How to Design and Write up a Study: A beginners Guide

Part 2: Hypothesis Testing

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From predictions to variables

Conceptual hypothesis needs to be translated into an empirical hypothesis: i.e. we restate our prediction in terms of relations between variables we intend to manipulate

The ‚**if**'-part of a hypothesis corresponds to the **independent variables**
The ‚**then**'-part of a hypothesis corresponds to the **dependent variables**

A hypothesis claims that there is a general relationship between these

The **precision** of this claimed relationship also determines the informativity of a hypothesis.
Undirected → Directed → Directed+Effect size → Mathematical relationship

We should **aim for a high level of precision** in formulating hypotheses

2

Exercise 3

Did you formulate your hypothesis in an appropriately informative way in Exercise 2?

If not, how would you rephrase it?

3

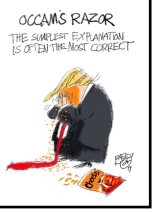
Risks from not having an "if-then" type hypothesis

"**Mission creep**":

Fuzzy questions inevitably pull researchers towards attempting to answer a much larger family of apparently related questions

Unnecessary complexity:

A clearly outlined problem will prevent us from adopting an overly complex approach to our research question (think of Occam's Razor)



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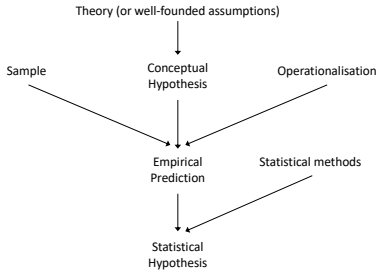
Hypothesis Testing



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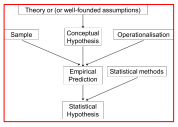
Hypothesis Testing: Example



- Conceptual hypothesis, empirical prediction, and statistical hypothesis differ in terms of the employed concepts
- There is no 1:1 mapping: each higher level description could be translated into the lower levels in many ways

Short-term memory (STM) depends on activation of representations in long-term memory (LTM)

Enhanced STM of familiar items

Lists of familiar words will be recalled better — or — Accuracy of recognising images of familiar tools will be higher — or — ...

t-test: familiar vs. unfamiliar — or — correlation: familiarity rating vs. no .of recalled items — or — ...

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From a conceptual hypothesis to empirical and statistical predictions

"If all you've got is a hammer, everything looks like a nail"

Research skills

Research techniques – e.g. EEG, eye tracking, psychophysics

Analysis – e.g. t-tests and ANOVAs, correlations and factor analysis

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Exercise 4

What is the

- Conceptual hypothesis
- Empirical prediction
- Statistical hypothesis

in the paper you used for the previous exercises?

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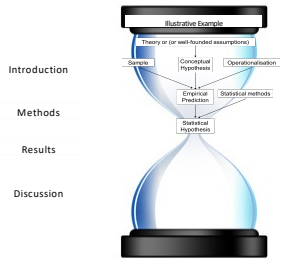
Correspondences between research design and structure of a written research report



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Thank you for your attention!

- This recording: research as hypothesis testing
- Next recording: the benefits of a thorough literature review

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