recovery.R

Wolf

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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/simd1.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(fcorr) - abs(ocorr)  
  
# Check max difference  
max(ftest)

## [1] 0.07605575

# Print to console  
ftest

## sinc fair anxi depe live  
## sinc 0.000000000 -0.038424617 -0.006563062 -0.0453071398 -0.013338560  
## fair -0.038424617 0.000000000 -0.025490297 -0.0147584755 -0.020273937  
## anxi -0.006563062 -0.025490297 0.000000000 -0.0920238019 -0.090853930  
## depe -0.045307140 -0.014758476 -0.092023802 0.0000000000 -0.080232500  
## live -0.013338560 -0.020273937 -0.090853930 -0.0802324998 0.000000000  
## forg -0.133273122 -0.095692878 -0.058301092 0.0380109635 0.023767132  
## pati -0.061739762 -0.054847656 -0.063703581 -0.0221753086 -0.008260306  
## perf 0.013731770 0.063899371 -0.047151063 0.0001202403 0.076055746  
## inqu -0.047898718 0.034810116 0.033583728 -0.0332370218 -0.059563658  
## unco 0.029696260 -0.001517286 -0.027547827 -0.1045365009 -0.078152817  
## forg pati perf inqu unco  
## sinc -0.133273122 -0.061739762 0.0137317697 -0.047898718 0.029696260  
## fair -0.095692878 -0.054847656 0.0638993710 0.034810116 -0.001517286  
## anxi -0.058301092 -0.063703581 -0.0471510631 0.033583728 -0.027547827  
## depe 0.038010963 -0.022175309 0.0001202403 -0.033237022 -0.104536501  
## live 0.023767132 -0.008260306 0.0760557457 -0.059563658 -0.078152817  
## forg 0.000000000 -0.114308641 -0.1137918378 -0.009195715 -0.018619171  
## pati -0.114308641 0.000000000 -0.0853297921 -0.016290900 0.030136792  
## perf -0.113791838 -0.085329792 0.0000000000 -0.036225288 0.029689609  
## inqu -0.009195715 -0.016290900 -0.0362252877 0.000000000 -0.125338498  
## unco -0.018619171 0.030136792 0.0296896087 -0.125338498 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: -9009.785, Max-Change: 1.45705  
Iteration: 2, Log-Lik: -8674.088, Max-Change: 0.69590  
Iteration: 3, Log-Lik: -8623.525, Max-Change: 0.49654  
Iteration: 4, Log-Lik: -8615.936, Max-Change: 0.16047  
Iteration: 5, Log-Lik: -8614.305, Max-Change: 0.12566  
Iteration: 6, Log-Lik: -8613.331, Max-Change: 0.05313  
Iteration: 7, Log-Lik: -8613.046, Max-Change: 0.04447  
Iteration: 8, Log-Lik: -8612.814, Max-Change: 0.03176  
Iteration: 9, Log-Lik: -8612.689, Max-Change: 0.01979  
Iteration: 10, Log-Lik: -8612.602, Max-Change: 0.01671  
Iteration: 11, Log-Lik: -8612.569, Max-Change: 0.00874  
Iteration: 12, Log-Lik: -8612.554, Max-Change: 0.00632  
Iteration: 13, Log-Lik: -8612.539, Max-Change: 0.00509  
Iteration: 14, Log-Lik: -8612.535, Max-Change: 0.00336  
Iteration: 15, Log-Lik: -8612.532, Max-Change: 0.00154  
Iteration: 16, Log-Lik: -8612.532, Max-Change: 0.00170  
Iteration: 17, Log-Lik: -8612.531, Max-Change: 0.00137  
Iteration: 18, Log-Lik: -8612.530, Max-Change: 0.00129  
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Iteration: 22, Log-Lik: -8612.529, Max-Change: 0.00188  
Iteration: 23, Log-Lik: -8612.529, Max-Change: 0.00016  
Iteration: 24, Log-Lik: -8612.528, Max-Change: 0.00035  
Iteration: 25, Log-Lik: -8612.528, Max-Change: 0.00015  
Iteration: 26, Log-Lik: -8612.528, Max-Change: 0.00035  
Iteration: 27, Log-Lik: -8612.528, Max-Change: 0.00012  
Iteration: 28, Log-Lik: -8612.528, Max-Change: 0.00010  
Iteration: 29, Log-Lik: -8612.528, Max-Change: 0.00029  
Iteration: 30, Log-Lik: -8612.528, Max-Change: 0.00030  
Iteration: 31, Log-Lik: -8612.528, Max-Change: 0.00034  
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Iteration: 33, Log-Lik: -8612.528, Max-Change: 0.00023  
Iteration: 34, Log-Lik: -8612.528, Max-Change: 0.00016  
Iteration: 35, Log-Lik: -8612.528, Max-Change: 0.00026  
Iteration: 36, Log-Lik: -8612.528, Max-Change: 0.00011  
Iteration: 37, Log-Lik: -8612.528, Max-Change: 0.00009  
Iteration: 1, Log-Lik: -8677.215, Max-Change: 0.58950  
Iteration: 2, Log-Lik: -8496.347, Max-Change: 0.76472  
Iteration: 3, Log-Lik: -8422.665, Max-Change: 0.79163  
Iteration: 4, Log-Lik: -8081.765, Max-Change: 2.07517  
Iteration: 5, Log-Lik: -7763.583, Max-Change: 0.95966  
Iteration: 6, Log-Lik: -7694.699, Max-Change: 0.39673  
Iteration: 7, Log-Lik: -7685.880, Max-Change: 0.20140  
Iteration: 8, Log-Lik: -7683.272, Max-Change: 0.14578  
Iteration: 9, Log-Lik: -7681.179, Max-Change: 0.07981  
Iteration: 10, Log-Lik: -7680.471, Max-Change: 0.06100  
Iteration: 11, Log-Lik: -7679.699, Max-Change: 0.04609  
Iteration: 12, Log-Lik: -7679.223, Max-Change: 0.03499  
Iteration: 13, Log-Lik: -7678.439, Max-Change: 0.01491  
Iteration: 14, Log-Lik: -7678.388, Max-Change: 0.00946  
Iteration: 15, Log-Lik: -7678.350, Max-Change: 0.00805  
Iteration: 16, Log-Lik: -7678.268, Max-Change: 0.01020  
Iteration: 17, Log-Lik: -7678.255, Max-Change: 0.00434  
Iteration: 18, Log-Lik: -7678.248, Max-Change: 0.00749  
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Iteration: 22, Log-Lik: -7678.226, Max-Change: 0.00329  
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Iteration: 32, Log-Lik: -7678.215, Max-Change: 0.00092  
Iteration: 33, Log-Lik: -7678.215, Max-Change: 0.00055  
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Iteration: 35, Log-Lik: -7678.214, Max-Change: 0.00111  
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Iteration: 41, Log-Lik: -7678.214, Max-Change: 0.00100  
Iteration: 42, Log-Lik: -7678.214, Max-Change: 0.00180  
Iteration: 43, Log-Lik: -7678.212, Max-Change: 0.00035  
Iteration: 44, Log-Lik: -7678.212, Max-Change: 0.00026  
Iteration: 45, Log-Lik: -7678.212, Max-Change: 0.00019  
Iteration: 46, Log-Lik: -7678.212, Max-Change: 0.00012  
Iteration: 47, Log-Lik: -7678.212, Max-Change: 0.00069  
Iteration: 48, Log-Lik: -7678.212, Max-Change: 0.00018  
Iteration: 49, Log-Lik: -7678.212, Max-Change: 0.00016  
Iteration: 50, Log-Lik: -7678.212, Max-Change: 0.00022  
Iteration: 51, Log-Lik: -7678.212, Max-Change: 0.00011  
Iteration: 52, Log-Lik: -7678.212, Max-Change: 0.00009  
Iteration: 1, Log-Lik: -9149.870, Max-Change: 0.88449  
Iteration: 2, Log-Lik: -8890.175, Max-Change: 1.08327  
Iteration: 3, Log-Lik: -8282.739, Max-Change: 1.61211  
Iteration: 4, Log-Lik: -8115.444, Max-Change: 0.61201  
Iteration: 5, Log-Lik: -8061.371, Max-Change: 0.32153  
Iteration: 6, Log-Lik: -8036.225, Max-Change: 0.26429  
Iteration: 7, Log-Lik: -8027.571, Max-Change: 0.25129  
Iteration: 8, Log-Lik: -8021.172, Max-Change: 0.15131  
Iteration: 9, Log-Lik: -8018.190, Max-Change: 0.08872  
Iteration: 10, Log-Lik: -8017.205, Max-Change: 0.04990  
Iteration: 11, Log-Lik: -8016.121, Max-Change: 0.04025  
Iteration: 12, Log-Lik: -8015.445, Max-Change: 0.02796  
Iteration: 13, Log-Lik: -8014.775, Max-Change: 0.01851  
Iteration: 14, Log-Lik: -8014.623, Max-Change: 0.01401  
Iteration: 15, Log-Lik: -8014.527, Max-Change: 0.01177  
Iteration: 16, Log-Lik: -8014.330, Max-Change: 0.00447  
Iteration: 17, Log-Lik: -8014.320, Max-Change: 0.00242  
Iteration: 18, Log-Lik: -8014.317, Max-Change: 0.00239  
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Iteration: 20, Log-Lik: -8014.306, Max-Change: 0.00142  
Iteration: 21, Log-Lik: -8014.305, Max-Change: 0.00146  
Iteration: 22, Log-Lik: -8014.304, Max-Change: 0.00081  
Iteration: 23, Log-Lik: -8014.303, Max-Change: 0.00030  
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Iteration: 26, Log-Lik: -8014.303, Max-Change: 0.00039  
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Iteration: 28, Log-Lik: -8014.303, Max-Change: 0.00013  
Iteration: 29, Log-Lik: -8014.303, Max-Change: 0.00029  
Iteration: 30, Log-Lik: -8014.303, Max-Change: 0.00032  
Iteration: 31, Log-Lik: -8014.302, Max-Change: 0.00025  
Iteration: 32, Log-Lik: -8014.302, Max-Change: 0.00031  
Iteration: 33, Log-Lik: -8014.302, Max-Change: 0.00012  
Iteration: 34, Log-Lik: -8014.302, Max-Change: 0.00010  
Iteration: 1, Log-Lik: -8514.069, Max-Change: 1.45455  
Iteration: 2, Log-Lik: -8423.282, Max-Change: 0.37105  
Iteration: 3, Log-Lik: -8414.328, Max-Change: 0.21930  
Iteration: 4, Log-Lik: -8409.851, Max-Change: 0.23599  
Iteration: 5, Log-Lik: -8407.053, Max-Change: 0.13620  
Iteration: 6, Log-Lik: -8406.355, Max-Change: 0.02662  
Iteration: 7, Log-Lik: -8406.164, Max-Change: 0.02381  
Iteration: 8, Log-Lik: -8405.789, Max-Change: 0.01737  
Iteration: 9, Log-Lik: -8405.598, Max-Change: 0.01335  
Iteration: 10, Log-Lik: -8405.396, Max-Change: 0.00299  
Iteration: 11, Log-Lik: -8405.389, Max-Change: 0.00188  
Iteration: 12, Log-Lik: -8405.386, Max-Change: 0.00167  
Iteration: 13, Log-Lik: -8405.384, Max-Change: 0.00116  
Iteration: 14, Log-Lik: -8405.383, Max-Change: 0.00091  
Iteration: 15, Log-Lik: -8405.382, Max-Change: 0.00066  
Iteration: 16, Log-Lik: -8405.382, Max-Change: 0.00027  
Iteration: 17, Log-Lik: -8405.382, Max-Change: 0.00038  
Iteration: 18, Log-Lik: -8405.382, Max-Change: 0.00031  
Iteration: 19, Log-Lik: -8405.382, Max-Change: 0.00016  
Iteration: 20, Log-Lik: -8405.382, Max-Change: 0.00037  
Iteration: 21, Log-Lik: -8405.382, Max-Change: 0.00012  
Iteration: 22, Log-Lik: -8405.382, Max-Change: 0.00010  
Iteration: 23, Log-Lik: -8405.382, Max-Change: 0.00024  
Iteration: 24, Log-Lik: -8405.382, Max-Change: 0.00046  
Iteration: 25, Log-Lik: -8405.382, Max-Change: 0.00011  
Iteration: 26, Log-Lik: -8405.382, Max-Change: 0.00027  
Iteration: 27, Log-Lik: -8405.382, Max-Change: 0.00010  
Iteration: 28, Log-Lik: -8405.382, Max-Change: 0.00044  
Iteration: 29, Log-Lik: -8405.382, Max-Change: 0.00014  
Iteration: 30, Log-Lik: -8405.382, Max-Change: 0.00032  
Iteration: 31, Log-Lik: -8405.382, Max-Change: 0.00022  
Iteration: 32, Log-Lik: -8405.382, Max-Change: 0.00010

## Warning: Log-likelihood was decreasing near the ML solution. EM method may  
## be unstable

##   
Iteration: 1, Log-Lik: -9041.939, Max-Change: 1.64663  
Iteration: 2, Log-Lik: -8384.663, Max-Change: 1.35662  
Iteration: 3, Log-Lik: -8284.290, Max-Change: 0.55112  
Iteration: 4, Log-Lik: -8272.337, Max-Change: 0.28708  
Iteration: 5, Log-Lik: -8268.660, Max-Change: 0.12479  
Iteration: 6, Log-Lik: -8267.344, Max-Change: 0.08555  
Iteration: 7, Log-Lik: -8266.678, Max-Change: 0.03991  
Iteration: 8, Log-Lik: -8266.342, Max-Change: 0.04062  
Iteration: 9, Log-Lik: -8266.143, Max-Change: 0.02824  
Iteration: 10, Log-Lik: -8265.982, Max-Change: 0.01498  
Iteration: 11, Log-Lik: -8265.914, Max-Change: 0.01596  
Iteration: 12, Log-Lik: -8265.866, Max-Change: 0.00950  
Iteration: 13, Log-Lik: -8265.836, Max-Change: 0.00874  
Iteration: 14, Log-Lik: -8265.814, Max-Change: 0.00937  
Iteration: 15, Log-Lik: -8265.800, Max-Change: 0.00548  
Iteration: 16, Log-Lik: -8265.793, Max-Change: 0.00429  
Iteration: 17, Log-Lik: -8265.787, Max-Change: 0.00424  
Iteration: 18, Log-Lik: -8265.782, Max-Change: 0.00296  
Iteration: 19, Log-Lik: -8265.778, Max-Change: 0.00246  
Iteration: 20, Log-Lik: -8265.776, Max-Change: 0.00174  
Iteration: 21, Log-Lik: -8265.776, Max-Change: 0.00182  
Iteration: 22, Log-Lik: -8265.774, Max-Change: 0.00027  
Iteration: 23, Log-Lik: -8265.774, Max-Change: 0.00042  
Iteration: 24, Log-Lik: -8265.774, Max-Change: 0.00021  
Iteration: 25, Log-Lik: -8265.774, Max-Change: 0.00017  
Iteration: 26, Log-Lik: -8265.774, Max-Change: 0.00054  
Iteration: 27, Log-Lik: -8265.774, Max-Change: 0.00013  
Iteration: 28, Log-Lik: -8265.774, Max-Change: 0.00011  
Iteration: 29, Log-Lik: -8265.774, Max-Change: 0.00045  
Iteration: 30, Log-Lik: -8265.774, Max-Change: 0.00041  
Iteration: 31, Log-Lik: -8265.774, Max-Change: 0.00020  
Iteration: 32, Log-Lik: -8265.774, Max-Change: 0.00035  
Iteration: 33, Log-Lik: -8265.773, Max-Change: 0.00015  
Iteration: 34, Log-Lik: -8265.773, Max-Change: 0.00012  
Iteration: 35, Log-Lik: -8265.773, Max-Change: 0.00031  
Iteration: 36, Log-Lik: -8265.773, Max-Change: 0.00009  
Iteration: 1, Log-Lik: -9396.879, Max-Change: 1.30744  
Iteration: 2, Log-Lik: -8880.589, Max-Change: 2.07501  
Iteration: 3, Log-Lik: -8493.846, Max-Change: 0.62620  
Iteration: 4, Log-Lik: -8453.116, Max-Change: 0.30167  
Iteration: 5, Log-Lik: -8444.437, Max-Change: 0.14668  
Iteration: 6, Log-Lik: -8440.880, Max-Change: 0.07242  
Iteration: 7, Log-Lik: -8439.682, Max-Change: 0.05419  
Iteration: 8, Log-Lik: -8438.627, Max-Change: 0.03837  
Iteration: 9, Log-Lik: -8438.044, Max-Change: 0.02698  
Iteration: 10, Log-Lik: -8437.503, Max-Change: 0.01702  
Iteration: 11, Log-Lik: -8437.392, Max-Change: 0.01261  
Iteration: 12, Log-Lik: -8437.322, Max-Change: 0.00952  
Iteration: 13, Log-Lik: -8437.226, Max-Change: 0.00466  
Iteration: 14, Log-Lik: -8437.219, Max-Change: 0.00291  
Iteration: 15, Log-Lik: -8437.215, Max-Change: 0.00255  
Iteration: 16, Log-Lik: -8437.211, Max-Change: 0.00282  
Iteration: 17, Log-Lik: -8437.209, Max-Change: 0.00058  
Iteration: 18, Log-Lik: -8437.209, Max-Change: 0.00072  
Iteration: 19, Log-Lik: -8437.209, Max-Change: 0.00023  
Iteration: 20, Log-Lik: -8437.209, Max-Change: 0.00035  
Iteration: 21, Log-Lik: -8437.209, Max-Change: 0.00018  
Iteration: 22, Log-Lik: -8437.209, Max-Change: 0.00014  
Iteration: 23, Log-Lik: -8437.209, Max-Change: 0.00024  
Iteration: 24, Log-Lik: -8437.209, Max-Change: 0.00048  
Iteration: 25, Log-Lik: -8437.209, Max-Change: 0.00029  
Iteration: 26, Log-Lik: -8437.209, Max-Change: 0.00042  
Iteration: 27, Log-Lik: -8437.209, Max-Change: 0.00020  
Iteration: 28, Log-Lik: -8437.209, Max-Change: 0.00015  
Iteration: 29, Log-Lik: -8437.209, Max-Change: 0.00024  
Iteration: 30, Log-Lik: -8437.209, Max-Change: 0.00012  
Iteration: 31, Log-Lik: -8437.209, Max-Change: 0.00047  
Iteration: 32, Log-Lik: -8437.209, Max-Change: 0.00023  
Iteration: 33, Log-Lik: -8437.209, Max-Change: 0.00033  
Iteration: 34, Log-Lik: -8437.209, Max-Change: 0.00028  
Iteration: 35, Log-Lik: -8437.208, Max-Change: 0.00039  
Iteration: 36, Log-Lik: -8437.208, Max-Change: 0.00019  
Iteration: 37, Log-Lik: -8437.208, Max-Change: 0.00015  
Iteration: 38, Log-Lik: -8437.208, Max-Change: 0.00022  
Iteration: 39, Log-Lik: -8437.208, Max-Change: 0.00011  
Iteration: 40, Log-Lik: -8437.208, Max-Change: 0.00044  
Iteration: 41, Log-Lik: -8437.208, Max-Change: 0.00021  
Iteration: 42, Log-Lik: -8437.208, Max-Change: 0.00031  
Iteration: 43, Log-Lik: -8437.208, Max-Change: 0.00027  
Iteration: 44, Log-Lik: -8437.208, Max-Change: 0.00038  
Iteration: 45, Log-Lik: -8437.208, Max-Change: 0.00018  
Iteration: 46, Log-Lik: -8437.208, Max-Change: 0.00014  
Iteration: 47, Log-Lik: -8437.208, Max-Change: 0.00021  
Iteration: 48, Log-Lik: -8437.208, Max-Change: 0.00011  
Iteration: 49, Log-Lik: -8437.208, Max-Change: 0.00008  
Iteration: 1, Log-Lik: -9599.621, Max-Change: 0.78498  
Iteration: 2, Log-Lik: -9311.177, Max-Change: 1.40520  
Iteration: 3, Log-Lik: -8361.381, Max-Change: 1.51201  
Iteration: 4, Log-Lik: -7922.303, Max-Change: 1.32713  
Iteration: 5, Log-Lik: -7793.499, Max-Change: 0.46448  
Iteration: 6, Log-Lik: -7756.321, Max-Change: 0.34765  
Iteration: 7, Log-Lik: -7724.746, Max-Change: 0.20183  
Iteration: 8, Log-Lik: -7712.354, Max-Change: 0.08568  
Iteration: 9, Log-Lik: -7702.925, Max-Change: 0.12807  
Iteration: 10, Log-Lik: -7695.712, Max-Change: 0.09232  
Iteration: 11, Log-Lik: -7690.973, Max-Change: 0.09134  
Iteration: 12, Log-Lik: -7687.526, Max-Change: 0.07416  
Iteration: 13, Log-Lik: -7683.438, Max-Change: 0.04174  
Iteration: 14, Log-Lik: -7682.268, Max-Change: 0.04645  
Iteration: 15, Log-Lik: -7681.499, Max-Change: 0.03344  
Iteration: 16, Log-Lik: -7680.812, Max-Change: 0.02869  
Iteration: 17, Log-Lik: -7680.460, Max-Change: 0.02581  
Iteration: 18, Log-Lik: -7680.197, Max-Change: 0.02272  
Iteration: 19, Log-Lik: -7679.588, Max-Change: 0.00805  
Iteration: 20, Log-Lik: -7679.516, Max-Change: 0.00839  
Iteration: 21, Log-Lik: -7679.473, Max-Change: 0.00795  
Iteration: 22, Log-Lik: -7679.348, Max-Change: 0.00886  
Iteration: 23, Log-Lik: -7679.340, Max-Change: 0.00284  
Iteration: 24, Log-Lik: -7679.337, Max-Change: 0.00215  
Iteration: 25, Log-Lik: -7679.331, Max-Change: 0.00301  
Iteration: 26, Log-Lik: -7679.329, Max-Change: 0.00166  
Iteration: 27, Log-Lik: -7679.328, Max-Change: 0.00176  
Iteration: 28, Log-Lik: -7679.324, Max-Change: 0.00106  
Iteration: 29, Log-Lik: -7679.324, Max-Change: 0.00192  
Iteration: 30, Log-Lik: -7679.324, Max-Change: 0.00019  
Iteration: 31, Log-Lik: -7679.324, Max-Change: 0.00018  
Iteration: 32, Log-Lik: -7679.324, Max-Change: 0.00048  
Iteration: 33, Log-Lik: -7679.324, Max-Change: 0.00062  
Iteration: 34, Log-Lik: -7679.324, Max-Change: 0.00052  
Iteration: 35, Log-Lik: -7679.324, Max-Change: 0.00014  
Iteration: 36, Log-Lik: -7679.324, Max-Change: 0.00036  
Iteration: 37, Log-Lik: -7679.324, Max-Change: 0.00020  
Iteration: 38, Log-Lik: -7679.324, Max-Change: 0.00051  
Iteration: 39, Log-Lik: -7679.324, Max-Change: 0.00013  
Iteration: 40, Log-Lik: -7679.324, Max-Change: 0.00012  
Iteration: 41, Log-Lik: -7679.324, Max-Change: 0.00031  
Iteration: 42, Log-Lik: -7679.324, Max-Change: 0.00051  
Iteration: 43, Log-Lik: -7679.324, Max-Change: 0.00038  
Iteration: 44, Log-Lik: -7679.324, Max-Change: 0.00013  
Iteration: 45, Log-Lik: -7679.324, Max-Change: 0.00034  
Iteration: 46, Log-Lik: -7679.324, Max-Change: 0.00014  
Iteration: 47, Log-Lik: -7679.324, Max-Change: 0.00037  
Iteration: 48, Log-Lik: -7679.324, Max-Change: 0.00012  
Iteration: 49, Log-Lik: -7679.324, Max-Change: 0.00055  
Iteration: 50, Log-Lik: -7679.324, Max-Change: 0.00015  
Iteration: 51, Log-Lik: -7679.324, Max-Change: 0.00037  
Iteration: 52, Log-Lik: -7679.324, Max-Change: 0.00022  
Iteration: 53, Log-Lik: -7679.323, Max-Change: 0.00055  
Iteration: 54, Log-Lik: -7679.323, Max-Change: 0.00015  
Iteration: 55, Log-Lik: -7679.323, Max-Change: 0.00013  
Iteration: 56, Log-Lik: -7679.323, Max-Change: 0.00033  
Iteration: 57, Log-Lik: -7679.323, Max-Change: 0.00011  
Iteration: 58, Log-Lik: -7679.323, Max-Change: 0.00050  
Iteration: 59, Log-Lik: -7679.323, Max-Change: 0.00013  
Iteration: 60, Log-Lik: -7679.323, Max-Change: 0.00034  
Iteration: 61, Log-Lik: -7679.323, Max-Change: 0.00020  
Iteration: 62, Log-Lik: -7679.323, Max-Change: 0.00050  
Iteration: 63, Log-Lik: -7679.323, Max-Change: 0.00013  
Iteration: 64, Log-Lik: -7679.323, Max-Change: 0.00012  
Iteration: 65, Log-Lik: -7679.323, Max-Change: 0.00030  
Iteration: 66, Log-Lik: -7679.323, Max-Change: 0.00010  
Iteration: 67, Log-Lik: -7679.323, Max-Change: 0.00045  
Iteration: 68, Log-Lik: -7679.323, Max-Change: 0.00012  
Iteration: 69, Log-Lik: -7679.323, Max-Change: 0.00030  
Iteration: 70, Log-Lik: -7679.323, Max-Change: 0.00018  
Iteration: 71, Log-Lik: -7679.323, Max-Change: 0.00045  
Iteration: 72, Log-Lik: -7679.323, Max-Change: 0.00012  
Iteration: 73, Log-Lik: -7679.323, Max-Change: 0.00011  
Iteration: 74, Log-Lik: -7679.323, Max-Change: 0.00027  
Iteration: 75, Log-Lik: -7679.323, Max-Change: 0.00009

## Warning: Log-likelihood was decreasing near the ML solution. EM method may  
## be unstable

##   
Iteration: 1, Log-Lik: -8502.297, Max-Change: 1.63495  
Iteration: 2, Log-Lik: -8007.760, Max-Change: 0.93482  
Iteration: 3, Log-Lik: -7942.439, Max-Change: 0.71860  
Iteration: 4, Log-Lik: -7932.421, Max-Change: 0.25273  
Iteration: 5, Log-Lik: -7928.865, Max-Change: 0.14024  
Iteration: 6, Log-Lik: -7927.690, Max-Change: 0.05942  
Iteration: 7, Log-Lik: -7927.413, Max-Change: 0.04519  
Iteration: 8, Log-Lik: -7927.049, Max-Change: 0.02929  
Iteration: 9, Log-Lik: -7926.856, Max-Change: 0.02122  
Iteration: 10, Log-Lik: -7926.621, Max-Change: 0.00762  
Iteration: 11, Log-Lik: -7926.594, Max-Change: 0.00552  
Iteration: 12, Log-Lik: -7926.579, Max-Change: 0.00417  
Iteration: 13, Log-Lik: -7926.567, Max-Change: 0.00334  
Iteration: 14, Log-Lik: -7926.563, Max-Change: 0.00326  
Iteration: 15, Log-Lik: -7926.561, Max-Change: 0.00135  
Iteration: 16, Log-Lik: -7926.560, Max-Change: 0.00329  
Iteration: 17, Log-Lik: -7926.558, Max-Change: 0.00085  
Iteration: 18, Log-Lik: -7926.558, Max-Change: 0.00087  
Iteration: 19, Log-Lik: -7926.557, Max-Change: 0.00050  
Iteration: 20, Log-Lik: -7926.557, Max-Change: 0.00023  
Iteration: 21, Log-Lik: -7926.557, Max-Change: 0.00039  
Iteration: 22, Log-Lik: -7926.557, Max-Change: 0.00016  
Iteration: 23, Log-Lik: -7926.557, Max-Change: 0.00027  
Iteration: 24, Log-Lik: -7926.557, Max-Change: 0.00044  
Iteration: 25, Log-Lik: -7926.557, Max-Change: 0.00030  
Iteration: 26, Log-Lik: -7926.557, Max-Change: 0.00023  
Iteration: 27, Log-Lik: -7926.557, Max-Change: 0.00016  
Iteration: 28, Log-Lik: -7926.557, Max-Change: 0.00012  
Iteration: 29, Log-Lik: -7926.557, Max-Change: 0.00016  
Iteration: 30, Log-Lik: -7926.557, Max-Change: 0.00027  
Iteration: 31, Log-Lik: -7926.557, Max-Change: 0.00024  
Iteration: 32, Log-Lik: -7926.557, Max-Change: 0.00020  
Iteration: 33, Log-Lik: -7926.557, Max-Change: 0.00012  
Iteration: 34, Log-Lik: -7926.557, Max-Change: 0.00008  
Iteration: 1, Log-Lik: -8654.521, Max-Change: 0.90875  
Iteration: 2, Log-Lik: -8445.738, Max-Change: 0.81805  
Iteration: 3, Log-Lik: -8203.791, Max-Change: 0.93637  
Iteration: 4, Log-Lik: -8084.673, Max-Change: 0.61435  
Iteration: 5, Log-Lik: -8059.843, Max-Change: 0.46017  
Iteration: 6, Log-Lik: -8050.784, Max-Change: 0.30105  
Iteration: 7, Log-Lik: -8047.367, Max-Change: 0.16822  
Iteration: 8, Log-Lik: -8046.129, Max-Change: 0.10954  
Iteration: 9, Log-Lik: -8045.619, Max-Change: 0.05582  
Iteration: 10, Log-Lik: -8045.456, Max-Change: 0.02930  
Iteration: 11, Log-Lik: -8045.360, Max-Change: 0.04007  
Iteration: 12, Log-Lik: -8045.305, Max-Change: 0.02832  
Iteration: 13, Log-Lik: -8045.266, Max-Change: 0.00530  
Iteration: 14, Log-Lik: -8045.260, Max-Change: 0.00484  
Iteration: 15, Log-Lik: -8045.256, Max-Change: 0.00232  
Iteration: 16, Log-Lik: -8045.255, Max-Change: 0.00279  
Iteration: 17, Log-Lik: -8045.254, Max-Change: 0.00094  
Iteration: 18, Log-Lik: -8045.253, Max-Change: 0.00051  
Iteration: 19, Log-Lik: -8045.253, Max-Change: 0.00023  
Iteration: 20, Log-Lik: -8045.253, Max-Change: 0.00060  
Iteration: 21, Log-Lik: -8045.253, Max-Change: 0.00025  
Iteration: 22, Log-Lik: -8045.253, Max-Change: 0.00016  
Iteration: 23, Log-Lik: -8045.253, Max-Change: 0.00045  
Iteration: 24, Log-Lik: -8045.253, Max-Change: 0.00018  
Iteration: 25, Log-Lik: -8045.253, Max-Change: 0.00011  
Iteration: 26, Log-Lik: -8045.253, Max-Change: 0.00035  
Iteration: 27, Log-Lik: -8045.253, Max-Change: 0.00013  
Iteration: 28, Log-Lik: -8045.253, Max-Change: 0.00008  
Iteration: 1, Log-Lik: -8716.980, Max-Change: 0.72865  
Iteration: 2, Log-Lik: -8505.584, Max-Change: 0.61464  
Iteration: 3, Log-Lik: -8189.806, Max-Change: 0.92929  
Iteration: 4, Log-Lik: -8032.753, Max-Change: 0.46379  
Iteration: 5, Log-Lik: -8017.661, Max-Change: 0.21766  
Iteration: 6, Log-Lik: -8010.995, Max-Change: 0.09507  
Iteration: 7, Log-Lik: -8009.088, Max-Change: 0.07845  
Iteration: 8, Log-Lik: -8007.777, Max-Change: 0.05293  
Iteration: 9, Log-Lik: -8007.281, Max-Change: 0.03118  
Iteration: 10, Log-Lik: -8007.102, Max-Change: 0.02579  
Iteration: 11, Log-Lik: -8006.945, Max-Change: 0.01544  
Iteration: 12, Log-Lik: -8006.873, Max-Change: 0.01143  
Iteration: 13, Log-Lik: -8006.821, Max-Change: 0.00840  
Iteration: 14, Log-Lik: -8006.802, Max-Change: 0.00486  
Iteration: 15, Log-Lik: -8006.792, Max-Change: 0.00381  
Iteration: 16, Log-Lik: -8006.783, Max-Change: 0.00211  
Iteration: 17, Log-Lik: -8006.782, Max-Change: 0.00099  
Iteration: 18, Log-Lik: -8006.782, Max-Change: 0.00024  
Iteration: 19, Log-Lik: -8006.782, Max-Change: 0.00021  
Iteration: 20, Log-Lik: -8006.782, Max-Change: 0.00058  
Iteration: 21, Log-Lik: -8006.782, Max-Change: 0.00016  
Iteration: 22, Log-Lik: -8006.782, Max-Change: 0.00013  
Iteration: 23, Log-Lik: -8006.782, Max-Change: 0.00041  
Iteration: 24, Log-Lik: -8006.781, Max-Change: 0.00051  
Iteration: 25, Log-Lik: -8006.781, Max-Change: 0.00024  
Iteration: 26, Log-Lik: -8006.781, Max-Change: 0.00038  
Iteration: 27, Log-Lik: -8006.781, Max-Change: 0.00018  
Iteration: 28, Log-Lik: -8006.781, Max-Change: 0.00015  
Iteration: 29, Log-Lik: -8006.781, Max-Change: 0.00024  
Iteration: 30, Log-Lik: -8006.781, Max-Change: 0.00011  
Iteration: 31, Log-Lik: -8006.781, Max-Change: 0.00009

# 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(ipar) - abs(opar)  
  
# Check max differnece  
max(iptest)

## [1] 1.22

# print to console  
iptest

## a1 d1 d2 d3 d4 d5 d6  
## HSinc1 0.089 0.092 0.385 0.130 -0.006 0.005 0.058  
## HSinc2 -0.037 -0.120 -0.066 -0.012 -0.074 -0.398 -0.095  
## HSinc3 -0.001 -0.036 -0.187 -0.139 0.297 0.193 0.243  
## HSinc4 0.146 0.343 -0.091 0.034 -0.038 -0.040 0.136  
## HSinc5 0.119 0.126 -0.009 -0.016 -0.017 -0.131 0.040  
## HSinc6 0.279 0.064 -0.049 -0.012 0.030 -0.075 -0.039  
## HSinc7 0.009 0.028 0.010 0.091 0.028 -0.104 -0.247  
## HSinc8 -0.176 -0.210 0.185 0.068 0.046 -0.151 -0.342  
## HSinc9 -0.028 -0.076 -0.012 -0.054 0.151 -0.020 -0.114  
## HSinc10 -0.152 0.076 0.100 -0.097 -0.062 0.034 0.344  
## HFair1 0.431 1.220 0.350 0.004 0.038 0.068 0.005  
## HFair2 -0.002 -0.324 0.071 0.026 0.039 0.118 -0.184  
## HFair3 -0.057 -0.155 0.088 -0.107 -0.070 0.050 0.019  
## HFair4 -0.111 -0.126 0.215 -0.048 0.101 0.094 -0.231  
## HFair5 0.010 -0.355 -0.273 -0.137 0.007 -0.043 0.016  
## HFair6 0.019 0.058 -0.052 -0.014 0.082 0.107 -0.047  
## HFair7 -0.089 -0.036 0.037 0.125 0.013 -0.141 0.798  
## HFair8 -0.207 -0.167 -0.140 -0.273 -0.326 -0.446 -0.111  
## HFair9 0.143 0.128 0.295 0.367 0.552 0.304 1.137  
## HFair10 0.059 -0.153 0.016 0.165 0.191 0.230 0.076  
## EAnxi1 0.128 0.194 0.233 0.165 0.286 -0.115 -0.007  
## EAnxi2 -0.113 -0.331 -0.118 -0.143 0.115 0.114 -0.104  
## EAnxi3 -0.086 -0.198 -0.236 -0.252 0.033 -0.235 -0.217  
## EAnxi4 -0.197 -0.253 -0.178 -0.108 -0.171 0.017 -0.108  
## EAnxi5 -0.105 -0.001 0.074 0.099 -0.121 -0.074 -0.203  
## EAnxi6 -0.033 -0.094 -0.084 -0.167 -0.441 -0.470 -0.157  
## EAnxi7 0.008 -0.203 0.057 -0.036 -0.111 -0.202 0.063  
## EAnxi8 0.048 -0.176 -0.137 -0.007 -0.043 0.109 0.509  
## EAnxi9 -0.026 -0.237 -0.118 -0.188 -0.010 0.142 -0.013  
## EAnxi10 -0.068 -0.031 -0.006 -0.121 -0.031 -0.140 0.078  
## EDepe1 -0.171 0.389 0.463 0.233 0.084 0.033 0.174  
## EDepe2 -0.002 0.039 -0.029 -0.059 -0.022 -0.109 -0.186  
## EDepe3 -0.001 0.533 0.332 0.259 0.091 0.067 0.145  
## EDepe4 -0.121 -0.184 -0.076 0.056 0.096 -0.089 -0.076  
## EDepe5 -0.005 0.142 -0.038 -0.086 0.159 0.161 0.094  
## EDepe6 -0.095 0.017 0.088 0.078 -0.128 -0.021 -0.224  
## EDepe7 -0.153 0.046 0.146 0.045 0.044 -0.036 0.062  
## EDepe8 -0.076 -0.468 -0.097 -0.104 -0.064 -0.194 -0.075  
## EDepe9 0.058 0.228 0.036 0.080 0.108 0.219 0.295  
## EDepe10 -0.318 -0.352 -0.097 -0.075 -0.178 -0.079 -0.083  
## XLive1 0.175 -0.068 0.139 -0.030 0.015 0.107 0.075  
## XLive2 -0.021 -0.200 -0.100 0.036 -0.046 -0.029 -0.073  
## XLive3 -0.088 -0.305 0.179 0.113 0.045 0.062 -0.147  
## XLive4 0.148 0.210 0.068 0.005 -0.156 0.182 0.147  
## XLive5 0.233 0.347 0.240 0.046 0.000 -0.035 0.330  
## XLive6 0.175 -0.405 -0.076 -0.014 0.092 -0.078 -0.037  
## XLive7 -0.027 0.297 0.119 -0.038 0.061 0.122 -0.038  
## XLive8 0.056 0.341 0.201 0.131 0.063 -0.054 -0.028  
## XLive9 0.196 0.327 0.055 0.127 0.159 -0.089 -0.119  
## XLive10 -0.070 -0.130 -0.138 -0.161 -0.076 0.134 0.165  
## AForg1 0.046 -0.003 -0.092 -0.043 0.050 0.308 0.718  
## AForg2 -0.129 -0.370 0.103 -0.052 0.085 -0.064 -0.050  
## AForg3 0.124 0.467 0.505 0.291 0.088 0.180 0.315  
## AForg4 0.025 0.049 -0.152 -0.026 -0.002 0.135 -0.003  
## AForg5 -0.102 -0.323 0.065 0.065 -0.061 -0.115 -0.064  
## AForg6 -0.245 -0.158 0.141 0.071 0.000 0.035 -0.152  
## AForg7 0.096 -0.032 0.153 0.109 -0.207 -0.003 0.060  
## AForg8 0.006 0.069 0.000 0.029 0.010 0.077 -0.070  
## AForg9 -0.058 0.070 -0.232 -0.176 -0.173 0.050 0.017  
## AForg10 0.090 0.066 0.057 0.021 0.048 0.285 0.274  
## APati1 -0.155 0.089 0.129 0.191 0.081 -0.200 0.036  
## APati2 0.033 -0.098 0.231 -0.035 -0.010 0.050 0.408  
## APati3 -0.073 0.277 0.010 0.097 0.037 0.019 0.184  
## APati4 -0.139 -0.104 -0.122 -0.144 0.191 0.115 0.512  
## APati5 0.118 0.093 0.024 0.042 -0.001 0.161 0.279  
## APati6 -0.140 0.230 0.028 -0.012 0.050 -0.324 -0.431  
## APati7 -0.048 0.360 -0.058 -0.038 -0.076 0.024 -0.169  
## APati8 -0.179 0.089 0.183 0.209 0.126 -0.344 -0.242  
## APati9 -0.236 -0.266 0.011 -0.028 -0.044 -0.120 -0.273  
## APati10 -0.112 0.161 0.130 0.162 -0.015 -0.050 -0.064  
## CPerf1 -0.266 -1.037 -0.667 -0.301 -0.368 0.202 0.204  
## CPerf2 -0.053 -0.307 -0.036 -0.018 0.014 0.046 0.282  
## CPerf3 0.050 -0.216 0.292 -0.102 -0.069 0.166 0.145  
## CPerf4 0.403 0.681 0.277 0.220 0.065 0.162 0.386  
## CPerf5 0.176 -0.086 0.209 0.072 0.138 -0.059 -0.012  
## CPerf6 -0.021 0.046 -0.020 0.061 -0.075 0.170 -0.065  
## CPerf7 0.088 -0.526 -0.027 -0.143 -0.128 0.005 0.364  
## CPerf8 -0.020 0.364 -0.187 0.101 0.041 0.103 0.087  
## CPerf9 -0.346 -0.118 0.019 -0.232 -0.220 -0.183 -0.351  
## CPerf10 0.060 -0.127 -0.083 -0.008 0.078 -0.051 -0.347  
## OInqu1 -0.119 0.628 0.016 -0.114 -0.255 -0.100 0.007  
## OInqu2 -0.059 0.220 0.197 -0.132 -0.162 -0.160 0.069  
## OInqu3 -0.147 -0.539 -0.016 -0.094 -0.211 -0.056 0.082  
## OInqu4 -0.177 -0.430 -0.242 -0.209 -0.298 -0.182 0.041  
## OInqu5 -0.280 -0.227 -0.076 -0.044 -0.055 0.107 0.097  
## OInqu6 -0.255 -0.186 -0.089 -0.214 -0.029 0.102 -0.144  
## OInqu7 -0.143 0.123 0.017 -0.033 -0.110 -0.084 -0.173  
## OInqu8 0.049 0.011 -0.177 -0.039 0.047 0.470 0.356  
## OInqu9 0.083 0.145 -0.026 0.062 0.008 0.085 0.046  
## OInqu10 -0.069 0.068 -0.040 -0.049 -0.152 -0.140 -0.026  
## OUnco1 0.072 0.326 0.387 0.142 0.292 -0.004 -0.080  
## OUnco2 -0.001 -0.182 0.103 0.119 0.205 0.190 -0.063  
## OUnco3 -0.002 -0.568 -0.016 0.067 0.059 0.002 0.078  
## OUnco4 -0.163 0.122 0.072 0.209 -0.074 -0.051 -0.254  
## OUnco5 -0.089 -0.318 -0.107 0.038 0.041 -0.073 -0.013  
## OUnco6 0.026 0.001 0.049 0.242 0.340 0.324 0.037  
## OUnco7 -0.002 0.305 0.148 -0.015 -0.033 -0.096 0.181  
## OUnco8 -0.071 -0.135 0.074 0.041 0.053 0.096 -0.016  
## OUnco9 -0.124 -0.024 -0.205 0.056 -0.146 0.074 0.483  
## OUnco10 -0.028 -0.053 -0.050 0.066 0.011 -0.076 -0.238

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