What Works for Me

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Rasch practitioners would like everyone in the world to use their model. However, if its use is to be expanded beyond its current realm, they may need to develop a variety of explanations to explain its concepts. Not everyone takes to mathematical explanations using terms such as "inverse probability" or "conjoint additivity". Some may not be mathematically inclined, others may think quantitatively but not have a taste for mathematics (a subtle difference), while still others are interested only in application. Just as an understanding of the workings of an internal combustion engine is not necessary to drive a car (as Ben Wright has said many times), understanding the mathematical foundations of objective measurement is not essential to being able to apply it. All that is required is a basic understanding of the concepts involved. There is no reason why the basic concepts could not be explained in terms with which people are already familiar, perhaps through the use of analogies. While analogies are imperfect explanations of complex ideas, they allow people to put new information into a context that they already understand. Once they get the "gist" of the idea, they can proceed to apply that idea. For some it might mean accepting the explanations that are provided without an in-depth understanding of the mathematical operations, while for others it may lead to further exploration of their foundations to truly understand them.

I'd like to call for an exchange of simple, concrete explanations of specific objective measurement concepts that work for Rasch practitioners who have had to explain them to colleagues or students. The explanations that made sense to practitioners when they learned the basics will not necessarily work for everyone. When this happens, practitioners have to develop other ways of explaining them. The explanations may only work for some people, but the greater the variety of simple explanations available, the greater the chances of finding the one explanation that will work best in a particular situation. Sharing explanations will expand the number of ways in which these basic concepts can be explained.

I'd like to start off this exchange with an explanation of misfit that has worked for me when explaining it to someone who has some knowledge of statistics. I describe the analysis of fit in terms of a chi-square analysis using the explanation provided in Chapter 4 of "Best Test Design." If someone understands chi-square analysis conceptually, they should be able to understand misfit. Is it a perfect explanation? No, but it has helped some people understand the general concepts involved in fit analysis. Here it is.

Fit analysis is a type of chi-square analysis that compares the responses observed to the response that would have been expected of the person given their responses to the set of items. Some variation from expectation will always be found because no one responds exactly as expected. But when the responses to an item or by a person exceed random variation, that variation is considered significant and evidence of misfit. Conceptually but not necessarily computationally, expected responses are determined by examining the marginal totals for a given cell. The difference between the expected and observed response is obtained and squared and these differences or residuals are summed across persons and across items. If the sum of differences across items (or persons) is not significant, the variation can be considered random and the item (or person) fits the Rasch model. But if this sum is so large as to be improbable, then the item (or person) misfits the model and is re-examined to discover why.

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