recovery.R

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### Check simulated dataset to see if the appropriate item parameters  
### Can be recovered.  
# Load Dependencies  
library(mirt)

## Loading required package: stats4

## Loading required package: lattice

library(plyr)  
  
# Set Working Directory  
setwd("e:/dropbox/dissertation/03 - code")  
  
# Load utilities  
source("utils.R")  
  
d <- read.table("cyw/bigSim.dat", header=T)  
  
# Select out constructs to be included and create a vector of keys for   
# reverse coded items  
sincerity <- d[,1:10]  
fairness <- d[,11:20]  
anxiety <- d[,21:30]  
dependence <- d[,31:40]  
liveliness <- d[,41:50]  
forgiveness <- d[,51:60]  
patience <- d[,61:70]  
perfectionism <- d[,71:80]  
inquisitiveness <- d[,81:90]  
unconventionality <- d[,91:100]  
  
# Create a vector of names  
n <- c("sincerity", "fairness", "anxiety", "dependence", "liveliness",  
 "forgiveness", "patience", "perfectionism", "inquisitiveness",   
 "unconventionality")  
  
# Define keys for negatively coded variables  
# Note: Negative is defined in reference to the construct name,  
# Not it's social desirability. dependence is absent because it  
# consists of only positive items.  
key <- list()  
key[["sinc"]] <- c(2:10)  
key[["fair"]] <- c(6:10)  
key[["anxi"]] <- c(6:10)  
key[["live"]] <- c(9,10)  
key[["forg"]] <- c(5:10)  
key[["pati"]] <- c(6:10)  
key[["perf"]] <- c(9,10)  
key[["inqu"]] <- c(7:10)  
key[["unco"]] <- c(6:10)  
  
# Reverse code and compute factor scores for each facet.  
for (i in 1:length(n)){  
 name <- substr(n[i],1,4)  
 if(!is.null(key[[name]])) {   
 tmp <- revcode(eval(as.name(n[i])),key[[name]],7)  
 } else tmp <- eval(as.name(n[i]))  
 tmp <- rowMeans(tmp)  
 assign(name, tmp)   
}  
  
# Combine factor scores into a matrix  
factors <- cbind(sinc,fair,anxi,depe,live,forg,pati,perf,inqu,unco)  
  
# Correlations  
fcorr <- cor(factors)  
  
# Load correlation matrix used to simulate facet-level data  
ocorr <- as.matrix(read.table("resources/fcorr.dat", header=T, row.names=1))  
  
# Find the difference between recovered facet scores and those originally  
# specified  
ftest <- abs(abs(fcorr) - abs(ocorr))  
  
# Check max difference  
max(ftest)

## [1] 0.08613981

# Print to console  
ftest

## sinc fair anxi depe live forg  
## sinc 0.000000000 0.081021252 0.03020216 0.048566373 0.021929769 0.04041341  
## fair 0.081021252 0.000000000 0.01858245 0.029161354 0.012803019 0.06741307  
## anxi 0.030202158 0.018582451 0.00000000 0.086139811 0.067555445 0.02732160  
## depe 0.048566373 0.029161354 0.08613981 0.000000000 0.016453130 0.01585438  
## live 0.021929769 0.012803019 0.06755544 0.016453130 0.000000000 0.04044660  
## forg 0.040413407 0.067413069 0.02732160 0.015854380 0.040446597 0.00000000  
## pati 0.028509463 0.026884390 0.05311890 0.029039427 0.032720592 0.06149364  
## perf 0.007630972 0.013197721 0.01316426 0.004451487 0.009319042 0.02763913  
## inqu 0.011593783 0.005677387 0.02547413 0.039364656 0.025657480 0.01051925  
## unco 0.006843613 0.041505253 0.01661400 0.039680374 0.019449011 0.01426991  
## pati perf inqu unco  
## sinc 0.028509463 0.007630972 0.011593783 0.006843613  
## fair 0.026884390 0.013197721 0.005677387 0.041505253  
## anxi 0.053118904 0.013164261 0.025474132 0.016613997  
## depe 0.029039427 0.004451487 0.039364656 0.039680374  
## live 0.032720592 0.009319042 0.025657480 0.019449011  
## forg 0.061493642 0.027639128 0.010519250 0.014269914  
## pati 0.000000000 0.012927297 0.015830288 0.004355391  
## perf 0.012927297 0.000000000 0.053357750 0.005024705  
## inqu 0.015830288 0.053357750 0.000000000 0.084573071  
## unco 0.004355391 0.005024705 0.084573071 0.000000000

# Write to file  
write.table(ftest, "cyw/ftest.dat")  
  
## Check item parameters  
# Instantiate Looping Variables  
ipar <- NULL  
rows <- NULL  
  
# Estimate item parameters by construct using the grm. eval(as.name()) replaces   
# itself with the "name" for the current value of x. Then extract the item  
# parameters from the model object as a dataframe   
for(c in 1:length(n)) {  
 y <- mirt(eval(as.name(n[c])), 1)  
 p <- as.data.frame(coef(y, simplify=T)$items)   
 ipar <- rbind.fill(ipar,p)  
 rows <- c(rows, rownames(p))  
}

##   
Iteration: 1, Log-Lik: -35998565.236, Max-Change: 2.16952  
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## Warning: Log-likelihood was decreasing near the ML solution. EM method may  
## be unstable

# rbind.fill doesn't support row names, so rejoin those  
rownames(ipar) <- rows  
  
# Load item parameters used to simulate item level data  
opar <- read.table("resources/ipar.dat", header=T, row.names=1)  
  
# Compute the difference between recovered item parameters and those  
# used to simulate the data.  
iptest <- abs(abs(ipar) - abs(opar))  
  
# Check max differnece  
max(iptest, na.rm=T)

## [1] 0.02

# print to console  
iptest

## a1 d1 d2 d3 d4 d5 d6  
## HSinc1 0.001 0.000 0.003 0.003 0.004 0.001 0.005  
## HSinc2 0.002 0.002 0.003 0.004 0.004 0.007 0.008  
## HSinc3 0.000 0.004 0.006 0.007 0.007 0.006 0.007  
## HSinc4 0.004 0.009 0.010 0.007 0.004 0.002 0.007  
## HSinc5 0.001 0.003 0.001 0.003 0.003 0.004 0.004  
## HSinc6 0.002 0.012 0.008 0.008 0.006 0.004 0.009  
## HSinc7 0.000 0.003 0.003 0.005 0.005 0.003 0.002  
## HSinc8 0.002 0.002 0.002 0.000 0.004 0.003 0.006  
## HSinc9 0.002 0.004 0.003 0.002 0.002 0.002 0.007  
## HSinc10 0.001 0.001 0.001 0.002 0.003 0.002 0.004  
## HFair1 0.005 0.011 0.007 0.006 0.006 0.005 0.000  
## HFair2 0.001 0.006 0.002 0.003 0.005 0.003 0.003  
## HFair3 0.000 0.001 0.003 0.003 0.002 0.002 0.003  
## HFair4 0.000 0.003 0.001 0.004 0.004 0.006 0.007  
## HFair5 0.001 0.006 0.001 0.001 0.000 0.001 0.001  
## HFair6 0.002 0.000 0.002 0.002 0.002 0.003 0.002  
## HFair7 0.004 0.002 0.004 0.005 0.007 0.006 0.012  
## HFair8 0.001 0.002 0.004 0.005 0.007 0.010 0.009  
## HFair9 0.001 0.004 0.003 0.001 0.005 0.008 0.013  
## HFair10 0.000 0.004 0.003 0.004 0.005 0.005 0.001  
## EAnxi1 0.003 0.004 0.002 0.001 0.001 0.003 0.002  
## EAnxi2 0.002 0.002 0.008 0.004 0.003 0.003 0.005  
## EAnxi3 0.002 0.008 0.006 0.005 0.004 0.005 0.005  
## EAnxi4 0.000 0.003 0.000 0.002 0.003 0.001 0.004  
## EAnxi5 0.002 0.001 0.001 0.001 0.000 0.001 0.001  
## EAnxi6 0.004 0.000 0.006 0.008 0.011 0.013 0.014  
## EAnxi7 0.002 0.006 0.005 0.001 0.001 0.001 0.000  
## EAnxi8 0.001 0.001 0.000 0.000 0.001 0.001 0.000  
## EAnxi9 0.002 0.001 0.001 0.003 0.001 0.001 0.001  
## EAnxi10 0.000 0.001 0.000 0.001 0.001 0.003 0.006  
## EDepe1 0.000 0.005 0.003 0.002 0.001 0.003 0.004  
## EDepe2 0.001 0.002 0.002 0.002 0.001 0.002 0.001  
## EDepe3 0.002 0.002 0.001 0.002 0.002 0.003 0.003  
## EDepe4 0.001 0.000 0.001 0.002 0.003 0.003 0.003  
## EDepe5 0.003 0.001 0.004 0.005 0.003 0.001 0.001  
## EDepe6 0.001 0.003 0.002 0.002 0.000 0.002 0.002  
## EDepe7 0.001 0.000 0.001 0.002 0.002 0.001 0.000  
## EDepe8 0.002 0.010 0.003 0.004 0.003 0.002 0.000  
## EDepe9 0.000 0.002 0.003 0.002 0.002 0.001 0.003  
## EDepe10 0.000 0.001 0.001 0.001 0.001 0.001 0.001  
## XLive1 0.000 0.007 0.001 0.002 0.002 0.001 0.003  
## XLive2 0.001 0.000 0.002 0.003 0.001 0.001 0.000  
## XLive3 0.005 0.000 0.004 0.002 0.003 0.003 0.008  
## XLive4 0.002 0.003 0.001 0.002 0.000 0.001 0.001  
## XLive5 0.002 0.006 0.001 0.002 0.001 0.005 0.006  
## XLive6 0.001 0.005 0.001 0.003 0.000 0.000 0.003  
## XLive7 0.003 0.002 0.002 0.002 0.000 0.001 0.004  
## XLive8 0.000 0.001 0.001 0.000 0.002 0.001 0.000  
## XLive9 0.000 0.004 0.001 0.002 0.001 0.000 0.004  
## XLive10 0.002 0.002 0.000 0.001 0.000 0.002 0.000  
## AForg1 0.000 0.002 0.001 0.002 0.002 0.000 0.002  
## AForg2 0.008 0.020 0.012 0.010 0.009 0.000 0.003  
## AForg3 0.003 0.013 0.003 0.003 0.002 0.005 0.005  
## AForg4 0.002 0.005 0.002 0.001 0.001 0.000 0.001  
## AForg5 0.002 0.000 0.001 0.005 0.006 0.004 0.004  
## AForg6 0.000 0.000 0.000 0.002 0.004 0.005 0.003  
## AForg7 0.002 0.002 0.000 0.002 0.004 0.001 0.004  
## AForg8 0.002 0.000 0.000 0.001 0.003 0.005 0.004  
## AForg9 0.001 0.004 0.001 0.003 0.001 0.000 0.001  
## AForg10 0.001 0.000 0.001 0.000 0.000 0.001 0.004  
## APati1 0.003 0.003 0.003 0.004 0.003 0.004 0.002  
## APati2 0.002 0.003 0.001 0.001 0.001 0.003 0.003  
## APati3 0.001 0.005 0.002 0.002 0.000 0.004 0.001  
## APati4 0.005 0.003 0.001 0.002 0.003 0.006 0.002  
## APati5 0.009 0.001 0.001 0.001 0.003 0.007 0.007  
## APati6 0.005 0.000 0.001 0.000 0.001 0.001 0.002  
## APati7 0.008 0.004 0.006 0.002 0.002 0.004 0.003  
## APati8 0.005 0.004 0.003 0.005 0.004 0.003 0.003  
## APati9 0.001 0.002 0.000 0.005 0.002 0.001 0.002  
## APati10 0.003 0.004 0.002 0.000 0.000 0.003 0.001  
## CPerf1 0.011 0.019 0.019 0.006 0.008 0.003 0.007  
## CPerf2 0.001 0.002 0.003 0.002 0.004 0.000 0.002  
## CPerf3 0.005 0.002 0.007 0.005 0.001 0.002 0.003  
## CPerf4 0.004 0.004 0.002 0.001 0.000 0.000 0.003  
## CPerf5 0.002 0.001 0.002 0.002 0.001 0.002 0.001  
## CPerf6 0.001 0.002 0.002 0.001 0.001 0.001 0.005  
## CPerf7 0.001 0.009 0.000 0.001 0.000 0.000 0.003  
## CPerf8 0.002 0.003 0.000 0.001 0.000 0.002 0.002  
## CPerf9 0.000 0.003 0.001 0.003 0.001 0.004 0.006  
## CPerf10 0.003 0.002 0.001 0.001 0.003 0.005 0.006  
## OInqu1 0.001 0.001 0.004 0.001 0.001 0.002 0.003  
## OInqu2 0.000 0.001 0.002 0.006 0.003 0.002 0.001  
## OInqu3 0.001 0.013 0.010 0.007 0.005 0.003 0.003  
## OInqu4 0.003 0.004 0.010 0.008 0.007 0.006 0.004  
## OInqu5 0.002 0.003 0.003 0.004 0.004 0.004 0.006  
## OInqu6 0.004 0.013 0.012 0.007 0.006 0.004 0.000  
## OInqu7 0.001 0.001 0.003 0.002 0.002 0.001 0.000  
## OInqu8 0.006 0.003 0.010 0.006 0.011 0.011 0.008  
## OInqu9 0.001 0.002 0.001 0.000 0.001 0.000 0.002  
## OInqu10 0.001 0.002 0.004 0.005 0.002 0.005 0.017  
## OUnco1 0.001 0.001 0.004 0.003 0.001 0.002 0.002  
## OUnco2 0.000 0.001 0.001 0.003 0.003 0.001 0.001  
## OUnco3 0.000 0.000 0.006 0.004 0.003 0.001 0.000  
## OUnco4 0.002 0.004 0.003 0.001 0.001 0.001 0.000  
## OUnco5 0.001 0.002 0.000 0.001 0.000 0.003 0.002  
## OUnco6 0.002 0.004 0.004 0.004 0.007 0.011 0.007  
## OUnco7 0.002 0.003 0.004 0.002 0.007 0.004 0.007  
## OUnco8 0.003 0.003 0.001 0.000 0.002 0.000 0.001  
## OUnco9 0.005 0.000 0.004 0.004 0.011 0.011 0.015  
## OUnco10 0.003 0.000 0.002 0.002 0.003 0.002 0.002

# Write to file  
write.table(iptest, "cyw/iptest.dat")