

# Experiment validity – External

Ivano Malavolta

# Types of threat to validity

## Theory



e.g. encoding algorithms

e.g. Energy efficiency



e.g. JPEG, PNG

e.g. energy per image

## Observation

# Types of threat to validity

## Theory



e.g. encoding algorithms

External

e.g. Energy efficiency

Construct



e.g. JPEG

e.g. energy per image

## Observation

# External validity

External Validity: **generalizability of the results**

- Are my results valid for the whole target population?
- Have I selected a representative sample?

# External validity: types of threat

- Interaction of selection and treatment
  - the population of subjects **is not representative** of the one for which I would like to generalize my results
  - eg, performing experiments with toy/synthetic apps
- Interaction of setting and treatment
  - the experimental setting or the material are not representative
  - e.g. I let the subjects using tools that they don't use in the reality
  - e.g. I run the experiment on a perfect Wifi connection
- Interaction of history and treatment
  - the experiment is conducted on a special time or day which affects the results
  - eg, our experiment on green software is performed after a big congress at which some subjects participated

# External validity: mitigation



Use an environment as realistic as possible



Explicitly define and model your context

# Acknowledgements

Some contents of lecture extracted from:

- Giuseppe Procaccianti's lectures at VU