

## TOPIC 10: VALIDITY

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**Experiment** incongruent = color names will be different from print color  $\rightarrow$  Time;  
**Condition** congruent = color names correspond to print color  $\rightarrow$  Time  
neutral = no relationship between the print color  $\rightarrow$  Time  
and the non-words.

MOST likely, your result will be  $\rightarrow$  Time<sub>c</sub> > Time<sub>n</sub> > Time<sub>i</sub>  
**Stroop effect**

### INDEPENDENT VARIABLES

manipulated variables

experiment = condition  
indep variable

incongruent  
neutral  
congruent

### DEPENDENT VARIABLES

measured variables

experiment = time or RT  
dep. variables

In all experiment, one or more indep. variables to measure the effects on a dependent variable.

### CONTROL VARIABLES (constants)

variables that are being held constant on purpose

experiment = number of words and colors.  
constant v.

You need them to prevent confounding, to prevent a variable to be

### CONFOUNDING VARIABLES

Variables that change simultaneously with the indep. variables.

It is necessary to eliminate them to be sure that changes between the dependent variables to another one can be attributed to the manipulation of indep. variables only.

### RANDOM ERROR

experiment: noise during testing  
Also needs to be eliminated as much as possible bc it causes variance in the data (sort of preferred).

**STROOP EFFECT** affects performance (dependent variable)

across all levels of the independent variable.

HOGG (1 PPS)

### STANDARD STROOP EFFECT

Indicates that people have difficulties to selectively attend to the ink color, when the color is incongruent as compared to neutral.

**EMOTIONAL STROOP EFFECT**  
neutral condition: participants just have to name the ink color.

emotion condition: participants have to decide ink color hurt in which the words were emotions and threatening words.

**BUT** anxiety = abstract concept

CONCEPTUAL VARIABLE (construct)  
A variable stated at an abstract or theoretical level  $\rightarrow$  conceptual definitions

OPERATIONAL VARIABLE (operational definition)

The specific way in which a construct is manipulated or measured in a study

to operationalize = means to turn a concept of interest into a measured or manipulated variable

**CLAIM** = argument that someone is trying to make.  
3 types of claims

### ① Frequency claim

describes a particular rate or degree of a single variable.  
↳ it claims how frequent or common something is.

example: percentage of a variable, number of people who engage in some activity or a certain group's level on a variable.

- Focus on one variable;

- often derived and justified on the basis of descriptive research

### ② Association claim

argues that one level of a variable is likely to be associated with a particular level of another variable.

↳ focus on relationship  $\leftarrow$  correlation  $\rightarrow$  causation

Variables associated or correlated  $\rightarrow$  correlate or covary

when one variable changes, the other variable tends to change too.

correlational study

variables are measured and

correlation between them is tested

### ③ Causal claim

argues that one variable is responsible for causing the other.

↳ focus on causation

### HOW DO WE KNOW THESE CLAIMS ARE GOOD?

#### 1) VALIDITY

the appropriateness of a claim.

↳ Valid if reasonable, accurate and justifiable.

#### 2) CONSTRUCT VALIDITY

An indication of how well a conceptual variable is measured or manipulated in a study, how well a construct is operationalized.

↳ to ensure it, researchers must establish that each variable has been measured reliably and that different levels of a variable accurately correspond to true differences in, say, depression or happiness.

#### Threats to construct validity:

i) Inadequate operational definition

↳ does the test really measure our variable or not?

ii) Mono-operation bias

↳ a single test score might sometimes not be good enough, sometimes it needs multiple measures.

It is the extent to which dependent and independent variables reflect what they are meant to reflect.

#### EXTERNAL VALIDITY

indication of how well the result of a study generalizes or represents individuals, settings, places, and times (contexts)  $\rightarrow$  is it possible to generalize?

besides those in the study itself.

#### Threats to external validity:

① SELECTION BIAS

↳ you make a claim on a population.

All members of the population should have an equal chance to be included in the study (unbiased samples).

random sample from a

normal population that can be generalized back to the population.

$\rightarrow$  sample = representative of the population

② SPECIFIC STUDY PLACE DIFFERENT FROM OTHER PLACES

study on memory in a stuffy room  $\neq$  study of memory in a non-stuffy room

③ SPECIFIC TIME AT WHICH THE STUDY IS PERFORMED IS DIFFERENT FROM OTHER TIMES

#### INTERNAL VALIDITY

Extent to which a study's statistical conclusions are accurate and reasonable

↳ HOW WELL DO THE NUMBERS SUPPORT THE CLAIMS?

#### Threats to internal validity:

① violated assumptions of the test statistics

↳ statistical test often require that various assumptions are met, for instance concerning the distribution of the individual variables that you are measuring.

↳ violating those assumptions

can lead to incorrect inferences

② Fishing and the error rate problem

seeing things that aren't there

↳ if researchers search of fish through their data, testing many different hypotheses to find the significant effect, they are inflating the probability that they ultimately find a significant effect which in reality does not exist.

③ Low statistical power

↳ power = probability of correctly rejecting the null hypothesis when in fact it is false.

they have a higher probability of incorrectly accepting the null hypothesis and conclude

that there is no effect when in reality there is an effect.

Basically, any change that is different from the manipulation of the independent variables between measurements at time 1 and time 2, can potentially affect the result.

Therefore it should be avoided.

Generally, it is avoided by using a control group that has not been exposed to the treatment.

#### STATISTICAL VALIDITY

The extent to which a study's statistical conclusions are accurate and reasonable

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#### PLACEBO EFFECTS:

this is an effect that arises when people receive a treatment.

They may just improve only because they believe they are receiving a real or effective treatment.

$\Rightarrow$  NOT IMAGINARY!

Placebos can be strong treatments.

How to rule out the placebo effect:

3 groups of subjects

placebo effect

true therapy

no therapy

double blind procedure

nobody knows who is in which group

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