

Statistics versus Measurement?

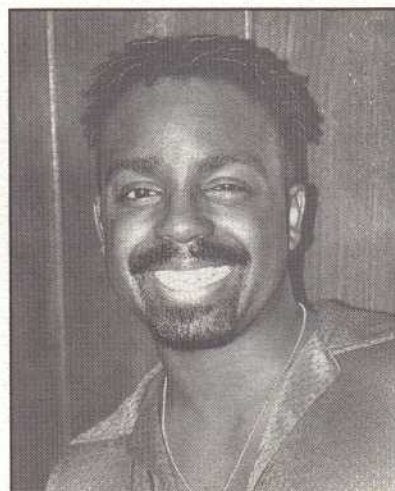
Keith M. McCoy

Most of the quantitative methods I have learned come from formal statistics. Upon satisfying all required doctoral coursework and two written prelim exams in statistics, I was stymied as to what dissertation topic to research. As a result, I embarked on a quest. How will statistics aid my career in education? As a math instructor at Chicago City Colleges, I engage frequently in testing and measuring student ability. I found what statistical theory lacked, measurement theory provided.

Parametric statistics generally involves modeling data. That is, after data collection, one seeks a model that adequately accounts for the data. This model should generally address the variability in the data. Consider this crude example. Suppose two models differ only in the amount of data variation explained by each model. A model that captures 90% variation in the data would then appear better than one that only captures 75% data variation. Sometimes a model is pre-specified. (a priori). Data often forced into a model whether they fit well or not. The idea that models and data should be independent seems lost and not investigated. When a model does not suitably fit the data, a desperate search is made for a better one. The problem may lie not with the intended model but with the data. Do the data violate the desired object of measurement? Is there a subset of the overall data that do not suitably fit the model? Is some other obscure construct being measured? These problems persist throughout educational data.

Most educators (myself included) consider themselves excellent test constructors. These are opinions not necessarily facts. Little is done to validate our tests. We regularly violate measurement assumptions by treating ordinal scores as linear measures. We assume that scores from a set of test items are additive and unidimensional. This is very far from the truth. My quest to provide better measures in testing data has led me to the school of measurement.

I certainly have a long way to go in my journey for good measures. Yet, I do not believe that the two schools, statistics and measurement, are mutually exclusive. Measurement models such as Rasch models provide researchers with appropriate linear measures. Statistical techniques like regression can be used to provide further analyses on these linear measures. As a result, I feel my journey will not be an arduous one. Moreover, many in the school of measurement are highly knowledgeable about statistics. So, I know my adventure from statistics to measurement will not be a lonely one.



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