

Scientific thinking

Sources of research ideas:

- literature
- discussion w/ colleagues
- observation

The Research Process:

1. Idea -> hypothesis
2. Literature review
3. Pilot research, then real
4. Analyze data, stats
5. Interpret the data
6. Write paper

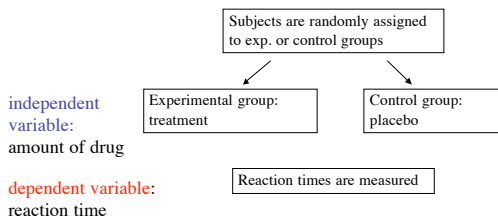
Sources of data

- Behavioral
 - In laboratory: experiments
- Physiological -> next class
 - Event Related Potential (ERP)
 - Brain imaging: e. g. functional MRI, PET
 - Etc.

Experimental design

Variables

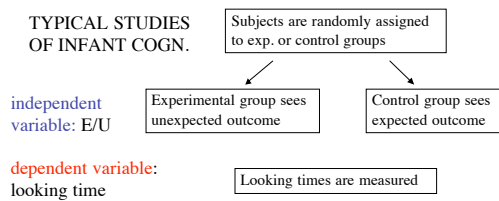
- Independent: what we *change* systematically
- Dependent: what we *measure*



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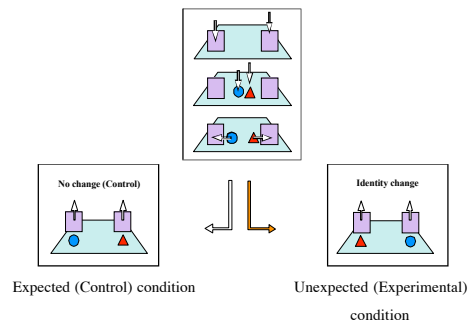


Looking time studies with infants

- Video recording
- Parent's eyes closed
- Observer measures looking times
- Times are re-scored later on by a second observer



An example for the violation-of-expectation method

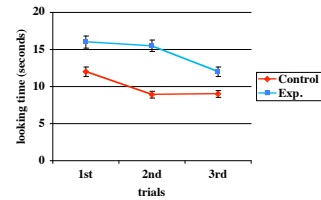


Infant subject in Experimental condition



Analysis

- Results are then analyzed



- Is the difference significant? If yes, then we have a positive result

Confounds

- According to our hypothesis, we studied the effects of the independent variable on the dependent variable
- However: there might have been other variables (confounds) -> control exp.

Dealing with some confounds

- Counterbalancing
 - Order of trials
 - Test stimuli
 - Etc.
- Control experiments

How many subjects?

- Depends on how much variability we can expect in the data
- Standard error of the mean (SEM)
- Increasing the number of subjects does not decrease the error of the measurement in a linear way.