

RCMAR Workshop: Exploratory Factor Analysis
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Review of Literature

There are many new developments in the area of exploratory factor analysis. The use of path models to explain exploratory factor analysis, speeds the learning curve in a subject that was previously dominated by matrix algebra (Loehlin, 1998). This approach not only improves understanding of the concepts but also of the subject's mathematical basis. The integration of factor analysis and measurement theory including item response theory (McDonald, 1985, 1999) is a breakthrough that will enable students to grasp the essentials of psychometric theory necessary for advanced study. The recognition that psychological constructs are often hierarchical in nature (Reise, Waller, & Comrey, 2000) is eminently reasonable and suggests that more attention needs to be given to hierarchical analysis. Hierarchical analyses need oblique rotations. There is a growing consensus that the defaults in factor analysis programs like SPSS are less than optimal. Common factor analysis is preferred to principal components, parallel analysis or scree tests to the eigenvalue greater than one criteria, and oblique rather than orthogonal rotation. Important progress is being made on issues that have long been problematic for factor analytic researchers. The old rules of thumb regarding sample size are now known to be inadequate; an excellent summary of Guadagnoli and Velicer's (1988) important work is given in Floyd and Widaman (1995). Sample size depends largely on how well and how many variables load on each factor. MacCallum and Widaman (1999) have taken this a step further by providing a theoretical and mathematical framework for understanding sample size issues in EFA. Statistical tests for factor loadings in EFA have been proposed (Cudeck & O'Dell, 1994). In spite of the fact that EFA is robust to distributional assumptions about the variables that go into the analysis (Gorsuch, 1985) the effects of non-normality on item fit statistics has received some attention. Given the growing recognition of the inadequacy of goodness of fit statistical tests these particular results may not be of much concern. However, the fact that distributional differences result in specific factors related to item mean levels or proportions (Gorsuch, 1997) is important to recognize. Here also, hierarchical analysis holds promise. One thing I haven't noticed in my review is any discussion of the practical aspects of EFA in the sense that the obtained factors may represent tentative hypotheses about possibly important constructs that may be validated to the extent that differential relations to other variables are found. To some extent this kind of reasoning was evident in the Hatcher and Barends article. Finally, the return of procrustes, but with more of a statistical basis, is interesting (McCrae et. al, 1996).

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Latent Trait Model

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Practical Advice-Tom Swift article by Preacher & MacCallum

–<http://quantrm2.psy.ohio-state.edu/maccallum/tomswift/paper.htm>

Darlington-Introduction and text book

–<http://www.psych.cornell.edu/Darlington/factor.htm>

Rummel-Introduction

<http://www.mega.nu:8080/ampp/rummel/ufa.htm>