S3 File. Code, outcome parameters, and graphical information for the penalized regression using the elastic net via the R packages glmnet and selectiveInference.

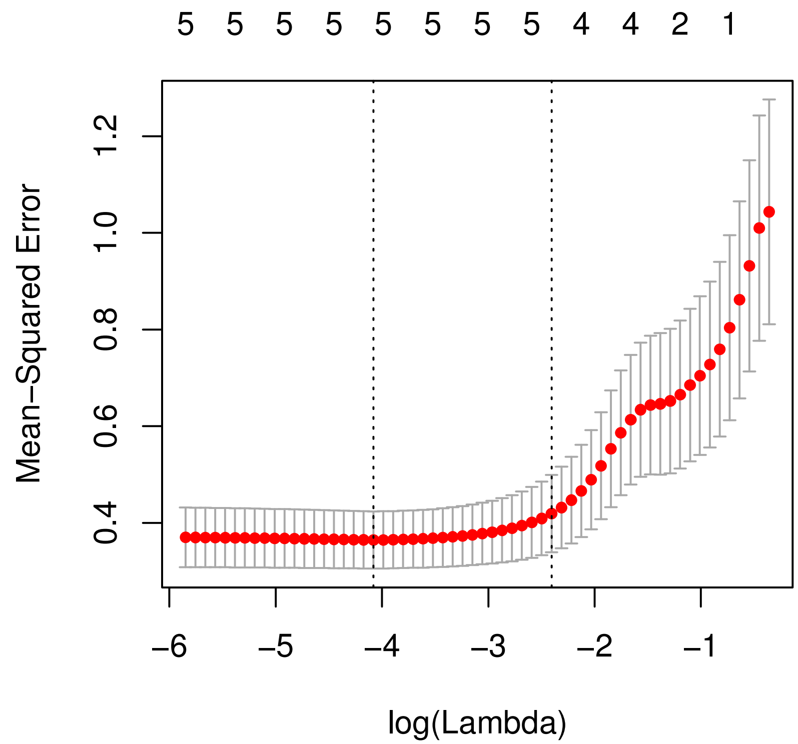
```
# create matrix from x variables (predictors) and standardize
  x_matrix_tmp <- data.frame(data1$age, data1$v_cn_diff, data1$telo, data1$coke_yrs, data1$alc_yrs)
# subset the dataframe
  x_matrix <- data.matrix(x_matrix_tmp) # convert subsetted data frame to matrix
  xdata.z <- scale(x_matrix, center=T, scale=T)

# create vector for y variable (dti, dependent) and standardize
  y_vector <- as.vector(data1$rd_coke)
  ydata.z <- scale(y_vector, center=T, scale=T)

# run elastic net (lasso/ridge special case anchors) with LOOCV as per Finch and Finch article
  glmnet1.cv <- cv.glmnet(xdata.z,ydata.z, standardize = FALSE, type.measure="mse", nfolds=22)

# obtain lambda with min MSE
 glmnet1.cv$lambda.min
[1] 0.01899326

# obtain coeficients from model with optimal lambda value
 coef(glmnet1.cv,s = "lambda.min")

                 1
(Intercept)      -8.245236e-16
data1.age        3.754791e-01
data1.et_diff    3.279492e-01
data1.telo       -3.307578e-01
data1.coke_yrs   6.068837e-01
data1.alc_yrs    7.078269e-02

  # obtain r-squared from best fitted model
  r2 <- glmnet1.cv$glmnet.fit$dev.ratio[which(glmnet1.cv$glmnet.fit$lambda == glmnet1.cv$lambda.min)]
  r2
[1] 0.78524

  # examine relationship between coefficient values and model fit (as R-squared)
   glmnet2.z <- glmnet(xdata.z,ydata.z,alpha=1, standardize=FALSE, nlambda=100)
   plot(glmnet2.z, xvar="dev", label=TRUE, ylab=c("Regression Coefficient"), xlab=c("R Squared"))
```

```
# use selectiveinference package for covariance test estimate
# of the null hypothesis = no relationship with the dependent variable

 lasso.sigma <- estimateSigma(xdata.z,ydata.z, intercept=FALSE, standardize=FALSE)
 lasso.beta <- coef(glmnet2.z, glmnet1.cv$lambda.min )[-1]
 lasso.inference <- fixedLassoInf(xdata.z,ydata.z, lasso.beta, glmnet1.cv$lambda.min, sigma=lasso.sigma$sigmahat)

Call:
fixedLassoInf(x = xdata.z, y = ydata.z, beta = lasso.beta, lambda = glmnet1.cv$lambda.min,
    sigma = lasso.sigma$sigmahat)

Standard deviation of noise (specified or estimated) sigma = 0.546

Testing results at lambda = 0.019, with alpha = 0.100

 Var   Coef Z-score P-value LowCI   UpCI   LowTailArea UpTailArea
   1  0.375   2.862   0.004    0.148   0.595      0.048      0.050
   2  0.327   2.453   0.014    0.088   0.547      0.049      0.049
   3 -0.330  -2.363   0.047   -0.560  -0.004      0.049      0.049
   4  0.606   3.884   0.000    0.352   1.048      0.050      0.049
   5  0.075   0.540   0.592   -0.721   0.280      0.050      0.049

 Var labels: 1. data1.age  2. data1.et_diff   3. data1.telo  4. data1.coke_yrs  5. data1.alc_yrs

 sink() # write output


# examine fit parameters (variance) across the range of lambda from glmnet fit
> print(glmnet1.cv$glmnet.fit)

Call:  glmnet(x = xdata.z, y = ydata.z, standardize = FALSE)

     Df    %Dev   Lambda
 [1,]  0 0.00000 0.698600
 [2,]  1 0.09095 0.636600
 [3,]  1 0.16650 0.580000
 [4,]  1 0.22920 0.528500
 [5,]  1 0.28120 0.481500
 [6,]  1 0.32440 0.438800
 [7,]  1 0.36030 0.399800
 [8,]  1 0.39010 0.364300
```

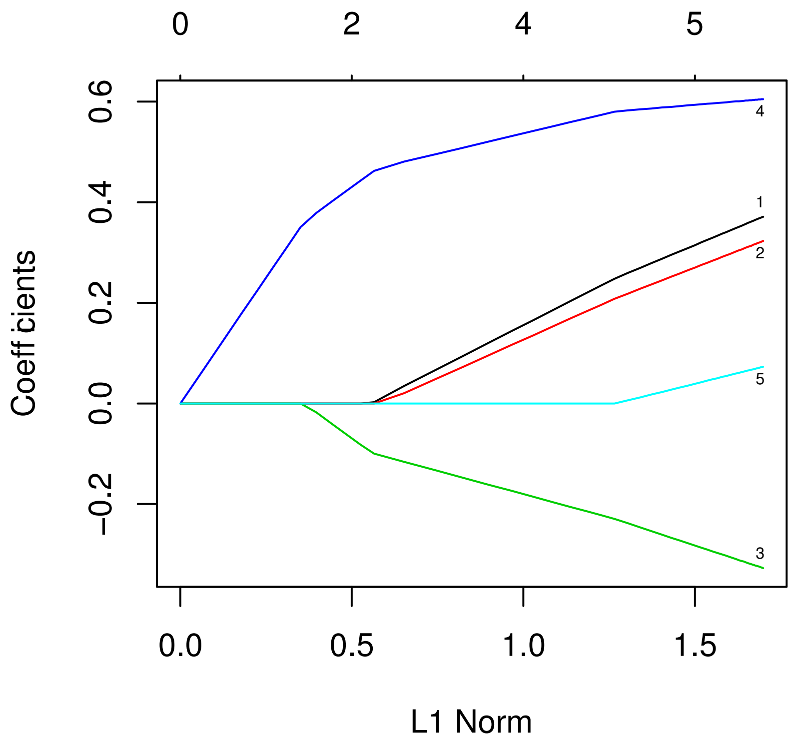
```
 [9,]  2 0.42360 0.331900
[10,]  2 0.45490 0.302400
[11,]  2 0.48090 0.275600
[12,]  2 0.50250 0.251100
[13,]  3 0.52200 0.228800
[14,]  4 0.56220 0.208500
[15,]  4 0.59970 0.189900
[16,]  4 0.63080 0.173100
[17,]  4 0.65670 0.157700
[18,]  4 0.67810 0.143700
[19,]  4 0.69600 0.130900
[20,]  4 0.71080 0.119300
[21,]  4 0.72300 0.108700
[22,]  4 0.73320 0.099030
[23,]  4 0.74170 0.090230
[24,]  4 0.74870 0.082220
[25,]  5 0.75520 0.074910
[26,]  5 0.76060 0.068260
[27,]  5 0.76510 0.062190
[28,]  5 0.76890 0.056670
[29,]  5 0.77200 0.051630
[30,]  5 0.77460 0.047050
[31,]  5 0.77670 0.042870
[32,]  5 0.77850 0.039060
[33,]  5 0.78000 0.035590
[34,]  5 0.78120 0.032430
[35,]  5 0.78220 0.029550
[36,]  5 0.78310 0.026920
[37,]  5 0.78380 0.024530
[38,]  5 0.78440 0.022350
[39,]  5 0.78480 0.020370
[40,]  5 0.78520 0.018560
[41,]  5 0.78560 0.016910
[42,]  5 0.78590 0.015410
[43,]  5 0.78610 0.014040
[44,]  5 0.78630 0.012790
[45,]  5 0.78640 0.011650
[46,]  5 0.78660 0.010620
[47,]  5 0.78670 0.009675
[48,]  5 0.78680 0.008816
[49,]  5 0.78680 0.008033
```

```
[50,]  5 0.78690 0.007319
[51,]  5 0.78700 0.006669
[52,]  5 0.78700 0.006076
[53,]  5 0.78700 0.005537
[54,]  5 0.78710 0.005045
[55,]  5 0.78710 0.004597
[56,]  5 0.78710 0.004188
[57,]  5 0.78710 0.003816
[58,]  5 0.78710 0.003477
[59,]  5 0.78710 0.003168
[60,]  5 0.78720 0.002887
[61,]  5 0.78720 0.002630
[62,]  5 0.78720 0.002397


glmnet1.cv$lambda.min   # obtain lambda with min MSE
[1] 0.0190806

> # obtain r-squared from best fitted model
> r2 <- glmnet1.cv$glmnet.fit$dev.ratio[which(glmnet1.cv$glmnet.fit$lambda == glmnet1.cv$lambda.min)]
> r2
[1] 0.7852

> RMSE <- sqrt(glmnet1.cv$lambda.min)
> RMSE
[1] 0.130031
```

```
> plot(glmnet1.cv)
```

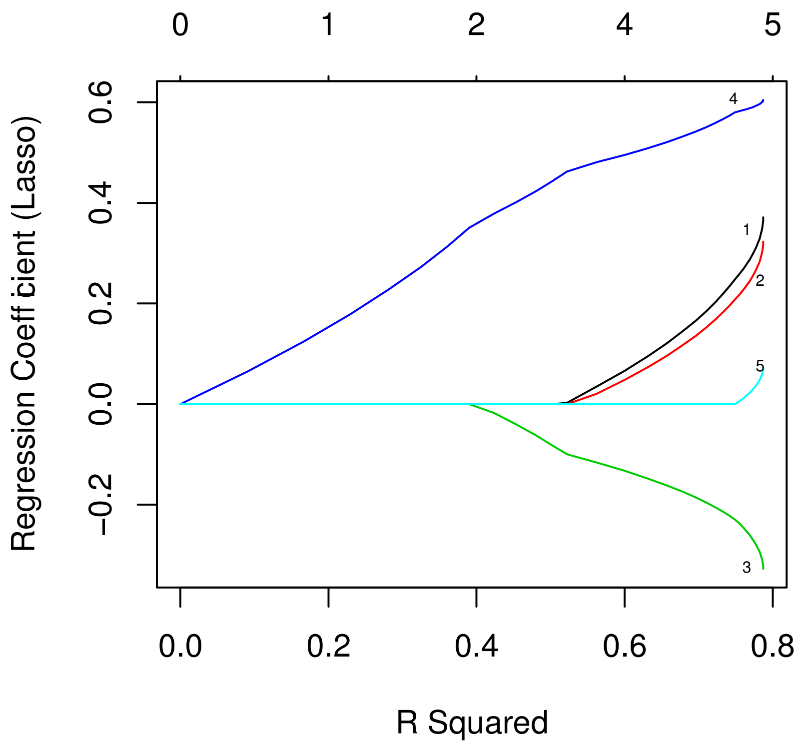


> plot(glmnet1.cv$glmnet.fit, xdata.z = "dev", label = TRUE)



1. Age
2. Anti-saccade (drift rate difference: cocaine vs. non-drug)
3. Telomere length
4. Years of cocaine use
5. Years of alcohol use

```
> plot(glmnet2.z, xvar="dev", label=TRUE, ylab=c("Regression Coefficient (Lasso)"), xlab=c("R Squared"))
```



1. Age
2. Anti-saccade (drift rate difference: cocaine vs. non-drug)
3. Telomere length
4. Years of cocaine use
5. Years of alcohol use