On trustworthiness and quality in quantitative research

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On trustworthiness
- General ideas
- Validity and reliability

On quality
- Approaches to quality
Quantitative research methods (if properly applied) are designed to guarantee that:

- Same data and methods give same conclusions (objectivity).
- Conclusions are correct (deductive methods, e.g. mathematics), mistakes will eventually be found (experimental methods, e.g. physics) or at least one has good idea how trustworthy the conclusions are (statistics).
- The results can be independently verified or reproduced by the scientific community.
General ideas, trustworthiness

On the other hand, no quantitative research method (alone) can guarantee that:

- The assumptions you have made are correct (e.g. the object of your research exists or can be explained within the scope of your research).
- You are measuring what you think you are measuring.
- The setting does not change (e.g. with time, place, culture).
- The research methods and the sample you have chosen are good for the purpose of your research (e.g. not biased).
- Your calculations are correct (mistakes are exist even in research papers of the very best mathematicians).
- You are not overlooking something important.
- The interpretation of the results is correct.
Validity and reliability measure trustworthiness of the research.

- **Validity** (usually very hard to study)
  - Internal: measure is measuring what it is supposed to measure.
  - External: measure holds across different settings, procedures and participants.
- **Reliability** is the consistency of a set of measurements or measuring instrument (usually can be studied quantitatively).
  - Test-retest reliability.
  - Internal consistency can be estimated with Cronbach $\alpha$. 
Approaches to quality

1. Quality as exceptional
   - Traditional notion of quality
   - Excelence (exceeding high standards)
   - Checking standards
     → Scientific journals, referee systems, prizes, academic degrees?

2. Quality as perfection or consistency
   - Zero defects
   - Quality culture
     → Reliability, referee systems

3. Quality as fitness for purpose
   (1) Meeting requirements
     → Validity (internal)
   (2) Mission
      - Quality assurance
     → Methodology, validity, reliability

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Approaches to quality

4 Quality as value for money
   → Performance indicators, e.g. citation indices, impact factors

5 Quality as transformation
   • Enhancing the participant
   • Value added
   • Empowering the participant
   → Academic degrees and titles (e.g. doctoral degree, docent)?