Hypothesis testing

```
library(knitr)
library(rmarkdown)
library(dplyr)
```

```
##
## Attaching package: 'dplyr'

## The following objects are masked from 'package:stats':
##
##     filter, lag

## The following objects are masked from 'package:base':
##
##     intersect, setdiff, setequal, union
```

R Markdown

This is an R Markdown document. Markdown is a simple formatting syntax for authoring HTML, PDF, and MS Word documents. For more details on using R Markdown see http://rmarkdown.rstudio.com.

When you click the **Knit** button a document will be generated that includes both content as well as the output of any embedded R code chunks within the document. You can embed an R code chunk like this:

```
data <- read.csv("C:\\Users\\fairy\\Desktop\\Replication\\Final_data_hypothesis_testing.csv")
head(data)
```

```
##   Index User Scenario FEATURE THPARTY WTP ORDPREF PROFFER AGE GENDER INCOME
## 1     0    1        1       0       1   0       1    2.24  26      0 139665
## 2     1    1        1       1       0   1       1    2.24  26      0 139665
## 3     2    1        2       0       1   0       1    1.24  26      0 139665
## 4     3    1        2       1       0   1       1    1.24  26      0 139665
## 5     4    1        3       0       0   1       1    1.99  26      0 139665
## 6     5    1        3       1       1   0       1    1.99  26      0 139665
##   RISKBEH RISKPERC MOBBEH LSLFCONF OWNEXP OTHEXP HEAREXP HomeExpDum MedRecDum
## 1       7        4      2        2      2      2       2          0         0
## 2       7        4      2        2      2      2       2          0         0
## 3       7        4      2        2      2      2       2          0         1
## 4       7        4      2        2      2      2       2          0         1
## 5       7        4      2        2      2      2       2          0         1
## 6       7        4      2        2      2      2       2          0         0
##   PwdDum
## 1      1
## 2      1
## 3      0
```

```
## 4      0
## 5      0
## 6      1
```

Including Plots

You can also embed plots, for example:

```
str(data)
```

```
## 'data.frame':    13920 obs. of  21 variables:
##  $ Index     : int  0 1 2 3 4 5 6 7 8 9 ...
##  $ User      : int  1 1 1 1 1 1 1 1 1 1 ...
##  $ Scenario  : int  1 1 2 2 3 3 4 4 5 5 ...
##  $ FEATURE   : int  0 1 0 1 0 1 0 1 0 1 ...
##  $ THPARTY   : int  1 0 1 0 0 1 1 1 0 1 ...
##  $ WTP       : int  0 1 0 1 1 0 0 1 1 1 ...
##  $ ORDPREF   : int  1 1 1 1 1 1 1 1 1 1 ...
##  $ PROFFER   : num  2.24 2.24 1.24 1.24 1.99 1.99 1.24 1.24 0.24 0.24 ...
##  $ AGE       : int  26 26 26 26 26 26 26 26 26 26 ...
##  $ GENDER    : int  0 0 0 0 0 0 0 0 0 0 ...
##  $ INCOME    : int  139665 139665 139665 139665 139665 139665 139665 139665 139665 139665 ...
##  $ RISKBEH   : int  7 7 7 7 7 7 7 7 7 7 ...
##  $ RISKPERC  : int  4 4 4 4 4 4 4 4 4 4 ...
##  $ MOBBEH    : int  2 2 2 2 2 2 2 2 2 2 ...
##  $ LSLFCONF  : int  2 2 2 2 2 2 2 2 2 2 ...
##  $ OWNEXP    : int  2 2 2 2 2 2 2 2 2 2 ...
##  $ OTHEXP    : int  2 2 2 2 2 2 2 2 2 2 ...
##  $ HEAREXP   : int  2 2 2 2 2 2 2 2 2 2 ...
##  $ HomeExpDum: int  0 0 0 0 0 0 0 0 1 0 ...
##  $ MedRecDum : int  0 0 1 1 1 0 1 1 0 0 ...
##  $ PwdDum    : int  1 1 0 0 0 1 0 0 0 1 ...
```

```
model <- glm(WTP ~ FEATURE + THPARTY + PROFFER + ORDPREF +
                   RISKBEH + RISKPERC + LSLFCONF + MOBBEH +
                   OWNEXP + OTHEXP + HEAREXP + AGE + INCOME +
                   GENDER + HomeExpDum + MedRecDum,
                   data = data, family = "binomial")
summary(model)
```

```
##
## Call:
## glm(formula = WTP ~ FEATURE + THPARTY + PROFFER + ORDPREF + RISKBEH +
##     RISKPERC + LSLFCONF + MOBBEH + OWNEXP + OTHEXP + HEAREXP +
##     AGE + INCOME + GENDER + HomeExpDum + MedRecDum, family = "binomial",
##     data = data)
##
## Deviance Residuals:
##     Min       1Q   Median       3Q      Max
## -1.4368  -1.0199  -0.9375   1.0442   1.4668
##
## Coefficients:
```

```
##               Estimate Std. Error z value Pr(>|z|)
## (Intercept) -5.176e-01  1.315e-01  -3.936 8.29e-05 ***
## FEATURE      8.386e-01  3.468e-02  24.180  < 2e-16 ***
## THPARTY     -3.805e-02  3.470e-02  -1.096   0.2729
## PROFFER      1.929e-03  2.013e-02   0.096   0.9237
## ORDPREF      8.669e-02  3.563e-02   2.433   0.0150 *
## RISKBEH      9.684e-04  8.688e-03   0.111   0.9112
## RISKPERC     3.139e-03  9.324e-03   0.337   0.7363
## LSLFCONF    -3.637e-02  2.158e-02  -1.686   0.0919 .
## MOBBEH       1.444e-03  8.699e-03   0.166   0.8682
## OWNEXP       1.167e-02  2.170e-02   0.538   0.5909
## OTHEXP      -1.183e-02  2.132e-02  -0.555   0.5791
## HEAREXP     -5.916e-03  2.151e-02  -0.275   0.7833
## AGE          2.968e-03  1.281e-03   2.316   0.0205 *
## INCOME       1.515e-08  3.347e-07   0.045   0.9639
## GENDER       5.275e-03  3.512e-02   0.150   0.8806
## HomeExpDum  -5.779e-03  4.249e-02  -0.136   0.8918
## MedRecDum   -5.648e-02  4.249e-02  -1.329   0.1838
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
##     Null deviance: 19294  on 13919  degrees of freedom
## Residual deviance: 18678  on 13903  degrees of freedom
## AIC: 18712
##
## Number of Fisher Scoring iterations: 4
```

```
# filter to just security features == 1
security_feature_data = data %>% filter(FEATURE == 1) %>% select(-FEATURE)
security_feature_data %>% head()
```

```
##   Index User Scenario THPARTY WTP ORDPREF PROFFER AGE GENDER INCOME RISKBEH
## 1     1    1        1       0   1       1    2.24  26      0 139665       7
## 2     3    1        2       0   1       1    1.24  26      0 139665       7
## 3     5    1        3       1   0       1    1.99  26      0 139665       7
## 4     7    1        4       1   1       1    1.24  26      0 139665       7
## 5     9    1        5       1   1       1    0.24  26      0 139665       7
## 6    11    1        6       1   0       1    1.49  26      0 139665       7
##   RISKPERC MOBBEH LSLFCONF OWNEXP OTHEXP HEAREXP HomeExpDum MedRecDum PwdDum
## 1        4      2        2      2      2       2          0         0      1
## 2        4      2        2      2      2       2          0         1      0
## 3        4      2        2      2      2       2          0         0      1
## 4        4      2        2      2      2       2          0         1      0
## 5        4      2        2      2      2       2          0         0      1
## 6        4      2        2      2      2       2          0         0      1
```

```
head(security_feature_data)
```

```
##   Index User Scenario THPARTY WTP ORDPREF PROFFER AGE GENDER INCOME RISKBEH
## 1     1    1        1       0   1       1    2.24  26      0 139665       7
## 2     3    1        2       0   1       1    1.24  26      0 139665       7
```

```
## 3     5    1        3       1   0       1    1.99  26      0 139665       7
## 4     7    1        4       1   1       1    1.24  26      0 139665       7
## 5     9    1        5       1   1       1    0.24  26      0 139665       7
## 6    11    1        6       1   0       1    1.49  26      0 139665       7
##   RISKPERC MOBBEH LSLFCONF OWNEXP OTHEXP HEAREXP HomeExpDum MedRecDum PwdDum
## 1        4      2        2      2      2       2          0         0      1
## 2        4      2        2      2      2       2          0         1      0
## 3        4      2        2      2      2       2          0         0      1
## 4        4      2        2      2      2       2          0         1      0
## 5        4      2        2      2      2       2          0         0      1
## 6        4      2        2      2      2       2          0         0      1
```

```r
#Logistic regression on security features
#Logistic regression
#FEATURE excluded
model_security <- glm(WTP ~ + THPARTY + PROFFER + ORDPREF +
                      RISKBEH + RISKPERC + LSLFCONF + MOBBEH +
                      OWNEXP + OTHEXP + HEAREXP + AGE + INCOME +
                      GENDER + HomeExpDum + MedRecDum,
                      data = security_feature_data, family = "binomial")
summary(model_security)
```

```
##
## Call:
## glm(formula = WTP ~ +THPARTY + PROFFER + ORDPREF + RISKBEH +
##     RISKPERC + LSLFCONF + MOBBEH + OWNEXP + OTHEXP + HEAREXP +
##     AGE + INCOME + GENDER + HomeExpDum + MedRecDum, family = "binomial",
##     data = security_feature_data)
##
## Deviance Residuals:
##     Min       1Q   Median       3Q      Max
## -1.4910  -1.3282   0.9777   1.0250   1.1326
##
## Coefficients:
##               Estimate Std. Error z value Pr(>|z|)
## (Intercept)  1.575e-01  1.835e-01   0.858   0.3909
## THPARTY      1.095e-02  4.885e-02   0.224   0.8226
## PROFFER      3.137e-02  2.833e-02   1.107   0.2682
## ORDPREF      1.125e-01  5.024e-02   2.238   0.0252 *
## RISKBEH     -1.584e-03  1.223e-02  -0.130   0.8969
## RISKPERC     1.365e-02  1.312e-02   1.040   0.2983
## LSLFCONF    -4.856e-02  3.034e-02  -1.600   0.1095
## MOBBEH      -2.556e-03  1.225e-02  -0.209   0.8347
## OWNEXP       1.497e-02  3.053e-02   0.490   0.6239
## OTHEXP      -8.257e-03  3.003e-02  -0.275   0.7833
## HEAREXP      1.214e-02  3.029e-02   0.401   0.6886
## AGE          4.135e-03  1.803e-03   2.293   0.0219 *
## INCOME       3.069e-08  4.707e-07   0.065   0.9480
## GENDER       4.003e-02  4.942e-02   0.810   0.4180
## HomeExpDum  -6.875e-02  5.976e-02  -1.151   0.2499
## MedRecDum   -7.438e-02  5.995e-02  -1.241   0.2147
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
```

```
## (Dispersion parameter for binomial family taken to be 1)
##
##     Null deviance: 9436.9  on 6988  degrees of freedom
## Residual deviance: 9419.8  on 6973  degrees of freedom
## AIC: 9451.8
##
## Number of Fisher Scoring iterations: 4
```