

<b>Quantitative research - Research instruments - Evaluating measurement instruments (Questionnaires)</b>	Set-up & Conduct- Methods & Data Collection	
	VERSION	4.0

## Aim

To evaluate the measurement properties of the measurement instrument(s) you are considering to use.

## Requirements

Knowledge about reliability, validity, responsiveness and interpretability of the measurement instrument(s) of interest.

## Documentation

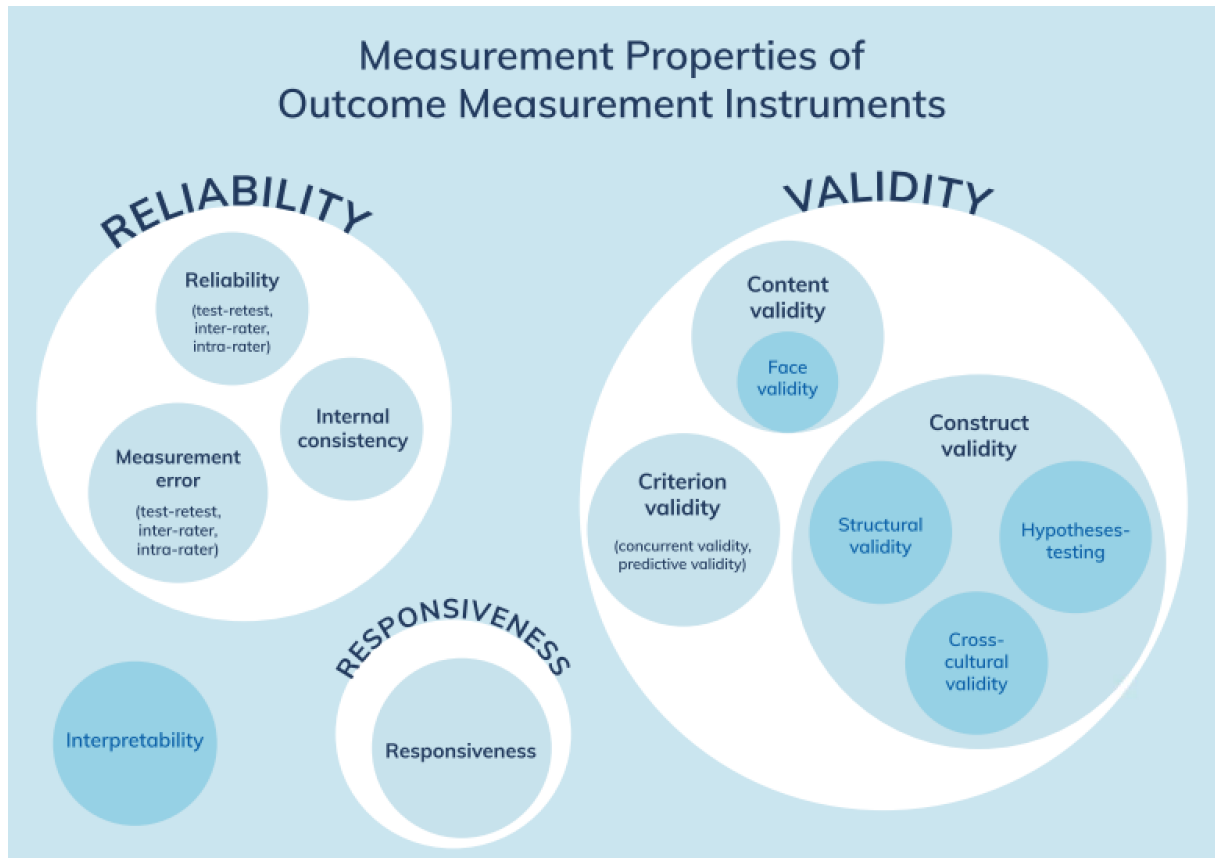
A clear definition and description of the conceptual model of the measurement instrument(s). List of the known reliability, validity, responsiveness and interpretability of the measurement instrument(s), including references. Tip: A database of more than 1100 systematic reviews of measurement properties of various measurements instruments can be found at <https://database.cosmin.nl/> [2].

## Responsibilities

- Executing researcher: Search for scientific articles providing information about the important measurement properties of the measurement instrument(s). When the quality is insufficient, chose different instrument or develop new instrument (See guideline 'developing measurement instruments'). When information on various measurement properties is lacking, perform clinimetric studies to fill the information gaps.
- Project leaders: Discuss important measurement properties of the measurement instrument(s) and consider alternative measurement instrument(s) when the properties are insufficient
- Research assistant: N.a.

## How To

The measurement properties of an instrument determine the quality of that instrument. It is important to use an instrument of which reliability, validity, and responsiveness are evaluated in the population that you are going to use it for. There are nine relevant measurement properties described in the COSMIN taxonomy (ref JCE 2010).



Source: <https://www.cosmin.nl/tools/cosmin-taxonomy-measurement-properties/>

Important measurement properties are ([Mokkink et al., 2010](#)):

## 1. Reliability

- Internal consistency, i.e. the degree of interrelatedness among the items. Reliability, i.e. the proportion of the total variance in the measurements which is due to 'true' differences between patients. Test-retest reliability, i.e. a reliable instrument will produce similar scores at both points in time. Inter-rater reliability addresses the issue of consistency of the implementation of a rating system, i.e. to which extent two or more raters agree. Intra-rater reliability is the degree of agreement among repeated administrations of a test performed by a single rater.
- Measurement error, i.e. the systematic and random error of a patient's score that is not attributed to true changes in the construct to be measured.

## 2. Validity

- Content validity, i.e. the degree to which the content of a patient-reported outcome instrument is an adequate reflection of the construct to be measured. Construct validity is whether the instrument is measuring what it claims to measure. Structural validity, i.e. the degree to which the scores of an instrument are an adequate reflection of the dimensionality of the construct to be measured. Hypotheses testing, i.e. the degree to which the scores of an instrument are consistent with hypotheses based on the assumption that the instrument validly measures the construct to be measured. Cross-cultural validity, i.e. the degree to which the performance of the

items on a translated or culturally adapted instrument are an adequate reflection of the performance of the items of the original version of the instrument.

- Criterion validity, i.e. the degree to which the scores of an instrument are an adequate reflection of a 'gold standard'.

### 3. Responsiveness

- Responsiveness, i.e. the ability of an instrument to detect change over time in the construct to be measured. Interpretability  
Interpretability, i.e. the degree to which one can assign qualitative meaning - that is, clinical or commonly understood connotations - to an instrument's quantitative scores or change in scores.

The website <https://www.cosmin.nl/> contains relevant and up-to-date information on how to evaluate measurement properties of measurement instruments, including guidelines for performing systematic reviews of outcome measurement instruments.

Other two useful Dutch websites to consult is 1) the website of the COTAN Documentation (an online database with an up-to-date and complete overview of Dutch psychodiagnostic instruments and their assessments) and 2) the website of [Meetinstrumenten in de zorg](#) (an overview of more than 400 patient reported outcome measures (PROMS), with information about i.e. the availability, feasibility and psychometric properties of the instrument).

### References

- [1] [Mokkink](#) LB, Terwee CB, Patrick DL, Alonso J, Stratford PW, Knol DL, Bouter LM, de Vet HCW. The COSMIN study reached international consensus on taxonomy, terminology, and definitions of measurement properties for health-related patient-reported outcomes. *J Clin Epidemiol* 2010;63(7):737-745.
- [2] <http://www.cosmin.nl> This website contains relevant and up-to-date information on how to evaluate measurement properties of measurement instruments and how to conduct systematic reviews on outcome measurement instruments.
- [3] <https://www.cotandocumentatie.nl/> This website contains an up-to-date overview of Dutch psychodiagnostic instruments and their assessments.
- [4] <https://meetinstrumentenzorg.nl/> This website contains an up-to-date overview of more than 400 PROMS.

### Audit questions

- Has the measurement instrument been translated into Dutch using appropriate methods? i.e. a forward backward translation
- If yes:
  - a. Have there been 2-3 forward translations by translators who are native speakers of Dutch and 2-3 back translations by translators who are native speakers of the source language?
  - b. Have the measurement properties of the instrument been assessed after the translation?
- Have the measurement properties of the instrument been assessed (by the researchers themselves or others)?
- If yes:

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- Was the validation study carried out in a similar sample to that in which the questionnaire will be used?
- Was the sample size adequate ( $N > 50$ )?
- Were the appropriate methods and statistics applied?
- Have all relevant measurement properties been sufficiently evaluated?

## LINKS

	Link
COSMIN	<a href="http://www.cosmin.nl/">http://www.cosmin.nl/</a>
COTAN documentation	<a href="https://www.cotandocumentatie.nl/">https://www.cotandocumentatie.nl/</a>
Meetinstrumenten in de zorg	<a href="https://meetinstrumentenzorg.nl/">https://meetinstrumentenzorg.nl/</a>

## DOCUMENT HISTORY

Version	Status	Date	Name
4.0	Revision	29OCT2020	Anouk Gathier, Dr. Wieneke Mookkink
3.0	Revision guideline	12AUG2016	EMGO
2.1	Revision format	12MAY2015	EMGO
2.0	Guideline 1.1B-08 rewritten and divided into 3 guidelines: 1.1B-08 a, b and c	27MAY2011	EMGO

## DOCUMENT APPROVAL

Role	Name	Date
Project Leader	Dr. Seta Jahfari	13MAY2021