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***Social Science  
Research Methods***

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# *Overview*

- Factor Analysis
- Other Statistical Techniques
- A Critique and Defense – Steers & Braunstein
- Critique for next class
- Readings for next class

# *Factor Analysis*

- A factor is a construct – a latent variable
- Data reduction
- A measure is factorially pure if it measures only one factor
- Factor matrix
  - \* Factor loadings
    - ◆ Correlation between measures and factors
- Communalities
  - \* Common factor variance

# *Factor Analysis*

- How many factors?
- Communality
- Principal factor method (principal axis)
- Rotation
  - \* Orthogonal
  - \* Oblique
- Second order factors
- Factor scores

# *Factor Analysis*

- Exploratory factor analysis (EFA)
- Confirmatory factor analysis (CFA)
- Reification
  - ★ Naming factors does not make them real
- Construct validity and constitutive definitions

# *Other Statistical Techniques*

- General Linear Model
  - ★ Generalizes the techniques we have discussed
- Structural Equation Modeling
  - ★ Analysis of covariance structures
  - ★ Combines factor analysis with a form of path analysis

# *A Critique and Defense*

- “A Behaviorally-Based Measure of Manifest Needs in Work Settings”  
Richard M. Steers & Daniel N. Braunstein  
Journal of Vocation Behavior 9, 251-266  
(1976)

# *A Critique and Defense*

## ■ Critique

- \* Four needs from Murray are measured – why these four; what are the consequences of omitting the others?
- \* Murray's theory is not reviewed so we cannot fully understand the constructs to be measured
- \* The theory is supposedly that motivated behavior is a function of the strength of various needs at a given point in time – but the paper does not address *stability* of the measures
- \* Concurrent validity?
- \* Reverse scoring used for only 25% of items – is this enough?
- \* How are Likert scales converted into scores and how are item-correlations computed?

# *A Critique and Defense*

## ■ Critique

- \* The first study uses managements students – does this compromise external validity?
- \* Relatively few items supports the aim of brevity but presumably compromises reliability?
- \* Table 2 supposedly shows highly acceptable association between MNQ and PRF for n Ach and n Dom. Surely at 0.61 and 0.62 this is an overstatement of convergent validity? Note also that they do not give measures of statistical significance for this table

# *A Critique and Defense*

## ■ Critique

- \* The authors claim a high degree of congruence between theory and research of Murray's needs and point-biserial correlations between MNQ scores and subject choices of work group characteristics. Since they do not cite the theory and research we cannot assess this claim. Still, none of the correlations is high, and so claims for predictive validity are suspect.
- \* Test-retest validity – were the 41 students used random? Perseveration may have overstated reliability for such a brief instrument. We are not told what measure is used – (domain sampling would be more relevant than true and error scores, so Cronbach's alpha would be best choice)

# *A Critique and Defense*

## ■ Critique

- \* How representative are subjects in second study?
- \* What are effects of complexity of the second study, with three questionnaires? Were order effects controlled for?
- \* Second and third studies focus on independence of four scales – why was this not important in the first study?
- \* Presentation of results is unconvincing: “ the various scales are generally not closely related . . . those high correlations that do exist are suggested by theory and have been found elsewhere”
- \* Table 5 is supposedly consistent with theory and earlier findings – but we cannot assess this
- \* No corrections for attenuation used anywhere

# *A Critique and Defense*

## ■ Critique

- \* “Median off-diagonal correlation” is ambiguous, and less than a complete analysis
- \* Why is coefficient alpha not cited for 2<sup>nd</sup> and 3<sup>rd</sup> studies?
- \* “Sources of attachment” are one-item measures, not known to be reliable or valid – so what is the value of Table 5?
- \* No check for social desirability bias is cited
- \* Column headings for Table 2 are misleading – presumably these are correlations?

# *A Critique and Defense*

## ■ Defense

- \* Goal of brief reliable valid measures is laudable and valuable for future research
- \* Reliability and face validity improved by measuring in the work environment, avoiding response bias and controlling for acquiescence and social desirability using behavior-based scales
- \* Multiple judges should enhance content validity
- \* Although only students were used, a wide variety of jobs supports external validity
- \* Median off-diagonal correlations indicates discriminant validity (although not comprehensively investigated)

# *A Critique and Defense*

## ■ Defense

- \* Cronbach's coefficient alpha used to assess internal consistency, with good results for n Dom
- \* Subjects were initially deceived but later debriefed
- \* Authors claim criterion-related validity of the instrument is established by relationships between MNQ scores and sources of attachments and criterion measures that are in accordance with the theory (although this is not convincingly presented)
- \* Although many quoted correlations and arguments are only weak, there are no contradictory results cited
- \* MNQ claimed to be superior to several other longer instruments, so it has a useful role in further exploratory research

## *Critiques for next class*

- Prepare a critique and a defense of:

“Realistic Job Previews and the Adjustment of New Employees”

Bernard L. Dugoni & Daniel R. Ilgen

Academy of Management Journal

Vol 24, No 3, 579-591 (1981)

# *Readings for next class*

- Please read:

“Earnings as An Explanatory Variable for Returns”

Peter D. Easton & Trevor S. Harris

Journal of Accounting Research Vol. 29 No. 1, 1991

“Capital Markets Research in Accounting “

S. P. Kothari

Journal of Accounting and Economics Vol. 31, 2001