

Validity and Reliability

Introduction

- **Validity and Reliability** are concepts used to evaluate the quality of research
- They indicate how well a method, technique or test measures something
- Before and after collecting data, the researcher needs to consider the validity and reliability of their data

Validity

- **Validity** is about the accuracy of a measure
 - Dose it measure what it is supposed to measure?
- Validity of research can be explained as an extent at which requirements of scientific research method have been followed during the process of generating research findings

Types of Validity

- Content Validity:
 - Measuring instrument provides adequate coverage of the topic under study
 - If we want to assess a specific behavior, the entire content of the behavior should be adequately represented in the test task
- Construct validity:
 - Accurately represent the reality
 - Seeks agreement between the theoretical concept and a specific measuring procedure
 - Doesn't measure what it shouldn't

Types of Validity

- Test Validity:
 - Correlation with the standards
 - Correlate with other tests
 - Predict future values of criterion
- Face validity:
 - Face validity occurs when something appear to be valid
 - Depends muchly on the judgement of the observer(s)
 - Subjective judgement by one or more experts

Types of Validity

- Internal Validity occurs when we can conclude that :
 - The observed relationships between variables being under studies is not due to systematic errors
 - The results of an observation are correct for the particular group of people or particular setting being studied
 - It is highly related to the scientific conduct of the study
- External validity:
 - External validity occurs when the relationships discovered can be generalized to other people, time and contexts
 - Correct sampling will allow generalization and give external validity

Factors affecting validity

1. Environmental factors: some environmental factors such as room temperature, lighting, and noise can influence the error rate
2. Research factors: the researchers and influence the results of the study in many ways
3. Instrumentation factors: an inadequate sampling of items is a common source of instrumentation errors
4. Subject factors: any changing physical, psychological or emotional state of the subject can introduce errors in the measuring process

Validity Threats

1. History

Unplanned events occur during a project → increase or decrease the expected outcomes of the project

2. Selection

People selected for the control group differ from the people selected for the experimental group

Validity Threats

3. Testing

Effect of pre-test on the post test: People are likely to do somewhat better on the post test than they did on the pre-test.

4. Instrumentation

Change of measurement instrument (such as a questionnaire) between pre-test & post test

Validity Threats

5. **Maturation**

Overtime people and thing change

e.g. Long training programs, Longitudinal studies → maturation process can produce changes that are independent of the program intervention

6. **Mortality**

In cohort studies → some drop-out or loss of cases.

Differences in results due to loss of cases rather than to the effect of a program intervention

Validity Threats

7. Hawthorne

If a group is being observed to determine the effect of an intervention, the observed change may be due to the fact that a group is being studied rather than due to intervention.

Strategies to reduce threats to validity

1. **Control group**

will reduce confounding factors and history effects

2. **Random selection of subjects**

will reduce selection bias

3. **Careful design and pre-testing**

will reduce instrumental threats

Strategies to reduce threats to validity

4. Knowledge of Environmental Events

enables researcher to be aware of and sensitive to external events that are threats to validity

5. Unobtrusive methods of data collection

allows adaptation time for subjects to get used to being observed to reduce Hawthorne effects.

Strategies to reduce threats to validity

6. Blinding of observers, subjects

to reduce selection bias

7. Triangulation

approaching the research problem from a different angle using different research techniques will increase the validity

Reliability

- **Reliability** is about the consistency of a measure
- The extent to which the same answers can be obtained using the same instruments more than one time
- The degree to which scores are free of measurement errors
- A measure can be reliable without being valid, but it cannot be valid without being reliable

Types of reliability

Psychologists consider **three types** of consistency:

- over time (test-retest **reliability**),
- across items (internal consistency), and
- across different researchers (inter-rater **reliability**)

Test-retest reliability

- Obtained by administering the same test twice over a period of time to a specific group of individuals
- Scores are tabulated and correlations calculated
- Correlations are higher for those with good reliability

Internal consistency

- The extent to which test, procedure assess the same characteristic, or quality
- A measure of precision between the measuring instruments used in a study
- The association of answers to set of questions designed to measure the same concept
- Helps researcher interpret the data and predict the values of scores and the limits of relationship among variables

Inter rater consistency

- The extent to which two or more individuals (rater or coder) agree
- Assess the consistency of how a measuring system is implemented

Factors influencing reliability

- Time interval between testing: testing with short intervals results higher reliability coefficient
- Conditions under which measure: favorable conditions will give higher reliability coefficient
- Length of test: the longer the test will provide more adequate sample of behavior being measured and thus the higher reliability
- Difficult of the test: too easy or too difficult test will give low reliability scores

Strategies for enhancing the reliability

- Standardization of instruments
(use working definitions, operation manual)
- Training of interviewers
- Refining the instruments
- Automating the instruments
- Repetition of same measurement methods

Relationship between validity and reliability

- Validity and reliability are closely related
- Reliability is a pre-requisite for measure of validity
- A test cannot be considered valid unless the results from its are reliable
- One needs reliability but it is not enough for validity

Validity and Reliability

RELIABLE BUT NOT VALID



VALID BUT NOT RELIABLE



RELIABLE AND VALID



Reference

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