

What's to Learn in Psychometrics?

Ben Wright

I. BASICS

- A. The only theory useful to you is one you know well enough to invent and verify
- B. The distinction between **quantitative** differences of degree and **qualitative** differences of kind
- C. The necessity and opportunity for social science to be **as quantitative as physics**
- D. A **useful variable** is a workable fiction indicating quantities of **one and only one** thing
- E. For a measure to have **meaning**, its line of increase must be **benchmarked** by **calibrated explanatory item content**
- F. How to **construct useful measurement** from **ordered nominal observations**

II. MEASUREMENT

- A. Observations must be **replicated** to accumulate and focus the information they are intended to imply
- B. **Counts** of replicating observations are the **scores** necessary to construct measures
- C. Scores must be statistically **sufficient** for measurement to occur
- D. But **scores are not measures** because:
 - 1. Scores are ordinal - not linear (additive)
 - 2. Scores are test and sample dependent - **not objective**
 - 3. Scores, on their own, **cannot be validated**
- E. Measures, in contrast to scores, are:
 - 1. **Additive**, linear, interval
 - 2. **Objective**, invariant, generalizable
 - 3. **Error** qualified for their estimation unreliability
 - 4. **Fit** validated for their one dimensional coherence
- F. When the score-to-measure function necessary to satisfy any reasonable measurement requirement is deduced, the Rasch model is found to be the necessary and sufficient result - this means that:
 - 1. Fit to the Rasch model is the necessary and sufficient condition for constructing measurement from data
 - 2. Only data which can be made to fit the Rasch model can be useful for constructing measurement

III. STATISTICS

- A. Are **never** perfectly **reliable**
 - 1. Their inherent **error must be estimated** and reported
 - 2. Inferences about measure distributions and regressions will be mistaken unless their **statistics are corrected for measurement error**
- B. Are **never** completely **valid**
 - 1. The extent of invalidity must be assessed, allowed for in estimation error and reported
 - 2. Improbable data signifying qualitative differences must be detected, identified, diagnosed, isolated and reported
- C. Always require **visualization**: graphing, plotting, mapping for **comprehension** and **communication**