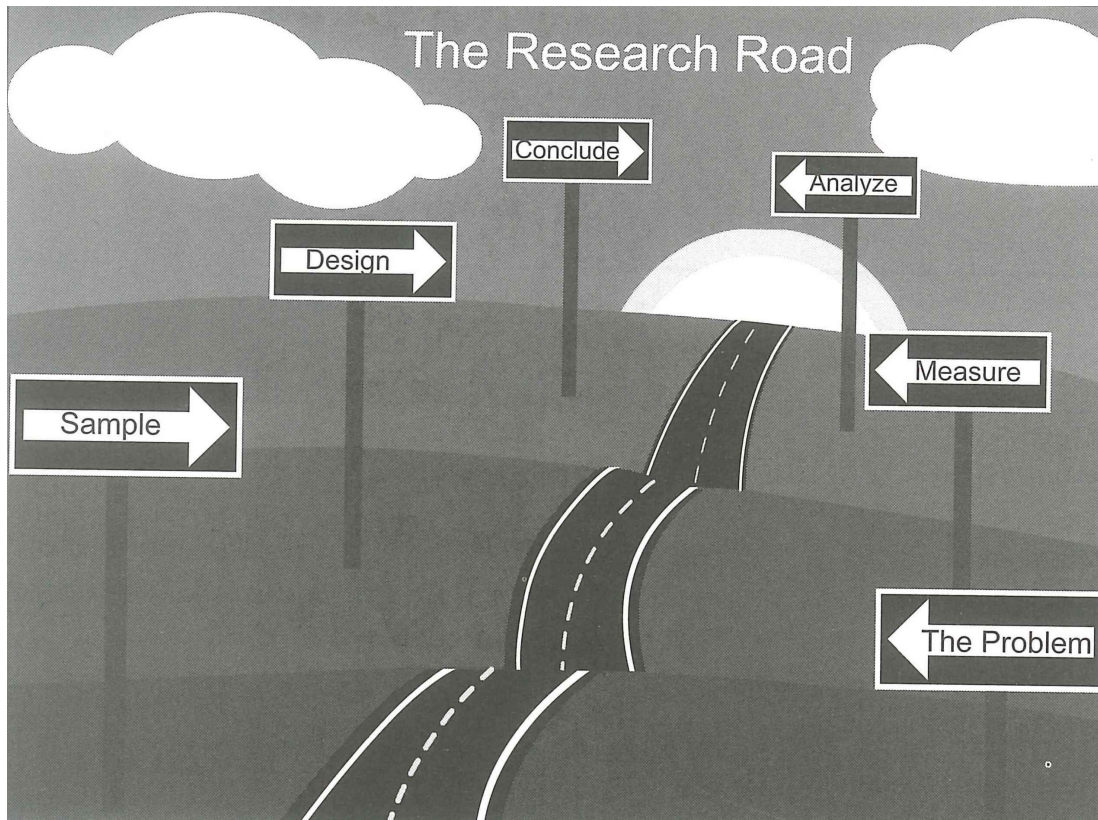


Research Foundation

Based in part on:

The research methods knowledge base. W.M.K. Trochim & J. P. Donnelly. ISBN-13: 978-1-59260-290-2. Cengage Learning, USA

The research roadmap



Source: The research methods knowledge base. W.M.K. Trochim & J. P. Donnelly.
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Steps on the research journey

- **The problem:** some general problem formulation that is typically too broad for one study and therefore is further distilled into a Research Question or mission statement
- **Sample:** sampling is the process of selecting units (such as people and organisations) from a population of interest so that, by studying the sample, you can generalise your results to the population from which the units were chosen
- **Measure:** measurement is the process of observing and recording the observations that are collected as part of a research effort

Steps on the research journey

- **Design:** research design provides the glue that holds the research project together
- **Analyse:** typically three steps of 1) data preparation, 2) descriptive statistics and graphics (what the data shows!) and 3) significance and statistical (inferential) analysis to test the research hypothesis of the research design
- **Conclude:** implications of the study and results, briefly mentioning any remaining problems and limitations of the study

The language of research

Types of studies

- **Descriptive studies:** designed to document what is going on or what exists, e.g. proportion of votes between two parties
- **Relational studies:** investigating the relationships between two or more variables, e.g. relationship between gender and voting proportions
- **Causal studies:** designed to determine whether one or more variables cause or affect one or more outcome variables, e.g. causal effect of advertising campaign on voting patterns

Variables

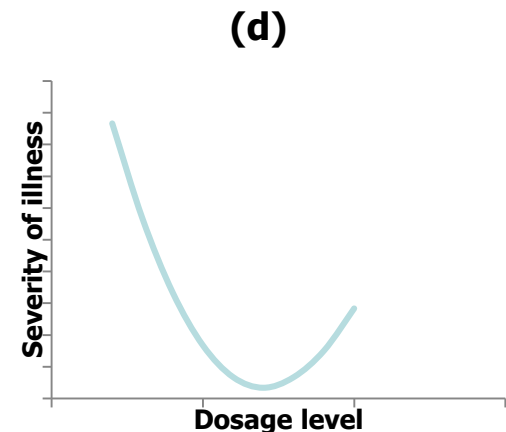
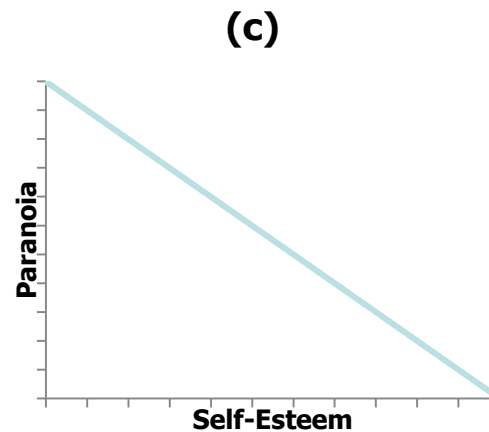
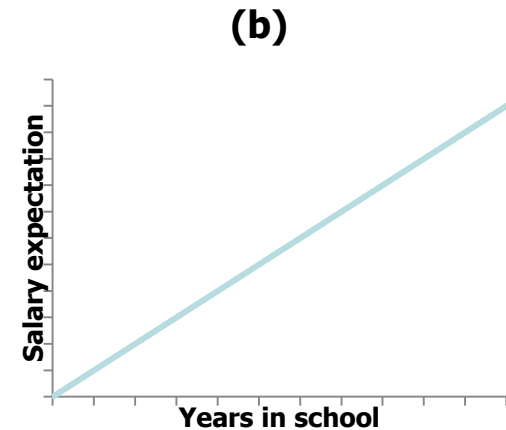
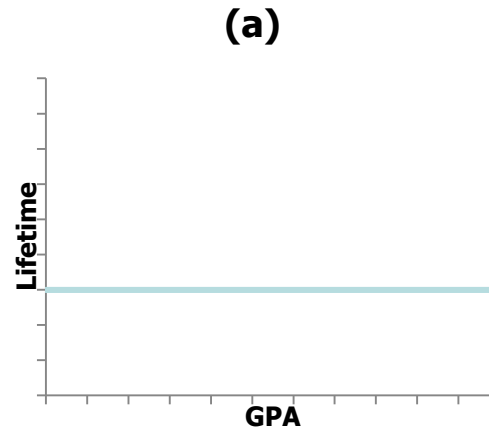
- A variable is any entity that can take on different values, e.g. age – different values for different people
- But not always quantitative or numerical, e.g. left-handed or right-handed... but can be represented by integers!
- An attribute is a specific value on a variable, e.g. left-handed or right-handed or rating of 1-5 from strongly disagree, disagree, neutral, agree to strongly agree
- The independent variable is what you (or nature) manipulates while the dependant variable is that which you presume to be affected
- Variables should be exhaustive (all possible answers) and mutually exclusive (not simultaneous)

Types of relationship

- A relationship refers to the correspondence between two variables
- Relationships can mean:
 - a) the nature of the relationship:
 - correlational relationship
 - causal relationship
 - third-variable problem
 - b) or the pattern of it

Relationship patterns

- a) None
- b) Positive
- c) Negative
- d) Curvilinear



Hypotheses

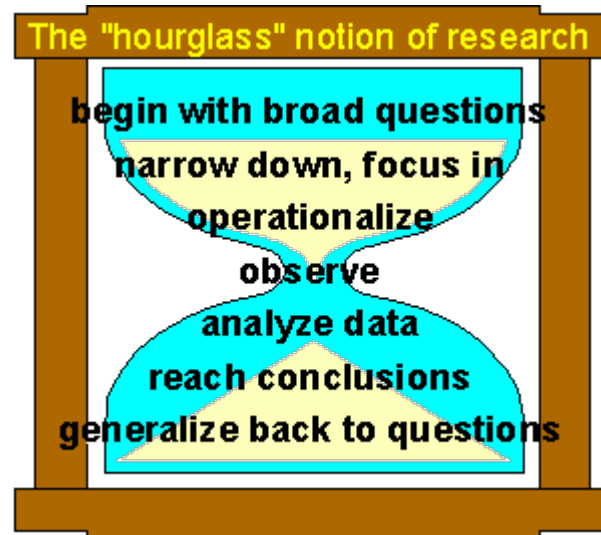
- An hypothesis is a specific statement of prediction.
- It describes in concrete (rather than theoretical!) terms what you expect to happen in your study.
- (Your) alternative hypothesis describes the prediction while the null hypothesis describes all other possible outcomes with respect to the hypothesised relationship
- These should be mutually exclusive but exhaust all possible outcomes + be tested so that one is accepted and the other rejected (the hypothetico-deductive model – theory to confirmation)

Types of data

- Quantitative: in numerical form
- Qualitative: not in numerical form but text, photographs, film, etc
- Beware: all qualitative data is based on quantitative judgements and all qualitative data can be summarized and manipulated numerically!

Rational of research

Structure of Research



Source: <http://www.socialresearchmethods.net/kb/strucres.php>

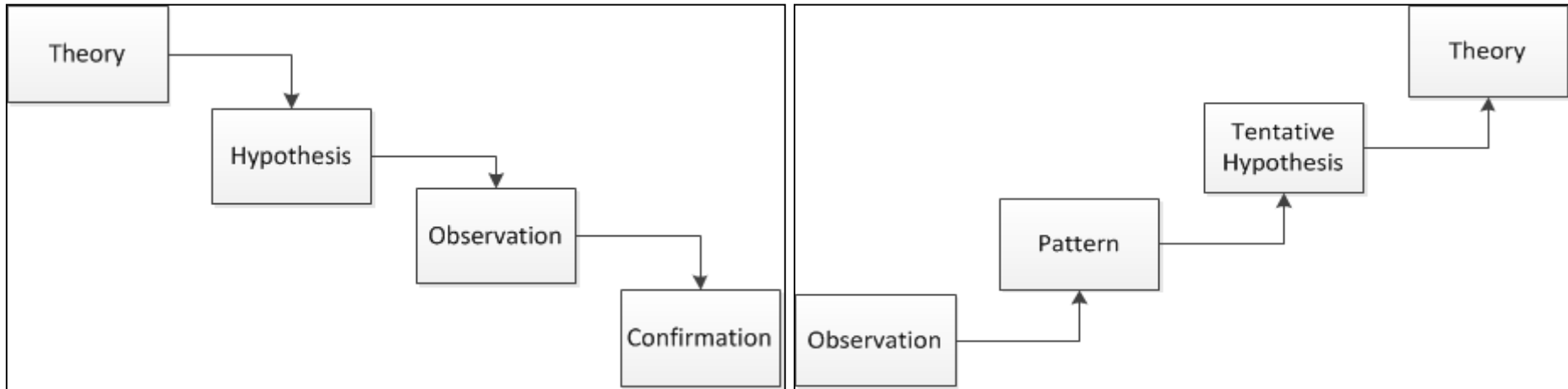
The research components

- The research problem
- The research question (linked to theory testing)
- The program (cause)
- The units
- The outcomes (effect)
- The design

Deduction and induction

- Deductive reasoning moves from the more general to the more specific
- Inductive reasoning moves from specific observations to broader generalisations and theories (Sherlock Holmes!)

Deductive and inductive reasoning



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Validity of research

Validity defined

- The quality of various conclusions you might reach based on a research project

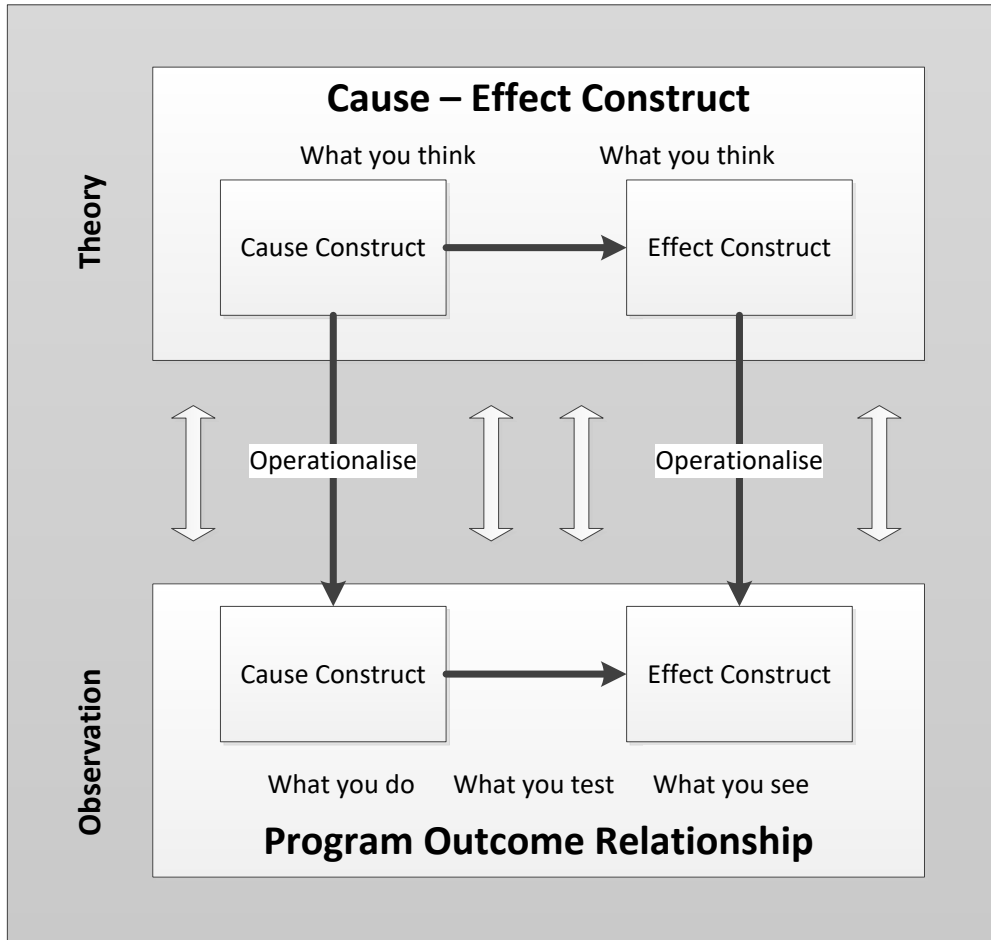
and

- The best available approximation to the truth of a given proposition, inference or conclusion

Two realms involved in research

- The land of theory: what the cause is believed to be and what the effect identified is (affecting something and measuring it)
- The land of observation: observing effects as the outcome of a research program testing hypotheses
- Operationalisation is the act of translating a theoretical construct into its manifestation (taking the idea and describe it as a series of operations and procedures)

Realms and components of research



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Four validity types

Conclusion validity – Is there a relationship?

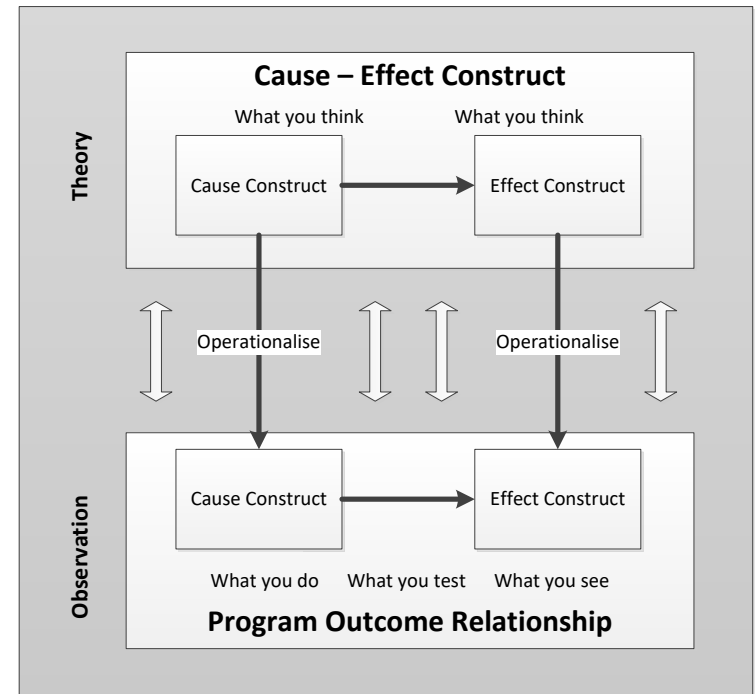
Internal validity - What type of relationship?

Construct validity – Is there a link between observed relationships and theory?

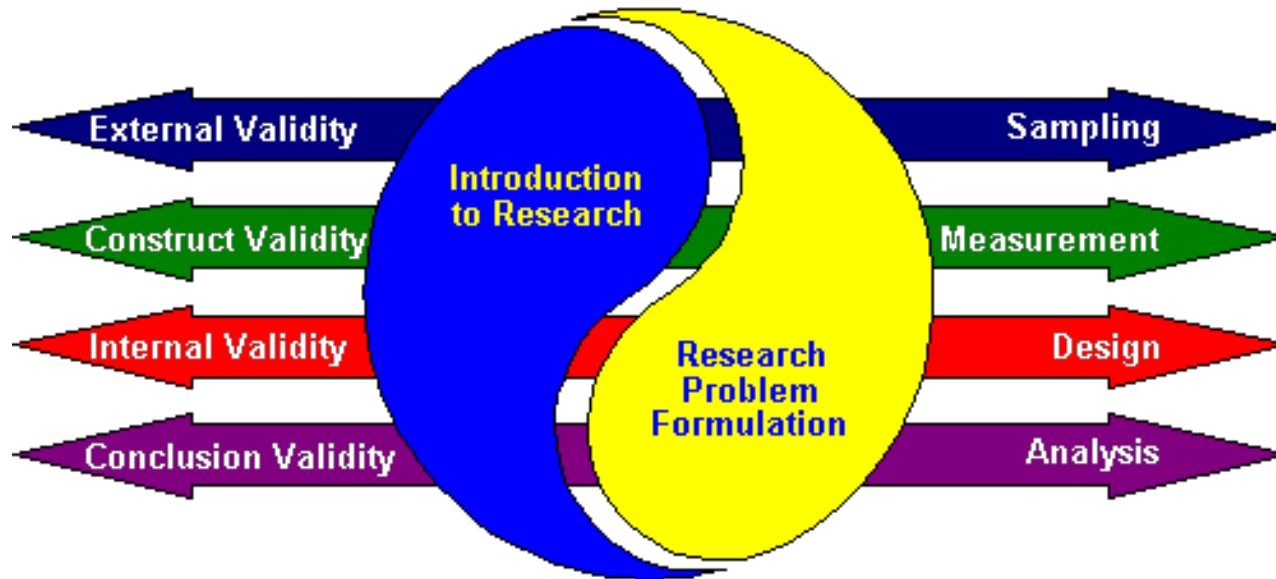
External validity – is generalisation of found links & relationships possible?

N.B.

Conclusion validity and Internal validity refer to the land of observation



Theory and practice

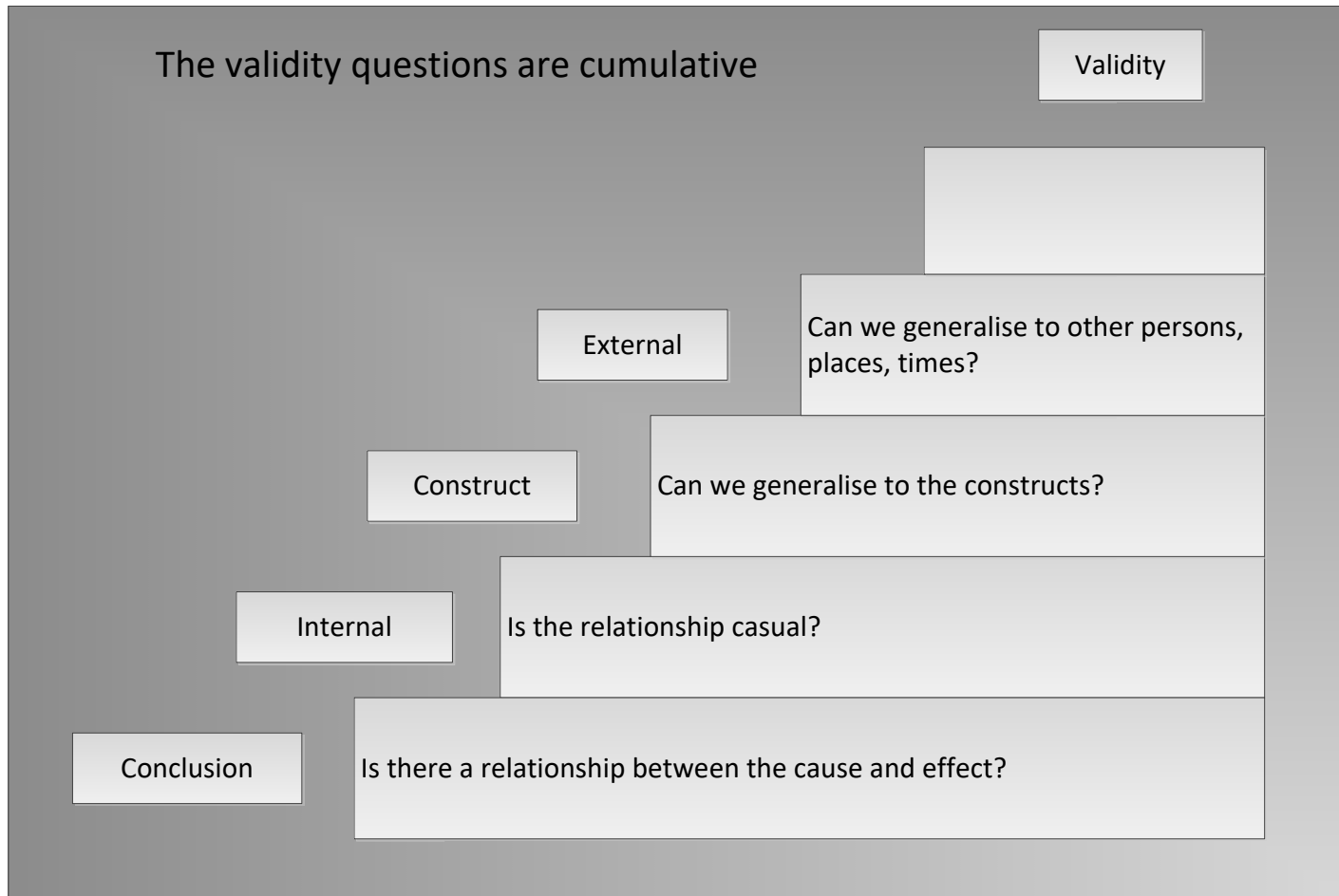


<http://www.socialresearchmethods.net/kb/yinyangmap.php>

How valid is the theory?

- Conclusion validity: in a research study, is there a relationship between two variables identified?
- Internal validity: if so is the relationship a causal one?
- Construct validity: given a causal relationship, did the operationalisation of the theoretical constructs reflect the ideal – typically were you able to measure what you wanted to capture?
- External validity: given the causal relation between the constructs of cause and effect, can you generalise this effect to other persons, cases, times or places etc?

Validity staircase



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Conceptualising

Where do research ideas come from?

- Practical problems experienced and identified in the field needing to be addressed
- Formulation of educational projects for learning enhancement!!!
- Request for Proposals (RFP) or Research Calls (regional, national, EU or international):
 - Problem that needs addressing
 - Context in which it operates
 - The envisaged approach
 - Funding available

Feasibility

- Is the research idea feasible?
- Trade-offs between rigour and practicalities
- Practicalities include:
 - How long the research will take?
 - Ethical considerations?
 - Is the cooperation there?
 - Are the required costs manageable?

Literature review

- A literature review is designed to identify related research
- and to set the current research project within a conceptual and theoretical context

- Concentrate your efforts on the most credible scientific literature
- and do the literature review as early as possible

What to look for in literature?

- A study that is quite similar to your anticipated study – also then checking their literature review!
- Other research will help you capture ALL the major relevant constructs in your approach to your study!
- Help in finding and selecting appropriate measurement instruments and approaches
- Avoiding the pitfalls – don't reinvent the wheel!

Summary

- The language of research (variable, attribute, causal relationship, hypothesis and unit of analysis)
- Rationale or logic of research and how it is structured (components of research, deductive/inductive reasoning, validity)
- Validity understood by its Conclusion, Internal, Construct or External nature
- How research is thought up or conceptualised

To do next

- Continue with the next section in this online course
- Keep up with the course schedule