

Additional File 3: R Code for Analysis

```
#####  
#Analysis Code  
#####  
  
#Clear workspace (run if desired)  
rm(list = ls())  
  
#List of project directories  
dirs <- list(  
  data = "...",  
  analysis = "...")  
  
#Load required packages  
if (!require(psych)) { install.packages("psych") } ; library(psych)  
if (!require(lavaan)) { install.packages("lavaan") } ; library(lavaan)  
  
#Load dataset  
load(paste0(dirs$data, "KSE-G.rda"))  
  
#####  
  
#####  
#Step 1: Measurement model  
#####  
  
#KSE-G  
KSEG_MM <- 'SDPQ =~ SDPQ1 + SDPQ2 + SDPQ3  
          SDNQ =~ SDNQ1 + SDNQ2 + SDNQ3'  
KSEG_MM.fit <- sem(KSEG_MM, data = KSEG, group = "COUN", estimator = "mlr", missing =  
"fiml", std.lv=TRUE)  
summary(KSEG_MM.fit, standardized = TRUE, fit.measures = TRUE)  
  
#####  
  
#####  
#Step 2: Scale values  
#####  
  
#Split dataset between countries  
KSEG_D <- subset(KSEG, subset=(COUN=="1"))  
KSEG_UK <- subset(KSEG, subset=(COUN=="2"))
```

##Germany

attach(KSEG_D)

#KSEG

describe((SDPQ1+SDPQ2+SDPQ3)/3)

describe((SDNQ1+SDNQ2+SDNQ3)/3)

describe(SDPQ1)

describe(SDPQ2)

describe(SDPQ3)

describe(SDNQ1)

describe(SDNQ2)

describe(SDNQ3)

#BFI-2-XS

describe((EXTR1R+EXTR2+EXTR3)/3)

describe((AGRE1+AGRE2R+AGRE3)/3)

describe((CONS1R+CONS2R+CONS3)/3)

describe((NEGA1+NEGA2+NEGA3R)/3)

describe((OPEN1+OPEN2R+OPEN3)/3)

#

#Employment status

describe(EMPL)

#

#Income

describe(INCO)

#

#Age

describe(AGE)

#

#Gender

describe(SEX)

#

#Education

describe(SCHO)

detach(KSEG_D)

#####

##UK

```
attach(KSEG_UK)
```

```
#KSE-G
```

```
describe((SDPQ1+SDPQ2+SDPQ3)/3)
```

```
describe((SDNQ1+SDNQ2+SDNQ3)/3)
```

```
describe(SDPQ1)
```

```
describe(SDPQ2)
```

```
describe(SDPQ3)
```

```
describe(SDNQ1)
```

```
describe(SDNQ2)
```

```
describe(SDNQ3)
```

```
# #BFI-2-XS
```

```
# describe((EXTR1R+EXTR2+EXTR3)/3)
```

```
# describe((AGRE1+AGRE2+AGRE3)/3)
```

```
# describe((CONS1R+CONS2R+CONS3)/3)
```

```
# describe((NEGA1+NEGA2+NEGA3R)/3)
```

```
# describe((OPEN1+OPEN2R+OPEN3)/3)
```

```
#
```

```
# #Employment status
```

```
# describe(EMPL)
```

```
#
```

```
# #Income
```

```
# describe(INCO)
```

```
#
```

```
# #Age
```

```
# describe(AGE)
```

```
#
```

```
# #Gender
```

```
# describe(SEX)
```

```
#
```

```
# #Education
```

```
# describe(SCHO)
```

```
detach(KSEG_UK)
```

```
#####
```

```
#####
```

```
#Step 4: Reliability
```

```
#####
```

```

###Cronbach's Alpha
#
# #KSE-G
# alpha(KSEG_D[c("SDPQ1","SDPQ2","SDPQ3")], check.keys = TRUE)
# alpha(KSEG_D[c("SDNQ1","SDNQ2","SDNQ3")], check.keys = TRUE)
#
# alpha(KSEG_UK[c("SDPQ1","SDPQ2","SDPQ3")], check.keys = TRUE)
# alpha(KSEG_UK[c("SDNQ1","SDNQ2","SDNQ3")], check.keys = TRUE)

#####

##McDonald's Omega

#KSE-G
KSEG_MM.fit_D <- sem(KSEG_MM, data = KSEG_D, estimator = "mlr", missing = "fiml",
std.lv=TRUE)
semTools::reliability(KSEG_MM.fit_D)
KSEG_MM.fit_UK <- sem(KSEG_MM, data = KSEG_UK, estimator = "mlr", missing = "fiml",
std.lv=TRUE)
semTools::reliability(KSEG_MM.fit_UK)

#####

##Retest reliability for Germany

attach(KSEG_D)

#KSEG
SDPQ <- SDPQ1+SDPQ2+SDPQ3
SDNQ <- SDNQ1+SDNQ2+SDNQ3
SDPQrt <- SDPQ1rt+SDPQ2rt+SDPQ3rt
SDNQrt <- SDNQ1rt+SDNQ2rt+SDNQ3rt
cor(SDPQ, SDPQrt, use = "pairwise.complete.obs")
cor(SDNQ, SDNQrt, use = "pairwise.complete.obs")

detach(KSEG_D)

#####

##Retest reliability for UK

attach(KSEG_UK)

```

```
#KSE-G
SDPQ <- SDPQ1+SDPQ2+SDPQ3
SDNQ <- SDNQ1+SDNQ2+SDNQ3
SDPQrt <- SDPQ1rt+SDPQ2rt+SDPQ3rt
SDNQrt <- SDNQ1rt+SDNQ2rt+SDNQ3rt
cor(SDPQ, SDPQrt, use = "pairwise.complete.obs")
cor(SDNQ, SDNQrt, use = "pairwise.complete.obs")

detach(KSEG_UK)

#####

#####
#Step 5: Construct and criterion validity
#####

##Germany

attach(KSEG_D)

#BFI-2-XS, KSEG
EXTR <- EXTR1R+EXTR2+EXTR3
AGRE <- AGRE1+AGRE2R+AGRE3
CONS <- CONS1R+CONS2R+CONS3
NEGA <- NEGA1+NEGA2+NEGA3R
OPEN <- OPEN1+OPEN2R+OPEN3
SDPQ <- SDPQ1+SDPQ2+SDPQ3
SDNQ <- SDNQ1+SDNQ2+SDNQ3
cor.test(SDPQ, EXTR, use = "pairwise.complete.obs")
cor.test(SDNQ, EXTR, use = "pairwise.complete.obs")
cor.test(SDPQ, AGRE, use = "pairwise.complete.obs")
cor.test(SDNQ, AGRE, use = "pairwise.complete.obs")
cor.test(SDPQ, CONS, use = "pairwise.complete.obs")
cor.test(SDNQ, CONS, use = "pairwise.complete.obs")
cor.test(SDPQ, NEGA, use = "pairwise.complete.obs")
cor.test(SDNQ, NEGA, use = "pairwise.complete.obs")
cor.test(SDPQ, OPEN, use = "pairwise.complete.obs")
cor.test(SDNQ, OPEN, use = "pairwise.complete.obs")

#Employment status, KSEG
cor.test(SDPQ, EMPL, use = "pairwise.complete.obs")
```

```
cor.test(SDNQ, EMPL, use = "pairwise.complete.obs")

#Income, KSEG
cor.test(SDPQ, INCO, use = "pairwise.complete.obs")
cor.test(SDNQ, INCO, use = "pairwise.complete.obs")

#Education, KSEG
cor.test(SDPQ, SCHO, use = "pairwise.complete.obs")
cor.test(SDNQ, SCHO, use = "pairwise.complete.obs")

#Age, KSEG
cor.test(SDPQ, AGE, use = "pairwise.complete.obs")
cor.test(SDNQ, AGE, use = "pairwise.complete.obs")

#Gender, KSEG
cor.test(SDPQ, SEX, use = "pairwise.complete.obs")
cor.test(SDNQ, SEX, use = "pairwise.complete.obs")

detach(KSEG_D)

#####

##UK

attach(KSEG_UK)

#BFI-2-XS, KSE-G
EXTR <- EXTR1R+EXTR2+EXTR3
AGRE <- AGRE1+AGRE2R+AGRE3
CONS <- CONS1R+CONS2R+CONS3
NEGA <- NEGA1+NEGA2+NEGA3R
OPEN <- OPEN1+OPEN2R+OPEN3
SDPQ <- SDPQ1+SDPQ2+SDPQ3
SDNQ <- SDNQ1+SDNQ2+SDNQ3
cor.test(SDPQ, EXTR, use = "pairwise.complete.obs")
cor.test(SDNQ, EXTR, use = "pairwise.complete.obs")
cor.test(SDPQ, AGRE, use = "pairwise.complete.obs")
cor.test(SDNQ, AGRE, use = "pairwise.complete.obs")
cor.test(SDPQ, CONS, use = "pairwise.complete.obs")
cor.test(SDNQ, CONS, use = "pairwise.complete.obs")
cor.test(SDPQ, NEGA, use = "pairwise.complete.obs")
cor.test(SDNQ, NEGA, use = "pairwise.complete.obs")
```

```
cor.test(SDPQ, OPEN, use = "pairwise.complete.obs")
cor.test(SDNQ, OPEN, use = "pairwise.complete.obs")

#Employment status, KSE-G
cor.test(SDPQ, EMPL, use = "pairwise.complete.obs")
cor.test(SDNQ, EMPL, use = "pairwise.complete.obs")

#Income, KSE-G
cor.test(SDPQ, INCO, use = "pairwise.complete.obs")
cor.test(SDNQ, INCO, use = "pairwise.complete.obs")

#Education, KSE-G
cor.test(SDPQ, SCHO, use = "pairwise.complete.obs")
cor.test(SDNQ, SCHO, use = "pairwise.complete.obs")

#Age, KSE-G
cor.test(SDPQ, AGE, use = "pairwise.complete.obs")
cor.test(SDNQ, AGE, use = "pairwise.complete.obs")

#Gender, KSE-G
cor.test(SDPQ, SEX, use = "pairwise.complete.obs")
cor.test(SDNQ, SEX, use = "pairwise.complete.obs")

detach(KSEG_UK)

#####

#####
#Step 6: Measurement invariance
#####

if (!require(semTools)) { install.packages("semTools") } ; library(semTools)

##Option I
#KSE-G
measurementInvariance(KSEG_MM, data = KSEG, group = "COUN", estimator = "mlr", missing =
"fiml", std.lv = TRUE)

#####

##Option II

if (!require(semPlot)) { install.packages("semPlot") } ; library(semPlot)
```

```
#KSE-G
#Configural invariance
KSEG.fit1 <- cfa(KSEG_MM, data = KSEG, group = "COUN", estimator = "mlr", missing = "fiml",
std.lv = TRUE)
summary(KSEG.fit1, standardized = T, fit.measures = T)
#Metric invariance
KSEG.fit2 <- cfa(KSEG_MM, data = KSEG, group = "COUN", estimator = "mlr", missing = "fiml",
group.equal = "loadings")
#Scalar invariance
KSEG.fit3 <- cfa(KSEG_MM, data = KSEG, group = "COUN", estimator = "mlr", missing = "fiml",
group.equal = c("loadings", "intercepts"))
summary(KSEG.fit3, standardized = T, fit.measures = T)
anova(KSEG.fit3, KSEG.fit2)
#Full uniqueness invariance
KSEG.fit4 <- cfa(KSEG_MM, data = KSEG, group = "COUN", estimator = "mlr", missing = "fiml",
group.equal = c("loadings", "intercepts", "residuals"))
summary(KSEG.fit4, standardized = T, fit.measures = T)
anova(KSEG.fit4, KSEG.fit3)
```

#####

#####

#Step 7: Reference values

#####

```
#Quote 1: male, lower education, 18-29
#Quote 2: male, lower education, 30-49
#Quote 3: male, lower education, 50-69
#Quote 4: male, middle education, 18-29
#Quote 5: male, middle education, 30-49
#Quote 6: male, middle education, 50-69
#Quote 7: male, upper education, 18-29
#Quote 8: male, upper education, 30-49
#Quote 9: male, upper education, 50-69
#Quote 10: female, lower education, 18-29
#Quote 11: female, lower education, 30-49
#Quote 12: female, lower education, 50-69
#Quote 13: female, middle education, 18-29
#Quote 14: female, middle education, 30-49
#Quote 15: female, middle education, 50-69
#Quote 16: female, upper education, 18-29
#Quote 17: female, upper education, 30-49
```

#Quote 18: female, upper education, 50-69

##Germany

attach(KSEG_D)

#KSE-G

SDPQ <- (SDPQ1+SDPQ2+SDPQ3)/3

SDNQ <- (SDNQ1+SDNQ2+SDNQ3)/3

tapply(SDPQ, SEX, describe)

tapply(SDNQ, SEX, describe)

AGE1 <- subset(KSEG_D, AGE == 18 | AGE == 19 | AGE == 20 | AGE == 21 | AGE == 22 | AGE == 23 | AGE == 24 | AGE == 25 | AGE == 26

| AGE == 27 | AGE == 28 | AGE == 29)

AGE2 <- subset(KSEG_D, AGE == 30 | AGE == 31 | AGE == 32 | AGE == 33 | AGE == 34 | AGE == 35 | AGE == 36 | AGE == 37 | AGE == 38

| AGE == 39 | AGE == 40 | AGE == 41 | AGE == 42 | AGE == 43 | AGE == 44 | AGE == 45 | AGE == 46 | AGE == 47

| AGE == 48 | AGE == 49)

AGE3 <- subset(KSEG_D, AGE == 50 | AGE == 51 | AGE == 52 | AGE == 53 | AGE == 54 | AGE == 55 | AGE == 56 | AGE == 57 | AGE == 58

| AGE == 59 | AGE == 60 | AGE == 61 | AGE == 62 | AGE == 63 | AGE == 64 | AGE == 65 | AGE == 66 | AGE == 67

| AGE == 68 | AGE == 69)

detach(KSEG_D)

attach(AGE1)

SDPQ <- (SDPQ1+SDPQ2+SDPQ3)/3

SDNQ <- (SDNQ1+SDNQ2+SDNQ3)/3

describe(SDPQ)

describe(SDNQ)

detach(AGE1)

attach(AGE2)

SDPQ <- (SDPQ1+SDPQ2+SDPQ3)/3

SDNQ <- (SDNQ1+SDNQ2+SDNQ3)/3

describe(SDPQ)

describe(SDNQ)

detach(AGE2)

attach(AGE3)

SDPQ <- (SDPQ1+SDPQ2+SDPQ3)/3

SDNQ <- (SDNQ1+SDNQ2+SDNQ3)/3

describe(SDPQ)

describe(SDNQ)

detach(AGE3)

```
#####
```

```
##UK
```

```
attach(KSEG_UK)
```

```
#KSE-G
```

```
SDPQ <- (SDPQ1+SDPQ2+SDPQ3)/3
```

```
SDNQ <- (SDNQ1+SDNQ2+SDNQ3)/3
```

```
tapply(SDPQ, SEX, describe)
```

```
tapply(SDNQ, SEX, describe)
```

```
AGE1 <- subset(KSEG_UK, AGE == 18 | AGE == 19 | AGE == 20 | AGE == 21 | AGE == 22 | AGE == 23 | AGE == 24 | AGE == 25 | AGE == 26
```

```
    | AGE == 27 | AGE == 28 | AGE == 29)
```

```
AGE2 <- subset(KSEG_UK, AGE == 30 | AGE == 31 | AGE == 32 | AGE == 33 | AGE == 34 | AGE == 35 | AGE == 36 | AGE == 37 | AGE == 38
```

```
    | AGE == 39 | AGE == 40 | AGE == 41 | AGE == 42 | AGE == 43 | AGE == 44 | AGE == 45 | AGE == 46 | AGE == 47
```

```
    | AGE == 48 | AGE == 49)
```

```
AGE3 <- subset(KSEG_UK, AGE == 50 | AGE == 51 | AGE == 52 | AGE == 53 | AGE == 54 | AGE == 55 | AGE == 56 | AGE == 57 | AGE == 58
```

```
    | AGE == 59 | AGE == 60 | AGE == 61 | AGE == 62 | AGE == 63 | AGE == 64 | AGE == 65 | AGE == 66 | AGE == 67
```

```
    | AGE == 68 | AGE == 69)
```

```
detach(KSEG_UK)
```

```
attach(AGE1)
```

```
SDPQ <- (SDPQ1+SDPQ2+SDPQ3)/3
```

```
SDNQ <- (SDNQ1+SDNQ2+SDNQ3)/3
```

```
describe(SDPQ)
```

```
describe(SDNQ)
```

```
detach(AGE1)
```

```
attach(AGE2)
```

```
SDPQ <- (SDPQ1+SDPQ2+SDPQ3)/3
```

```
SDNQ <- (SDNQ1+SDNQ2+SDNQ3)/3
```

```
describe(SDPQ)
```

```
describe(SDNQ)
```

```
detach(AGE2)
```

```
attach(AGE3)
```

```
SDPQ <- (SDPQ1+SDPQ2+SDPQ3)/3
```

```
SDNQ <- (SDNQ1+SDNQ2+SDNQ3)/3
```

```
describe(SDPQ)
```

```
describe(SDNQ)
```

```
detach(AGE3)
```

```
#####
```

```
#####
```

```
#Step 8: Descriptive statistics
```

```
#####
```

```
##Germany
```

```
attach(KSEG_D)
```

```
#Age
```

```
summary(AGE)
```

```
sd(AGE)
```

```
#Proportion women
```

```
table(SEX)
```

```
#Educational level
```

```
table(QUOT)
```

```
detach(KSEG_D)
```

```
#####
```

```
##UK
```

```
attach(KSEG_UK)
```

```
#Age
```

```
summary(AGE)
```

```
sd(AGE)
```

```
#Proportion women
```

```
table(SEX)
```

```
#Educational level
```

```
table(QUOT)
```

```
detach(KSEG_UK)
```