Profile analysis

1. Several DVS all measured on the same scale
   1. Basically a repeated measures multivariate analysis
   2. DVs can be measured all at once or several DVs at several times (doubly multivariate)
   3. More commonly used as a time series design (measure several times on same DV)
   4. Doubly multivariate – when I decide to test your grades several times during the semester but use two scales (repeated over time)
2. Research questions
   1. Mainly: do people have different “profiles” on a set of measures
   2. Measures must have the same range of scores with the values being the same meaning
      1. This is because the tests of profile analysis measure the difference in adjacent DVs for that time period
      2. Difference scores are called segments
   3. Parallelism profiles – do the different groups have different parallel profiles.
      1. In ANOVA this test is a test for the interaction (pictures would be useful)
   4. Overall group differences – regardless of parallelism – does one group on average have a higher score on the collected set of measures?
      1. The “levels” hypothesis – or your group differences
   5. Flatness of a profile – similarity of responses on the DV independent of group (the other main effect). Do all the DVs elicit the same average response?
   6. Contrasts after profile – if you get nonflatness, group differences or non-parallelism then you need to follow up with a contrast analysis
3. Limitations – Theoretical
   1. Choice of DV – pretty limited since they have to be the exact same scale
   2. If you are using a repeated measures as in over time analysis – it’s cool cause all the measures are the same
   3. If the units are not the same on all the scales, you can convert to z-scores to create equal units
   4. Differences in profiles is usually attributed to the differences in group treatments (causality)
4. Limitations – practical
   1. Sample size – use program! More people in the smallest groups than there are DVs (you need more peeps)
      1. Repeated measures ANOVA has more power than regular ANOVA because you are collecting more data points from the same people
      2. Here is mostly the same story, but multivariate analyses need more people just in general
      3. unequal n isn’t a big deal
   2. Missing data is a bit weird because it’s all from the same person and may need special input.
      1. Popular method is to replace missing value with the value estimated from the mean for that level of the repeated factor and for that case
      2. See page 345
   3. Power is usually a little stronger in multivariate because you have to deal less with spherecity
   4. Normality – robust! Check! (unless there are fewer cases in a cell than there are DVs)
   5. Outliers – all DVs get outlier analysis. Do eet!
   6. Homogeneity – if sample sizes are equal, homogeneity of variance isn’t necessary since all the scores come from the same person.
      1. Can use Box’s M for non equal sample sizes
   7. Linearity – for parallelism and flatness, you are assuming linearity since you are checking if the lines cross/are flat. You can test with SPSS PLOT, check all DV combos.
   8. Multicollinearity – singularity – oh noes what do I do, I expect the correlations to be high because they are the same scores from the same people! Eeek!
      1. Statistically it will not run when the r2 value reaches .999
5. Maths
   1. Parallelism and flatness are multivariate tests with sum of squares and cross product matrices. Levels = univariate between subjects main effect in ANOVA.
   2. Levels still between groups/within groups
   3. Parallelism first creates a matrix of the difference scores.
      1. Then basically tests if the slopes between each of the difference scores is flat (parallel) or not
   4. Flatness – is not important when parallelism is significant, but tests overall average of the differences is different from zero
6. Issues
   1. Univariate versus multivariate
      1. Spherecity must be met – the correlation between each time measurement must be the same…however with a multivariate test you will never meet this assumption
      2. If I measure you across time you are surely changing and life at 5 is not the same as life at 20
      3. If there are only 2 levels of the IV, spherecity doesn’t matter
   2. Fixes for spherecity
      1. Greenhouse geisser or huynh-feldt – are adjustments for violations with adjustments in significance
      2. Or lower your alpha rate (so need a lower p value) but then you lose power (easiest to do)
   3. Do both! See if they give you both (and then report univariate and say multivariate is the same, saves you time and headache)
   4. Multivariate requires more cases that univariate – if you don’t have enough cases per cell then do univariate
   5. Do a trend analysis instead if it makes sense with your data (mostly for longitudinal studies)
7. Check and see if you can do SPSS drop down or you have to go over syntax