



RELIABILITY

Consistency today.
Confidence tomorrow.

Reliability refers to the **consistency, stability, or dependability** of a measurement instrument.

Simple Meaning

Reliability = Consistent Results

if the same instrument produces similar results under similar conditions, it is considered reliable.

MAJOR TYPES OF RELIABILITY

Type	Meaning	Key Idea
 Test-Retest	Same test administered to the same group at different times.	Stability over time
 Split-Half	Test divided into two halves and scores are correlated.	Internal consistency
 Parallel/Equivalent Forms	Two equivalent forms of the same test are administered.	Consistency across forms
 Inter-Rater	Agreement between two or more raters/observers.	Consistency between raters
 Internal Consistency	Consistency among items measuring the same construct.	Items work together

RELIABLE MEASUREMENT | BETTER RESEARCH | STRONGER CONCLUSIONS

[Attempt Quiz Click Here](#)

RELIABILITY FORMULAS

1 Cronbach's Alpha

Used for internal consistency, especially with multi-item scales.

$$\alpha = \frac{k}{k-1} \left(1 - \frac{\sum \sigma_i^2}{\sigma_T^2} \right)$$

- k = number of items
- σ_i^2 = variance of each item
- σ_T^2 = variance of total test scores

2 KR-20

Used for dichotomously scored items (e.g., right/wrong, 0/1).

$$KR - 20 = \frac{k}{k-1} \left(1 - \frac{\sum pq}{\sigma_T^2} \right)$$

- p = proportion answering an item correctly
- $q = 1 - p$
- k = number of items

3 KR-21

$$KR - 21 = \frac{k}{k-1} \left(1 - \frac{k\bar{p}(1-\bar{p})}{\sigma_T^2} \right)$$

- $\bar{p}$ = mean proportion of correct responses
- Assumes approximately equal item difficulty.

4 Spearman-Brown Split-Half Formula

$$r_{SB} = \frac{2r}{1+r}$$

- Corrects the correlation between two halves to estimate reliability of the full test.

5 Spearman-Brown Prophecy Formula

$$r_{new} = \frac{nr}{1 + (n-1)r}$$

- r = reliability of the original test
- n = factor by which test length changes
- r_{new} = predicted reliability

6 Test-Retest Reliability

$$r_{test-retest} = \text{Correlation}(T_1, T_2)$$

- Assesses stability over time by correlating scores from two administrations of the same test.

[Attempt Quiz Click Here](#)

Adda247

INDIA'S NO.1 GOVT EXAM PREP PLATFORM

UGC NET MEGAPACK

For All UGC NET Subjects



Live
Classes



Mock
Tests



E-Books



Videos

- ✓ Learn from India's Best Faculty
- ✓ Comprehensive Preparation

*Your UGC NET Success
Starts Here!*



Bigger Goals



Brighter Future



With Adda247



Assistant Professor



Junior Research Fellowship
(JRF)



Ph.D. Admissions



Higher Education
Opportunities

PAPER 1
(Teaching & Research Aptitude)

Education

Management

Commerce

English

Political Science

Economics

Sociology

& All Other Subjects

*Dream
Prepare
Achieve*

BETTER PREPARATION
BRIGHTER TOMORROW

Test Prime

✓ 800+ exams covered

All Exams, One Subscription.

One Stop Preparation Kit

Salient Features



1.5 Lakh+
Mock Tests



Unlimited
Re-attempt



25k+ Previous
Year Papers



500%
Refund

Test Prime



IBPS



UPSC



Railways



Defence



SSC

and many more...



Explore Now >



*Same
Preparation
Bigger Possibilities!*

Measure what you intend to measure.

VALIDITY

IN EDUCATIONAL MEASUREMENT



Right Measure
Right Decisions

Validity refers to the extent to which an instrument **measures what it is intended to measure.**



Simple Meaning

Validity = Accuracy of Measurement

MAJOR TYPES OF VALIDITY

Type	Meaning	Key Idea
 Face Validity	Instrument appears, on the surface, to measure what it claims.	Looks appropriate
 Content Validity	Items adequately represent the content/domain being measured.	Content coverage
 Construct Validity	Instrument actually measures the theoretical construct it claims to measure.	Measures the construct
 Criterion-Related Validity	Scores are related to an external criterion.	Relationship with criterion

TYPES OF CONSTRUCT VALIDITY

 Convergent Validity	Measures of the same construct show strong relationships/correlations.	Strong relationship
 Discriminant Validity	The construct is distinct from different/other constructs, with weaker relationships.	Weaker relationship

TYPES OF CRITERION-RELATED VALIDITY

 Concurrent Validity	Instrument agrees with an established criterion measured at the same time.	At the same time
 Predictive Validity	Instrument predicts a future outcome/criterion.	Future outcome

"A valid instrument leads to meaningful and trustworthy results."

[Attempt Quiz Click Here](#)

Different
Contexts
Same
Credibility

OTHER TYPES OF VALIDITY

Valid
Research
Stronger
Conclusions

1 Ecological Validity



Refers to the extent to which the findings of a study can be applied to **real-life, natural settings**.

Real-World Relevance

Key Point

Higher ecological validity means the results are relevant and applicable to everyday situations.

2 Internal Validity



Refers to the extent to which the observed effects in a study are actually due to the **independent variable** and not to **other extraneous factors**.

Truth within the Study

Key Point

Higher internal validity means greater confidence that the cause-effect relationship is true.

3 External Validity



Refers to the extent to which the findings of a study can be generalized to **other populations, settings and times**.

Generalizability of Findings

Key Point

Higher external validity means the results can be applied beyond the specific study conditions.



"Validity gives meaning to research beyond measurement."



BETTER
RESEARCH
BRIGHTER
EDUCATION

[Attempt Quiz Click Here](#)

INTERNAL VALIDITY THREATS



Control for threats, stronger conclusions!

True effect?
Or something else?

Internal Validity

The extent to which the observed effect in a study can genuinely be attributed to the **independent variable**, rather than alternative explanations.

Threat

Meaning / How it threatens validity

Quick Recall

1 History



External events occurring during the study influence the outcome.

Outside event

2 Maturation



Natural changes in participants over time affect the outcome.

Natural change

3 Testing



Taking a pre-test influences performance on a later test.

Pre-test effect

4 Instrumentation



Changes in the measuring instrument, procedure, or observer affect results.

Measurement change

5 Statistical Regression



Extremely high or low scores tend to move toward the average on subsequent measurement.

Extreme → Mean

6 Selection



Groups differ systematically before the treatment begins.

Unequal groups

7 Mortality / Attrition



Participants drop out of the study, potentially changing group composition.

Dropout



"Identify the threats, strengthen the design, and trust your conclusions."



[Attempt Quiz Click Here](#)

EXTERNAL VALIDITY

MAJOR THREATS

External Validity = Can the findings be generalized beyond this study?

Threat

Meaning

Quick Recall

1

Selection Effects



Findings may not generalize because the **selected participants** differ from the target population.

Different participants

2

Setting Effects



Findings from one **research setting** may not apply to other settings or environments.

Different setting

3

Treatment Effects



The effect may depend on the specific **form, intensity, or delivery** of the treatment/intervention.

Treatment variation

4

Testing Effects



A **pre-test or repeated testing** may influence how participants respond to the treatment.

Pre-test effect

5

Interaction Effects



The treatment effect may change when combined with differences in **participants, settings, testing, or treatment conditions**.

Combined effects

[Attempt Quiz Click Here](#)

RAPID

MATCH-THE-FOLLOWING

Researcher / Concept Association

Researcher

Concept Association

1 Lee J. Cronbach

Cronbach's Alpha

2 C. H. Lawshe

Content Validity Ratio (CVR)

3 Kuder & Richardson

KR-20 / KR-21

4 Spearman–Brown

Split-half correction /
prophecy formula

5 Cohen

Cohen's Kappa — 2 raters

6 Fleiss

Fleiss' Kappa — multiple raters

7 Messick

Unified construct-validity
framework

8 Lincoln & Guba

Credibility, Transferability,
Dependability, Confirmability

9 Campbell & Stanley

Experimental validity /
threats to validity

[Attempt Quiz Click Here](#)