PLSC 597: "Modern Measurement"

Exercise One
February 12, 2018

Introduction

This exercise is focused on the first few weeks of the class, specifically those dealing with scaling, principal components, and factor analysis.

Exercise: Simulation

The goal of the simulation part of the exercise is to explore whether, when, and to what extent using interval-level methods (classical multidimensional scaling, principal components, factor analysis) on binary and/or ordinal-level data yields results that are incorrect or misleading. Because this is an advanced class, it will be up to you to design the simulation in question. Some guidelines:

1. Focus on only __one__ of the statistical techniques that we have discussed so far in the course.

2. Focus on *either* binary *or* ordinal measures/data, not both.

3. When conducting the simulations, consider varying at least:

    (a) The number of measures / items analyzed,

    (b) The number of dimensions / latent factors present in the underlying data,

    (c) The strength of the association(s) between the items and the underlying / latent phenomena,

    (d) The sample size / N.

Beyond these guidelines, it is up to you to design the simulations and draw conclusions from them.

Exercise: Data Analysis

The data for this part of the exercise are taken from "Semantic Computing of Moods Based on Tags in Social Media of Music" (Saari and Eerola 2013). A total of 59 individuals (mostly Finnish university students) rated up to 600 15-second clips of music, drawn from the last.fm genres of rock, pop, electronic, metal, jazz, and folk ($N = 17553$). Each track was rated on a one-to-nine Likert-type scale for ten different qualities expressed by each musical clip. The first three qualities related to the expressed in each clip, and included *Valence* ("negative"/"positive"), *Arousal* ("calm"/"energetic") and *Tension* ("relaxed"/"tense"). The other seven reflected the extent to which each clip did or did not express particular mood qualities: *Atmospheric, Happy, Dark, Sad, Angry, Sensual*, and *Sentimental*. For all ten scales, higher values reflect greater levels of that trait.

Your assignment is to use the techniques we discussed up to and including on February 8 to assess the structure and dimensionality of these characteristics of the musical clips. Use your own judgment about matters such as what techniques to use, how many dimensions appear to be present, etc. At a minimum, however, use at least two of the various methods we've discussed.

This homework is due *electronically* by 5:00 p.m. EST on **Thursday, February 22, 2018**, and is worth 100 points.