IRT Final Exam Review

Joe Marr

November 13, 2018

Lecture 1

The big picture is that Item Response Theory (IRM), also called Item Response Modeling (IRM), is mainly concerned with the relationship between the probability of a response and the underlying latent dimension.

$$P = P(\theta) \tag{1}$$

This methodology models the Item Characteristics Curve (ICC).

IRT deals with 4 things:

1. **Postulating Models** that describe the relationship between the probability of response and θ.
2. **Estimating** these models using an available data set.
3. **Evaluating Model Fit** and determining which model to select.
4. **Estimating Individual θs** based on the model fit for the correct dimensions.

As a result of these 4 steps one has the information to:

1. Characterize estimated parameters for the items.
2. Estimate the amount of the characteristic one exhibits.

Some things about the ICC = $[P(\theta)]$:

There are an infinite number of choices for the ICC for any given instrument. The latent dimension θ is the dimension of interest for estimation but it is not possible to perfectly measure this. The measurement process (4 steps) is a crude method to estimate θ and is not perfect.

History of IRT

- In the 1890s Binet and Simon attempted to measure intelligence in children. Their goal was to differentiate between low ability children and children who weren't putting forth effort in school.
- In the 1920s Burt modeled the number of children who correctly answered increasingly difficult problems resulting in the creation of an S-shaped curve similar to the ones discussed later in this class.
- Also in the 1920s, Thurstone began to model the curves that Burt graphed using a CDF of the normal distribution with appropriate means and variances.