Hypotheses

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Hypotheses and Research Questions

Predicting functional relationships between variables

Definition:

- A ***hypothesis*** is a tentative prediction about the nature of the relationship between two or more variables.
  - A hypothesis represents an <u>educated guess</u> about what will happen in an experiment
  - Hypotheses are always held <u>tentatively</u>
- A ***research question*** is simply a hypothesis stated in question form.

Should I use a hypothesis or a research question?

- ***Hypotheses***
  - Useful if there is an established line of research
  - Useful if a likely outcome can be anticipated in advance
  - Useful to test a specific theory or model
  - Can inhibit flexibility or blind a researcher to unanticipated results
- ***Research Questions***
  - Useful if there is little previous research on the topic
  - Allows a researcher to conduct more open-ended inquiries.
  - A wider range of outcomes can be reported
  - May encourage excessive manipulation of findings or "fishing expeditions."

Types of Hypotheses

- Null hypothesis
  Symbol = H_o or H0
- Experimental hypothesis
  Symbol = H_1, H_a, etc.
  nondirectional (two-way)
  directional (one-way)
- Research Question
  Symbol = RQ or R

Null Hypothesis

- the null hypothesis is a ***statistical hypothesis***, used to determine whether the results of an experiment are statistically significant.
- It posits that there is "no relationship" between two variables, or "no difference" between two groups.
- ***The null hypothesis*** is "supported," if the results are statistically non-significant
  - the null hypothesis is never "proven" (at least not by a single study)
  - impossibility of proving a negative
- ***The null hypothesis*** is "rejected," in favor of the experimental hypothesis, if the results are statistically significant

Experimental hypothesis

- A prediction that there will be statistically significant findings
  - significant differences or correlations between groups or among variables
- ***Nondirectional hypothesis***
  - significant difference in any direction
- ***Directional hypothesis***
  - Predicts that a specific group or condition will be higher or have more of something, **or**
  - predicts the specific direction that a correlation will take (positive negative, curvilinear)

- Null hypothesis:
  - H_o: Daily aerobic exercise has no effect on cholesterol level.
- Non directional hypothesis:
  - H_1: Daily aerobic exercise has an effect on cholesterol level..
- Directional hypothesis
  - H_a: Daily aerobic exercise will help reducing cholesterol level...

Research question

- RQ: Will Daily aerobic exercise change cholesterol level...

Phrasing hypotheses and research questions

- **Avoid vague or nebulous wording**
  - the hypothesis or research question must be clear and concise
  - The hypothesis or research question must be ***testable***.
  - The hypothesis or research question must be ***falsifiable***.

Thank You