ch12-3.R

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Thu Dec 10 16:54:11 2015

data=read.csv("data.csv")  
model <- 'price =~ x1 + x2 + x3 + x4  
service =~ x5 + x6 + x7 + x8  
Atm =~ x9 + x10 + x11 + x12  
cs =~ y1 + y2 + y3 + y4  
cl =~ y5 + y6 + y7 + y8  
cs ~ price + service + Atm  
cl ~ price + cs'  
require(lavaan)

## Loading required package: lavaan  
## This is lavaan 0.5-20  
## lavaan is BETA software! Please report any bugs.

fit <- sem(model, data =data)  
summary(fit, fit.measures=TRUE)

## lavaan (0.5-20) converged normally after 42 iterations  
##   
## Number of observations 730  
##   
## Estimator ML  
## Minimum Function Test Statistic 680.880  
## Degrees of freedom 162  
## P-value (Chi-square) 0.000  
##   
## Model test baseline model:  
##   
## Minimum Function Test Statistic 9378.667  
## Degrees of freedom 190  
## P-value 0.000  
##   
## User model versus baseline model:  
##   
## Comparative Fit Index (CFI) 0.944  
## Tucker-Lewis Index (TLI) 0.934  
##   
## Loglikelihood and Information Criteria:  
##   
## Loglikelihood user model (H0) -16068.033  
## Loglikelihood unrestricted model (H1) -15727.593  
##   
## Number of free parameters 48  
## Akaike (AIC) 32232.067  
## Bayesian (BIC) 32452.533  
## Sample-size adjusted Bayesian (BIC) 32300.118  
##   
## Root Mean Square Error of Approximation:  
##   
## RMSEA 0.066  
## 90 Percent Confidence Interval 0.061 0.071  
## P-value RMSEA <= 0.05 0.000  
##   
## Standardized Root Mean Square Residual:  
##   
## SRMR 0.043  
##   
## Parameter Estimates:  
##   
## Information Expected  
## Standard Errors Standard  
##   
## Latent Variables:  
## Estimate Std.Err Z-value P(>|z|)  
## price =~   
## x1 1.000   
## x2 1.027 0.039 26.383 0.000  
## x3 1.118 0.042 26.599 0.000  
## x4 1.052 0.043 24.503 0.000  
## service =~   
## x5 1.000   
## x6 1.005 0.034 29.146 0.000  
## x7 0.982 0.037 26.839 0.000  
## x8 0.999 0.038 26.090 0.000  
## Atm =~   
## x9 1.000   
## x10 1.087 0.055 19.761 0.000  
## x11 1.057 0.054 19.492 0.000  
## x12 0.984 0.056 17.618 0.000  
## cs =~   
## y1 1.000   
## y2 1.074 0.050 21.515 0.000  
## y3 1.154 0.055 20.834 0.000  
## y4 1.089 0.054 20.046 0.000  
## cl =~   
## y5 1.000   
## y6 0.942 0.048 19.544 0.000  
## y7 0.908 0.046 19.724 0.000  
## y8 0.801 0.052 15.308 0.000  
##   
## Regressions:  
## Estimate Std.Err Z-value P(>|z|)  
## cs ~   
## price -0.079 0.055 -1.447 0.148  
## service 0.448 0.049 9.171 0.000  
## Atm 0.370 0.059 6.218 0.000  
## cl ~   
## price 0.355 0.036 9.944 0.000  
## cs 0.652 0.045 14.423 0.000  
##   
## Covariances:  
## Estimate Std.Err Z-value P(>|z|)  
## price ~~   
## service 0.453 0.035 13.089 0.000  
## Atm 0.381 0.032 12.078 0.000  
## service ~~   
## Atm 0.381 0.033 11.683 0.000  
##   
## Variances:  
## Estimate Std.Err Z-value P(>|z|)  
## x1 0.304 0.020 15.525 0.000  
## x2 0.241 0.017 14.300 0.000  
## x3 0.273 0.019 14.082 0.000  
## x4 0.356 0.023 15.725 0.000  
## x5 0.289 0.019 14.894 0.000  
## x6 0.217 0.016 13.436 0.000  
## x7 0.309 0.020 15.304 0.000  
## x8 0.358 0.023 15.723 0.000  
## x9 0.453 0.028 15.917 0.000  
## x10 0.335 0.024 13.968 0.000  
## x11 0.345 0.024 14.387 0.000  
## x12 0.486 0.030 16.239 0.000  
## y1 0.421 0.026 16.031 0.000  
## y2 0.320 0.022 14.417 0.000  
## y3 0.440 0.029 15.173 0.000  
## y4 0.470 0.030 15.841 0.000  
## y5 0.375 0.025 14.984 0.000  
## y6 0.426 0.027 15.931 0.000  
## y7 0.381 0.024 15.808 0.000  
## y8 0.681 0.038 17.707 0.000  
## price 0.590 0.045 12.975 0.000  
## service 0.691 0.051 13.681 0.000  
## Atm 0.494 0.046 10.674 0.000  
## cs 0.252 0.025 10.128 0.000  
## cl 0.106 0.016 6.598 0.000

diagram<-semPlot::semPaths(fit, "std", "hide", sizeLat = 15, shapeLat = "star",   
 shapeMan = "heart",  
 col = list(man = "pink", lat = "yellow"),   
 residuals = FALSE, borders = FALSE,  
 edge.color = "purple", XKCD = TRUE, edge.width = 2,  
 rotation = 2, layout = "tree2", fixedStyle = 1, mar = c(1, 3, 1, 3))

## Warning: running command ''/usr/bin/otool' -L '/Library/Frameworks/  
## R.framework/Resources/library/tcltk/libs//tcltk.so'' had status 69

