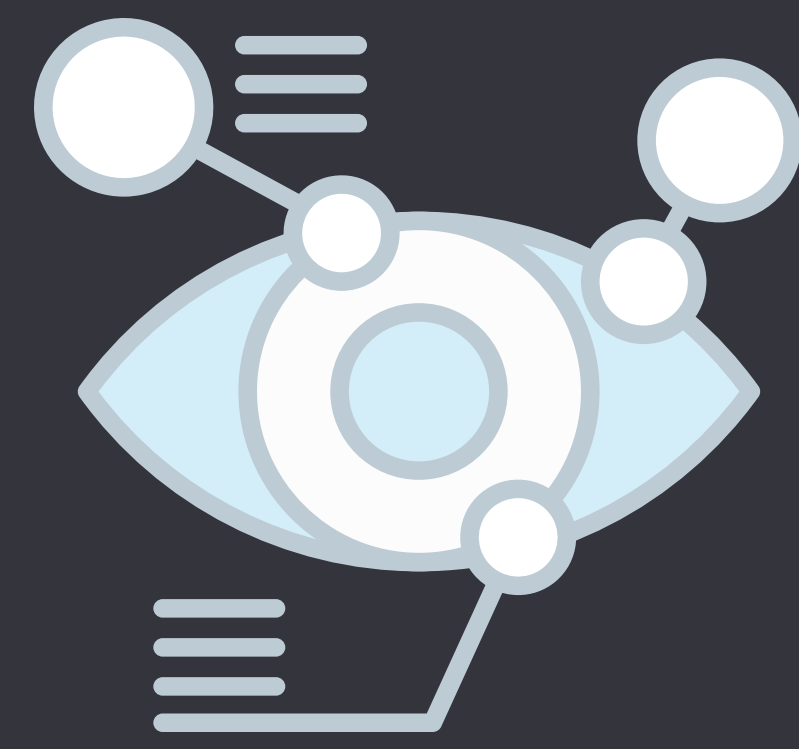


MEASUREMENT



Empirical researchers develop and use **test instruments** or **measures** to gather data and assign values for a concept or **construct** under investigation. However, these instruments are not totally free of **error** or **bias**. Throughout the research methods and instrument design process, it's important to consider **validity** and **reliability**.

Steps in the Measure Development Process

● Identify the Construct

or a concept that is specifically defined for scientific study.

Example: Mobility

● Delineate the Domain

Define what the construct is and is not.

Example: Level of mobility in people with lower limb amputations

● Measure Design and Item Generation

Create inventories, questions, or tasks.

Example: Timed Up and Go (TUG) Test

● Reliability Testing

Is the construct accurately described? Items are deleted or modified.

Methods: internal consistency reliability, test-retest

● Dimensionality Testing

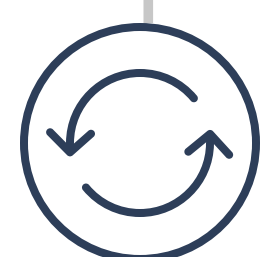
How many variables can be measured?

Methods: factor analysis, structural equation modeling

● Validity Testing

Does the measure capture the intended construct?

Types: construct, content, predictive, convergent, discriminant, nomological, etc.



Validation is ongoing! Researchers continually redefine measures or constructs, add, modify, or delete items, and expand dimensions.

Citation & Recommended Reading

Viswanathan, M. (2005). *Measurement error and research design*. SAGE Publications, Inc.

<https://dx-doi-org.libproxy.csudh.edu/10.4135/9781412984935>

Measurement Error

Random error happens by chance. It's inconsistent or doesn't repeat.

Ex: Vague questions ("Do you exercise regularly?")

Systematic error happens when there are consistent inaccurate responses.

Ex: Participant under-reporting

Measurement Bias

Inter-rater reliability is the extent to which researchers who use the measure agree.

There may also be bias in sampling and scoring.