Validity for continuous data

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Preventive medicine

Validity for continuous data

- The degree to which any measurement approach or instrument succeeds in describing or quantifying what it is designed to measure

- The degree to which a test measures what it claims, or purports, to be measuring

- **Face validity**
- *Content Validity*
- *Criterion Validity*
- *Discriminant Validity*
- *Construct validity*

Face validity (Logical)

- is the extent to which a measurement method (questions) appears "on its face" to measure the construct of interest.

- Measurement is accepted by those concerned as being logical on the "face of it" (also expert validity)

- face validity does not necessarily mean that a test is a valid measure of a construct, but rather, the test *looks* like it is a valid measure

- it is considered to be the weakest form of validity

- face validity alone is not sufficient

- **Example : measuring knowledge on breast cancer among doctors and among community ????**

- No statistical test

Content validity

- is the extent to which a measure "covers" the construct of interest.
- The extent to which all possible items that would be representative of a specified domain are included in the questionnaire.
- Do the items included in the measure adequately represent the universe of questions that could have been asked?
- Is the instruments ability to cover the full domain of the underlying concept
- It ensures that the measure includes an adequate and representative set of items that tap the concept.
- **judgment of experts in the field**
- For example, if a researcher conceptually defines test anxiety as involving both sympathetic nervous system activation and negative thoughts, -→ then this measure of test anxiety should include items about both nervous feelings and negative thoughts adequately
- For example: quality of life (physical , mental , social, ……..)
- it is a subjective judgment

Content validity CONT

- E.G The OECD Long-Term Disability Questionnaire (abbreviated version).

- The OECD scale was intended to measure disability in terms of the limitations in activities essential to **daily living: self-care, Household tasks, mobility, and communication**

- **The scale will have content validity if :**
    - all aspects of the thing we wish to measure are covered and
    - all the items appear relevant to the aim of the index,

- No statistical test
- **judgment of experts in the field**

Content validity cont.

- As a scale measuring physical disability, there is reasonable content validity, but not as a scale to measure a wider definition including **social disability or work**

(it does not contain any items concerning work and social activities).

Table 1. The OECD Long-Term Disability Questionnaire (abbreviated version)

1. Is your eyesight good enough to read ordinary newspaper print? (with glasses if usually worn).
2. Can you hear what is said in normal conversation with one other person? (with hearing aid if you usually wear one).
3. Can you speak without difficulty?
4. Can you carry an object of 5 kilos for 10 metres?
5. Can you walk more than 400 meters without resting?
6. Can you walk up and down one flight of stairs without resting?
7. Can you move between rooms?
8. Can you get in and out of bed?
9. Can you dress and undress?
10. Can you cut your own food? (such as meat, fruit, etc.)

McWhinnie 1981, cited by McDowell and Newell 1987)

Criterion Validity المعيارية

- This type of validity is measured after data collection

- Concurrent validity (with a gold standard)
- Predictive validity (a test now predict a test in the future)
- Convergent validity (relation with a scale with similar concept)
- Divergent validity (Discriminant Validity)

- The new tool is validated against a criterion.

Criterion Validity

- The extent to which people's scores on a measure are **correlated** with other variables (known as **criterion**) that one would expect them to be correlated with.

- **Concurrent validity:** When the criterion is measured at the same time as the construct. how well a new test compares to a well established test "**gold standard**"

- E.g Shortened scale vs full scale

- E.G new instrument for depression vs old standard one

- E.G questionnaire vs a clinical interview (HADS)

- Statistical test : eg correlation

- eg short version of a tool is correlated with the previous long version

Criterion Validity

- **Predictive validity:**

- when the criterion is measured at some point in the future (after the construct has been measured (new questionnaire for interview is correlated with the score of students in the future ''criterion'')

- College entry tests should have a high predictive validity in regard to final exam results. (needs follow up study)

- Statistical test : correlation , sensitivity and specificity, ROC curves

- The questionnaire has a predictive validity if it is correlated significantly with the score of students in the future.

Criterion Validity   cont

- **Convergent validity + Divergent validity**

- **Convergent validity:**

- the measurement (new tool) is related to variables (criterion) to which it should be related (**not necessary measuring the same construct**).

- E.g Geriatric Suicide Ideation Scale (new tool) correlated significantly and positively with depression (criterion) and hopelessness (criterion).

- E.g Intelligence Tests with academic performance

- Can be measured by statistical test (example correlation).

divergent validity (Discriminant Validity)

- **Discriminant Validity = divergent validity**

- 1) The measurement is unrelated or negatively correlated to variables (criterion) to which it should be unrelated.

- E.g. Geriatric Suicide Ideation Scale correlated significantly **and negatively** with life satisfaction (assessed by Life Satisfaction Inventory-Version A).'

- E. g happiness score correlated significantly **and negatively** and depression score.

- 2) the measure is able to discriminate between different groups of subjects : e.g physical quality of life will be different among young people and paralyzed people → if there is significant difference in QOL between the two groups, then the questionnaire has discriminant validity

Construct validity

- A construct is a concept
- Construct validity refers to the degree to which a test or instrument measures the theoretical construct it is intended to measure
- **Discriminant Validity + convergent validity→ Construct validity**

- If a tool has both Discriminant Validity and convergent validity → it is said to have Construct validity