIONS]

Internal Validity



What is internal validity? Some examples from our scenarios?

Internal Validity is the approximate truth about inferences regarding cause-effect or causal relationships. Thus, internal validity is only relevant in studies that try to establish a causal relationship

Manipulations: Instructor's Pace

Measure: Attentive of the Students

[DISCUSSIONS] Threats to Internal Validity



What Are The Potential Threats?

- History?
- Maturation?
- Selection?
- Mortality?
- Testing?
- Statistical Regression?
- Interactions with Selection?



Assigning Participants to Conditions



Which vacuum cleaner is more effective?
conventional one or smart automotive one?

What's Manipulations & Measures?

Manipulations: Vacuum Type

Measure: Speed, Cleanliness

Participants: 18 People in Class



[DISCUSSIONS] Study Design

Manipulations: Vacuum Type

Measure: Speed, Cleanliness

Participants: 18 People in Class



How Should We Assigning Participants To Different Interfaces For Designing Comparison Study;



Within Subject Design VS Between Subjects Design;

[DISCUSSIONS] Strategies

Manipulations: Vacuum Type

Measure: Speed, Cleanliness

Participants: 18 People in Class



What Does It Mean by Counterbalancing Strategy?

Goal: Each participant has an equal chance of landing in either conditions!

[DISCUSSIONS] Dangers from Statistical Regressions!!



What Does It Mean?



Experiment From The Coursera

Manipulations: Vacuum Type

Measure: Speed, Cleanliness

Participants: 18 People in Class

Peer Comments

“...In short, regression to the mean is when a random variable is extreme for a sample of the population on one observation but closer to the mean of the population on a subsequent observation....”

“...If care is not taken, one may draw causality from the shift in the random variable which is really attributed to regression to the mean. One example of this is if a group of poker players perform much better than another group in one day, then in the next day it is likely that the groups will perform closer to each other, as they would have regressed towards the mean....”

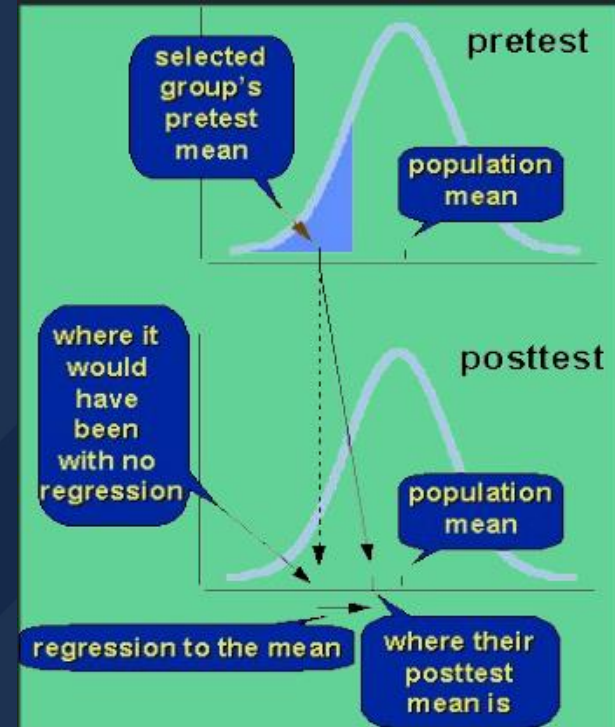
[DISCUSSIONS] Dangers from Statistical Regressions!!

When experimenters choose participants on the basis of their having scored very high or very low on a particular test, their scores tend to move toward the mean on a second test."

Manipulations: Vacuum Type

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[DISCUSSIONS] Interactions with Selections

Manipulations: Vacuum Type

Measure: Speed, Cleanliness

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Sometimes some of the threats such as history mentioned in this paper interact with other threats such as Selection, and then together they introduce a new threat to the Internal Validity.

What are some examples of this type of threat?