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Large samples: Subtle Effects and Disappointing Artefacts

Appendix 2

2 A) SPSS syntax for simulation of the selection of respondents according to the external criterion.

```
/* a*a*b*c - correlation between variables belonging to different groups
/* b*b - correlation within first group
/* c*c - correlation within second group

COMPUTE a=.915.
COMPUTE b=0.838.
COMPUTE c=0.809.
EXECUTE.

COMPUTE Ra = RV.Normal(0, 1) .
EXECUTE.
COMPUTE Rb = Ra * a + SQRT(1 - a*a) * RV.Normal(0, 1).
EXECUTE.
COMPUTE Rc = Ra * a + SQRT(1 - a*a) * RV.Normal(0, 1).
EXECUTE.

/* V11, V12 - first group of variables, V21, V22 - second group of variables

COMPUTE V11 = Rb * b + SQRT(1 - b*b) * RV.Normal(0, 1).
COMPUTE V12 = Rb * b + SQRT(1 - b*b) * RV.Normal(0, 1).
EXECUTE.

COMPUTE V21 = Rc * c + SQRT(1 - c*c) * RV.Normal(0, 1).
COMPUTE V22 = Rc * c + SQRT(1 - c*c) * RV.Normal(0, 1).
EXECUTE.

*****

/* correlation matrix:

CORRELATIONS
/VARIABLES=V11 V12 V21 V22
/PRINT=TWOTAIL NOSIG
/MISSING=PAIRWISE.

/* computing of "g-factor"]

COMPUTE fsc=V11 + V12 + V21 + V22.
EXECUTE.

/* standardization

DESCRIPTIVES VARIABLES=fsc
/SAVE
/STATISTICS=MEAN STDDEV MIN MAX.

/* random addition to control skewness

COMPUTE fsc_corr=Zfsc * 1. + RV.NORMAL(0,1) * .005.
EXECUTE.

/* selection of "respondents"
```

```

USE ALL.
COMPUTE filter_$=(fsc_corr <= .5).
VARIABLE LABELS filter_$ 'fsc_corr <= .3 (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.

/* checking result

CORRELATIONS
  /VARIABLES=V11 V12 V21 V22
  /PRINT=TWOTAIL NOSIG
  /MISSING=PAIRWISE.

DESCRIPTIVES VARIABLES=V11 V12 V21 V22
/STATISTICS=MEAN STDDEV SKEWNESS.

/* PCA

FACTOR
  /VARIABLES V11 V12 V21 V22
  /MISSING LISTWISE
  /ANALYSIS V11 V12 V21 V22
  /PRINT INITIAL EXTRACTION
  /CRITERIA FACTORS(1) ITERATE(25)
  /EXTRACTION PC
  /ROTATION NOROTATE
  /SAVE REG(ALL)
  /METHOD=CORRELATION.

/* variable for division to subsamples

COMPUTE fscFA_corr=0.71 * FAC1_1 + 0.71 * RV.NORMAL(0,1).
EXECUTE.

/* division to subsamples

RANK VARIABLES=fscFA_corr (A)
  /NTILES(2)
  /PRINT=YES
  /TIES=MEAN.

```

2 B) SPSS syntax for Simulation of the unequal distribution of tasks according to their difficulty.

```

/* a*a*b*c  correlztion between variables belonging to different groupd
/* b*b correlation within first group
/* c*c correlation within second group

COMPUTE a=.8.
COMPUTE b=0.73.
COMPUTE c=0.69.
EXECUTE.

/* scratchng parameter

COMPUTE as=14/15.
EXECUTE.

COMPUTE Ra = RV.Normal(0, 1) .

```

```

EXECUTE.
COMPUTE Rb = Ra * a + SQRT(1 - a*a) * RV.Normal(0, 1).
EXECUTE.
COMPUTE Rc = Ra * a + SQRT(1 - a*a) * RV.Normal(0, 1).
EXECUTE.

/* V11, V12 - first group of variables, V21, V22 - second group of variables

COMPUTE V11 = Rb * b + SQRT(1 - b*b) * RV.Normal(0, 1).
EXECUTE.
COMPUTE V12 = Rb * b + SQRT(1 - b*b) * RV.Normal(0, 1).
EXECUTE.

COMPUTE V21 = Rc * c + SQRT(1 - c*c) * RV.Normal(0, 1).
EXECUTE.
COMPUTE V22 = Rc * c + SQRT(1 - c*c) * RV.Normal(0, 1).
EXECUTE.

*****

/* scretching of the left half

IF (V11 < 0) Vn11= - Abs(V11-1) ** (1/as) + 1.
EXECUTE.

.* compressing of the right e

IF (V11 >= 0) Vn11=(V11+1) ** (as) - 1.
EXECUTE.

IF (V12 < 0) Vn12= - Abs(V12-1) ** (1/as) + 1.
IF (V12 >= 0) Vn12=(V12+1) ** (as) - 1.
EXECUTE.

IF (V21 < 0) Vn21= - Abs(V21-1) ** (1/as) + 1.
EXECUTE.

IF (V21 >= 0) Vn21=(V21+1) ** (as) - 1.
EXECUTE.

IF (V22 < 0) Vn22= - Abs(V22-1) ** (1/as) + 1.
EXECUTE.

IF (V22 >= 0) Vn22=(V22+1) ** (as) - 1.
EXECUTE.

/* division to subsamples

FACTOR
/VARIABLES Vn11 Vn12 Vn21 Vn22
/MISSING LISTWISE
/ANALYSIS Vn11 Vn12 Vn21 Vn22
/PRINT INITIAL EXTRACTION
/CRITERIA FACTORS(1) ITERATE(25)
/EXTRACTION PC
/ROTATION NOROTATE
/SAVE REG(ALL)
/METHOD=CORRELATION.

COMPUTE fsc_corr=0.71 * FAC1_1 + 0.71 * RV.NORMAL(0,1).
EXECUTE.

```

```
RANK VARIABLES=fsc_corr (A)
  /NTILES(2)
  /PRINT=YES
  /TIES=MEAN.
```

2 C) SPSS syntax for simulation of the “right” SLODR

```
COMPUTE filter=RV.BINOM(1,0.5).
EXECUTE.
```

```
COMPUTE a1=RV.NORMAL(0,1).
EXECUTE.
COMPUTE a2=RV.NORMAL(0,1).
EXECUTE.
```

```
IF (filter) g0=RV.NORMAL(-0.5,1).
EXECUTE.
```

```
IF (filter) v11=RV.NORMAL(0,1) * 0.6 + 0.8 * (g0 * 0.8 + a1 * 0.6).
IF (filter) v12=RV.NORMAL(0,1) * 0.6 + 0.8 * (g0 * 0.8 + a1 * 0.6).
IF (filter) v21=RV.NORMAL(0,1) * 0.6 + 0.8 * (g0 * 0.8 + a2 * 0.6).
IF (filter) v22=RV.NORMAL(0,1) * 0.6 + 0.8 * (g0 * 0.8 + a2 * 0.6).
EXECUTE.
```

```
IF (~ filter) g0=RV.NORMAL(0.5,1).
EXECUTE.
```

```
IF (~ filter) v11=RV.NORMAL(0,1) * 0.8 + 0.6 * (g0 * 0.6 + a1 * 0.8).
IF (~ filter) v12=RV.NORMAL(0,1) * 0.8 + 0.6 * (g0 * 0.6 + a1 * 0.8).
IF (~ filter) v21=RV.NORMAL(0,1) * 0.8 + 0.6 * (g0 * 0.6 + a2 * 0.8).
IF (~ filter) v22=RV.NORMAL(0,1) * 0.8 + 0.6 * (g0 * 0.6 + a2 * 0.8).
EXECUTE.
```

```
/* standardization with Zv11, Zv12, Zv21, Zv22 as a result
```

```
DESCRIPTIVES VARIABLES= Zv11 Zv12 Zv21 Zv22
  /SAVE
  /STATISTICS=MEAN STDDEV MIN MAX.
```

```
COMPUTE MeanV=(Zv11 + Zv12 + Zv21 + Zv22) / 4.
EXECUTE.
```

```
/* standardization of ZMeanV as a result
```

```
DESCRIPTIVES VARIABLES= MeanV
  /SAVE
  /STATISTICS=MEAN STDDEV MIN MAX.
```

```
/* division to subsamples
```

```
COMPUTE fsc_corr =.71 * ZMeanV + .71 * RV.NORMAL(0,1).
EXECUTE.
```

```
RANK VARIABLES=fsc_corr (A)
  /NTILES(2)
  /PRINT=YES
  /TIES=MEAN.
```

