# LA City Model

*Abnormal Distributions*

*October 10, 2018*

## Import the Data and load required packages

```
if(!require(lavaan))   {install.packages("lavaan")}
```

```
## Loading required package: lavaan
```

```
## This is lavaan 0.6-2
```

```
## lavaan is BETA software! Please report any bugs.
```

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

```
## Loading required package: semPlot
```

```
ds = file.choose()
laCityData = read.csv(ds, header=TRUE)
```

## Run the Model

This model is based off of theory found in Witters, D. (2016).

```
biFactorModel = "Health =~ Health.Clinics + Mental.Health.Centers + Public.Health.Programs + Mental.Heal
                 Community.Wellness =~ Unemployment.Rate + Violent.Crime.STD + Property.Crime.STD + Teen
                 Community.Wellness ~ Health"


biFactor = sem(biFactorModel, data = na.omit(laCityData))
```

```
## Warning in lav_data_full(data = data, group = group, cluster = cluster, :
## lavaan WARNING: some observed variances are (at least) a factor 1000 times
## larger than others; use varTable(fit) to investigate
```

```
## Warning in lav_object_post_check(object): lavaan WARNING: some estimated ov
## variances are negative
```

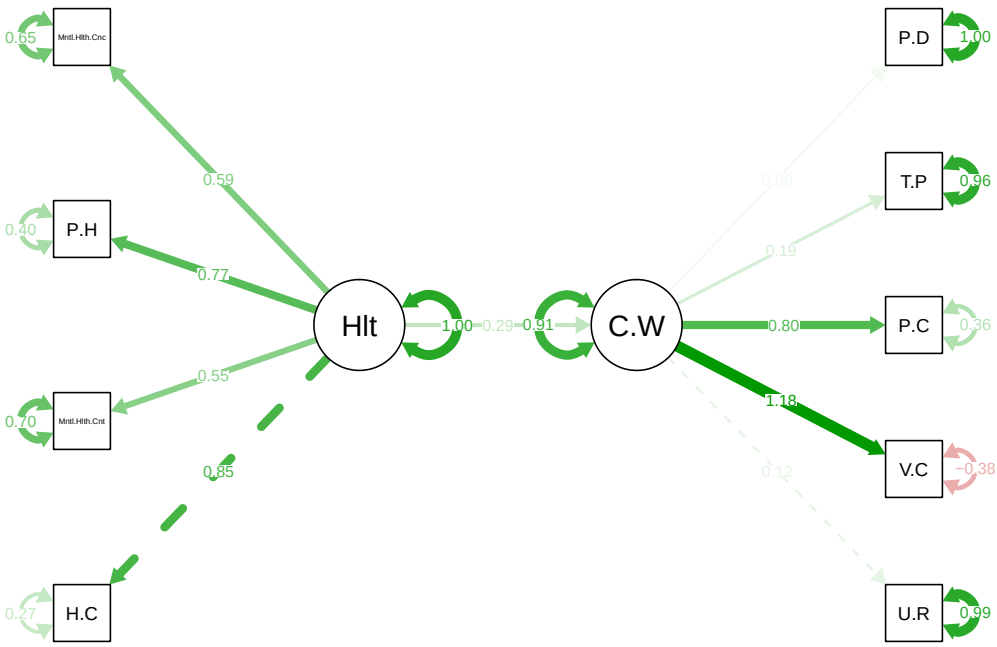
```
summary(biFactor, fit.measures=TRUE, standardized=TRUE)
```

```
## lavaan 0.6-2 ended normally after 126 iterations
##
##   Optimization method                           NLMINB
##   Number of free parameters                         19
##
##   Number of observations                            53
##
##   Estimator                                         ML
##   Model Fit Test Statistic                      46.413
##   Degrees of freedom                                26
##   P-value (Chi-square)                           0.008
##
## Model test baseline model:
```

```
##
##   Minimum Function Test Statistic              242.238
##   Degrees of freedom                               36
##   P-value                                       0.000
##
## User model versus baseline model:
##
##   Comparative Fit Index (CFI)                    0.901
##   Tucker-Lewis Index (TLI)                       0.863
##
## Loglikelihood and Information Criteria:
##
##   Loglikelihood user model (H0)               -468.590
##   Loglikelihood unrestricted model (H1)       -445.383
##
##   Number of free parameters                        19
##   Akaike (AIC)                                975.180
##   Bayesian (BIC)                             1012.615
##   Sample-size adjusted Bayesian (BIC)         952.936
##
## Root Mean Square Error of Approximation:
##
##   RMSEA                                          0.122
##   90 Percent Confidence Interval          0.061  0.178
##   P-value RMSEA <= 0.05                          0.030
##
## Standardized Root Mean Square Residual:
##
##   SRMR                                           0.142
##
## Parameter Estimates:
##
##   Information                                 Expected
##   Information saturated (h1) model          Structured
##   Standard Errors                             Standard
##
## Latent Variables:
##                        Estimate  Std.Err  z-value  P(>|z|)   Std.lv
##   Health =~
##     Health.Clinics         1.000                               1.274
##     Mntl.Hlth.Cntr         1.541    0.401    3.842    0.000    1.963
##     Pblc.Hlth.Prgr         0.671    0.126    5.323    0.000    0.855
##     Mntl.Hlth.Cncl         0.964    0.232    4.162    0.000    1.228
##   Community.Wellness =~
##     Unemploymnt.Rt         1.000                               0.237
##     Violnt.Crm.STD         6.229    5.341    1.166    0.244    1.475
##     Prprty.Crm.STD         3.883    3.074    1.263    0.207    0.919
##     Ten.Prgnncy.Rt         0.014    0.012    1.127    0.260    0.003
##     Percent.Drp.Ot         0.050    0.085    0.592    0.554    0.012
##   Std.all
##
##     0.854
##     0.551
##     0.774
```

```
##     0.593
##
##     0.116
##     1.177
##     0.801
##     0.192
##     0.058
##
## Regressions:
##                        Estimate  Std.Err  z-value  P(>|z|)   Std.lv
##   Community.Wellness ~
##     Health                0.054    0.056    0.970    0.332    0.292
##   Std.all
##
##     0.292
##
## Variances:
##                    Estimate  Std.Err  z-value  P(>|z|)   Std.lv  Std.all
##    .Health.Clinics    0.600    0.254    2.366    0.018    0.600    0.270
##    .Mntl.Hlth.Cntr    8.861    1.879    4.717    0.000    8.861    0.697
##    .Pblc.Hlth.Prgr    0.491    0.142    3.456    0.001    0.491    0.402
##    .Mntl.Hlth.Cncl    2.774    0.603    4.603    0.000    2.774    0.648
##    .Unemploymnt.Rt    4.116    0.794    5.184    0.000    4.116    0.987
##    .Violnt.Crm.STD   -0.604    0.416   -1.453    0.146   -0.604   -0.384
##    .Prprty.Crm.STD    0.472    0.179    2.632    0.008    0.472    0.358
##    .Ten.Prgnncy.Rt    0.000    0.000    5.225    0.000    0.000    0.963
##    .Percent.Drp.Ot    0.042    0.008    5.158    0.000    0.042    0.997
##     Health            1.623    0.473    3.432    0.001    1.000    1.000
##    .Commnty.Wllnss    0.051    0.084    0.614    0.539    0.915    0.915
```

```
semPaths(biFactor, what = "stand", rotation = 2)
```




```
### THIS CODE IS IF YOU WANT TO OUTPUT THE FACTOR LOADING SCORES TO A CSV
## zip.scores = data.frame(lavPredict(biFactor))
## write.csv(zip.scores, "zipscores.csv")
#3 usableData = na.omit(laCityData)
#3 rownames(useableData) = c(1:53)
## rownames(useableData)
## sort( merge.data.frame(zip.scores, useableData, by = "row.names"))
```