





Factor Analysis



Approaches to Data Reduction

- _____ approach
 - synonym frequency
 - cross-cultural universality
- _____ approach
 - Factor analysis



Analyzing

- Researchers:
 - Compiled a list of adjectives
 - Participants rated each adjective on its level of self-descriptiveness
 - Researchers examined patterns in these ratings
- How did they know which traits fell into which category?
- Answer: examine how they covary

- An analysis technique that uncovers the latent structure of variables
- Main purpose: reducing attribute space from a larger number of variables to a smaller number of factors

Uses of _____

- Data reduction: simplify
- Structure detection: find underlying patterns

- Correlation coefficients between the items and the factors
- Squared factor loading – percent of variance in that item explained by the factor

- Measures the amount of variation in the total sample accounted for by each factor
- Eigenvalue for a factor = Sum of squared factor loadings for all items on that factor
- Generally consider a factor legitimate if it is greater than 1.00

_____ **Factor**

Analysis

- Test that uncovers the underlying structure of a relatively large set of variables
- Typically a preliminary analysis
- Completely data-driven, atheoretical
- Analysis identifies the number of factors for you, based on eigenvalues and factor loadings
- Researcher looks back at the items and sees how they group together conceptually
 - e.g., if "outgoing" and "talkative" load onto one factor, the researcher may interpret that as the extraversion factor

_____ **Factor**

Analysis

- Determines if the number of factors and the loadings of items conform to what is expected on the basis of pre-established theory
- Specify how many factors to extract from the data
 - Example: If the Big 5 Theory is correct, then we should always be able to extract 5 factors from any data set and see that the correct items load onto those factors

Problems

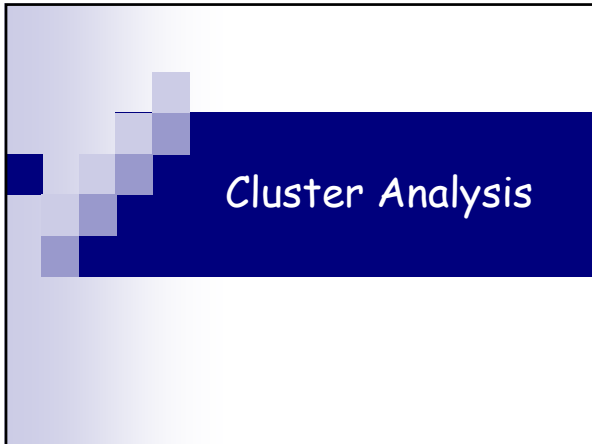
- Sometimes items load onto multiple factors
- Or, sometimes most items only appear to load onto one factor
- So, identifying which items belong to which factors is not always easy to tell

Solution:

- The placement of the x- and y-axes are arbitrary
- They do NOT have to be determined by the raw scores
- So, you can “rotate” the axes to make the differences stand out
- Most common = Varimax rotation
 - Maximizes the variance of the squared factor loadings
 - Makes the differences stand out the most

What You Report

- _____ for each factor
 - Especially exploratory factor analysis
- _____ of each item on the factors
 - Use the rotated matrix



Cluster Analysis

Definition

- Classification of participants into different groups so that the subset shares a common trait
- Very common in marketing and politics to determine target audiences

What You Report

- _____ for the clusters
- _____ of the clusters
 - Tells you who is in each cluster
- Rank of _____ Plot
 - Tells you how the cluster's scores compare to the average (note if it passes the critical value line)
 - Categorical outcomes tested using χ^2
 - Continuous outcomes tested using *t*-test
- SPSS also "tags" these cases in the spreadsheet so you can conduct follow-up analyses with *t*-tests and ANOVAs
