What's to Learn in Psychometrics?

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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**