Expriments for Trust

Group

```r
# Load the expriment's data
dmt <- read.csv("./cleaneddata/mturk.csv")
head(dmt)
```

```
##          Q6                                             Q7     FL_3_DO
## 1 Ketogenic                                                   MControl
## 2  Pritikin I do not trust what the speaker was saying. FTreatment
## 3  Pritikin       I trust what the speaker was saying.   FControl
## 4  Pritikin I do not trust what the speaker was saying. FTreatment
## 5  Pritikin       I trust what the speaker was saying.   FControl
## 6     Paleo                                                   MTreatment
```

```r
summary(dmt)
```

```
##          Q6                                             Q7
## ##            :  4                                          :276
## ##  Ketogenic:144   I do not trust what the speaker was saying.: 31
## ##  Paleo    :127   I trust what the speaker was saying.       :123
## ##  Pritikin :155
## ##       FL_3_DO
## ##  FControl  :109
## ##  FTreatment:106
## ##  MControl  :110
## ##  MTreatment:105
```

```r
# Adding columns for control, treatment and clusters (M, F)
t = c("FTreatment", "MTreatment")
s = c("FTreatment", "FControl")
dmt$treat = ifelse(dmt$FL_3_DO %in% t, 1, 0 )
dmt$female = ifelse(dmt$FL_3_DO %in% s, 1, 0)
dmt$trust = ifelse(dmt$Q7 == "I trust what the speaker was saying.", 1,
                   ifelse (dmt$Q6 != "Pritikin" | dmt$Q7 == "", NA, 0))
```

```r
head(dmt, 100)
```

```
##          Q6                                             Q7     FL_3_DO treat
## 1    Ketogenic                                                   MControl     0
## 2     Pritikin I do not trust what the speaker was saying. FTreatment     1
## 3     Pritikin       I trust what the speaker was saying.   FControl     0
## 4     Pritikin I do not trust what the speaker was saying. FTreatment     1
## 5     Pritikin       I trust what the speaker was saying.   FControl     0
## 6        Paleo                                                   MTreatment     1
## 7    Ketogenic                                                   MControl     0
## 8     Pritikin I do not trust what the speaker was saying. FTreatment     1
## 9     Pritikin       I trust what the speaker was saying.   MControl     0
## 10    Pritikin       I trust what the speaker was saying.   FControl     0
## 11    Pritikin I do not trust what the speaker was saying. MTreatment     1
## 12    Pritikin I do not trust what the speaker was saying. MTreatment     1
## 13   Ketogenic                                                   FControl     0
## 14   Ketogenic                                                   MControl     0
## 15       Paleo                                                   FTreatment     1
```

```
## 16      Paleo                                              MTreatment   1
## 17  Ketogenic                                              FTreatment   1
## 18  Ketogenic                                                FControl   0
## 19      Paleo                                                FControl   0
## 20   Pritikin           I trust what the speaker was saying. FTreatment   1
## 21      Paleo                                              MTreatment   1
## 22   Pritikin I do not trust what the speaker was saying.   MControl   0
## 23  Ketogenic                                              MTreatment   1
## 24      Paleo                                              FTreatment   1
## 25      Paleo                                                FControl   0
## 26   Pritikin           I trust what the speaker was saying. FTreatment   1
## 27   Pritikin I do not trust what the speaker was saying. MTreatment   1
## 28  Ketogenic                                                MControl   0
## 29   Pritikin           I trust what the speaker was saying. MTreatment   1
## 30   Pritikin           I trust what the speaker was saying. FTreatment   1
## 31   Pritikin           I trust what the speaker was saying.   MControl   0
## 32      Paleo                                                FControl   0
## 33   Pritikin           I trust what the speaker was saying.   MControl   0
## 34   Pritikin           I trust what the speaker was saying.   FControl   0
## 35      Paleo                                              FTreatment   1
## 36                                                         MTreatment   1
## 37                                                           MControl   0
## 38                                                           MControl   0
## 39                                                           FControl   0
## 40  Ketogenic                                              MTreatment   1
## 41      Paleo                                                MControl   0
## 42   Pritikin           I trust what the speaker was saying. FTreatment   1
## 43      Paleo                                                MControl   0
## 44      Paleo                                              FTreatment   1
## 45  Ketogenic                                                FControl   0
## 46      Paleo                                                FControl   0
## 47  Ketogenic                                              MTreatment   1
## 48  Ketogenic                                              MTreatment   1
## 49      Paleo                                              FTreatment   1
## 50      Paleo                                              FTreatment   1
## 51      Paleo                                                MControl   0
## 52  Ketogenic                                                FControl   0
## 53      Paleo                                                MControl   0
## 54   Pritikin           I trust what the speaker was saying. MTreatment   1
## 55      Paleo                                                MControl   0
## 56   Pritikin                                              FTreatment   1
## 57  Ketogenic                                              FTreatment   1
## 58  Ketogenic                                              MTreatment   1
## 59   Pritikin           I trust what the speaker was saying.   FControl   0
## 60  Ketogenic                                                FControl   0
## 61      Paleo                                              MTreatment   1
## 62      Paleo                                              FTreatment   1
## 63      Paleo                                                FControl   0
## 64  Ketogenic                                                MControl   0
## 65  Ketogenic                                                MControl   0
## 66  Ketogenic                                              FTreatment   1
## 67      Paleo                                              MTreatment   1
## 68  Ketogenic                                              MTreatment   1
## 69      Paleo                                                FControl   0
```

2

```
## 70      Paleo                                                  FControl    0
## 71      Paleo                                                  FTreatment  1
## 72      Paleo                                                  MControl    0
## 73   Pritikin I do not trust what the speaker was saying. FTreatment  1
## 74   Pritikin         I trust what the speaker was saying.  FControl    0
## 75      Paleo                                                  MTreatment  1
## 76   Pritikin         I trust what the speaker was saying. MTreatment  1
## 77  Ketogenic                                                  FTreatment  1
## 78   Pritikin         I trust what the speaker was saying.   MControl    0
## 79      Paleo                                                  FControl    0
## 80  Ketogenic                                                  FControl    0
## 81  Ketogenic                                                  FTreatment  1
## 82      Paleo                                                  MControl    0
## 83      Paleo                                                  MTreatment  1
## 84      Paleo                                                  FTreatment  1
## 85   Pritikin I do not trust what the speaker was saying.   MControl    0
## 86  Ketogenic                                                  FControl    0
## 87   Pritikin         I trust what the speaker was saying. MTreatment  1
## 88      Paleo                                                  FControl    0
## 89  Ketogenic                                                  MControl    0
## 90   Pritikin         I trust what the speaker was saying.   FControl    0
## 91  Ketogenic                                                  FTreatment  1
## 92      Paleo                                                  FTreatment  1
## 93   Pritikin         I trust what the speaker was saying.   FControl    0
## 94  Ketogenic                                                  MControl    0
## 95      Paleo                                                  FTreatment  1
## 96  Ketogenic                                                  MTreatment  1
## 97      Paleo                                                  MControl    0
## 98   Pritikin         I trust what the speaker was saying. FTreatment  1
## 99   Pritikin         I trust what the speaker was saying.   FControl    0
## 100     Paleo                                                  MTreatment  1
##     female trust
## 1        0    NA
## 2        1     0
## 3        1     1
## 4        1     0
## 5        1     1
## 6        0    NA
## 7        0    NA
## 8        1     0
## 9        0     1
## 10       1     1
## 11       0     0
## 12       0     0
## 13       1    NA
## 14       0    NA
## 15       1    NA
## 16       0    NA
## 17       1    NA
## 18       1    NA
## 19       1    NA
## 20       1     1
## 21       0    NA
## 22       0     0
```

```
## 23     0    NA
## 24     1    NA
## 25     1    NA
## 26     1     1
## 27     0     0
## 28     0    NA
## 29     0     1
## 30     1     1
## 31     0     1
## 32     1    NA
## 33     0     1
## 34     1     1
## 35     1    NA
## 36     0    NA
## 37     0    NA
## 38     0    NA
## 39     1    NA
## 40     0    NA
## 41     0    NA
## 42     1     1
## 43     0    NA
## 44     1    NA
## 45     1    NA
## 46     1    NA
## 47     0    NA
## 48     0    NA
## 49     1    NA
## 50     1    NA
## 51     0    NA
## 52     1    NA
## 53     0    NA
## 54     0     1
## 55     0    NA
## 56     1    NA
## 57     1    NA
## 58     0    NA
## 59     1     1
## 60     1    NA
## 61     0    NA
## 62     1    NA
## 63     1    NA
## 64     0    NA
## 65     0    NA
## 66     1    NA
## 67     0    NA
## 68     0    NA
## 69     1    NA
## 70     1    NA
## 71     1    NA
## 72     0    NA
## 73     1     0
## 74     1     1
## 75     0    NA
## 76     0     1
```

```
## 77        1    NA
## 78        0     1
## 79        1    NA
## 80        1    NA
## 81        1    NA
## 82        0    NA
## 83        0    NA
## 84        1    NA
## 85        0     0
## 86        1    NA
## 87        0     1
## 88        1    NA
## 89        0    NA
## 90        1     1
## 91        1    NA
## 92        1    NA
## 93        1     1
## 94        0    NA
## 95        1    NA
## 96        0    NA
## 97        0    NA
## 98        1     1
## 99        1     1
## 100       0    NA
```

```r
summary(dmt)
```

```
##        Q6                                            Q7
##          :  4                                          :276
##  Ketogenic:144   I do not trust what the speaker was saying.: 31
##  Paleo    :127   I trust what the speaker was saying.      :123
##  Pritikin :155
##
##
##
##        FL_3_DO          treat            female         trust
##  FControl  :109   Min.   :0.0000   Min.   :0.0   Min.   :0.0000
##  FTreatment:106   1st Qu.:0.0000   1st Qu.:0.0   1st Qu.:1.0000
##  MControl  :110   Median :0.0000   Median :0.5   Median :1.0000
##  MTreatment:105   Mean   :0.4907   Mean   :0.5   Mean   :0.7987
##                   3rd Qu.:1.0000   3rd Qu.:1.0   3rd Qu.:1.0000
##                   Max.   :1.0000   Max.   :1.0   Max.   :1.0000
##                                                  NA's   :276
```

```r
# Distribution of treatment vs control
hist(dmt$treat, main='Distribution of treatment, 1 is treatment', xlab='Treatment')
```

Distribution of treatment, 1 is treatment
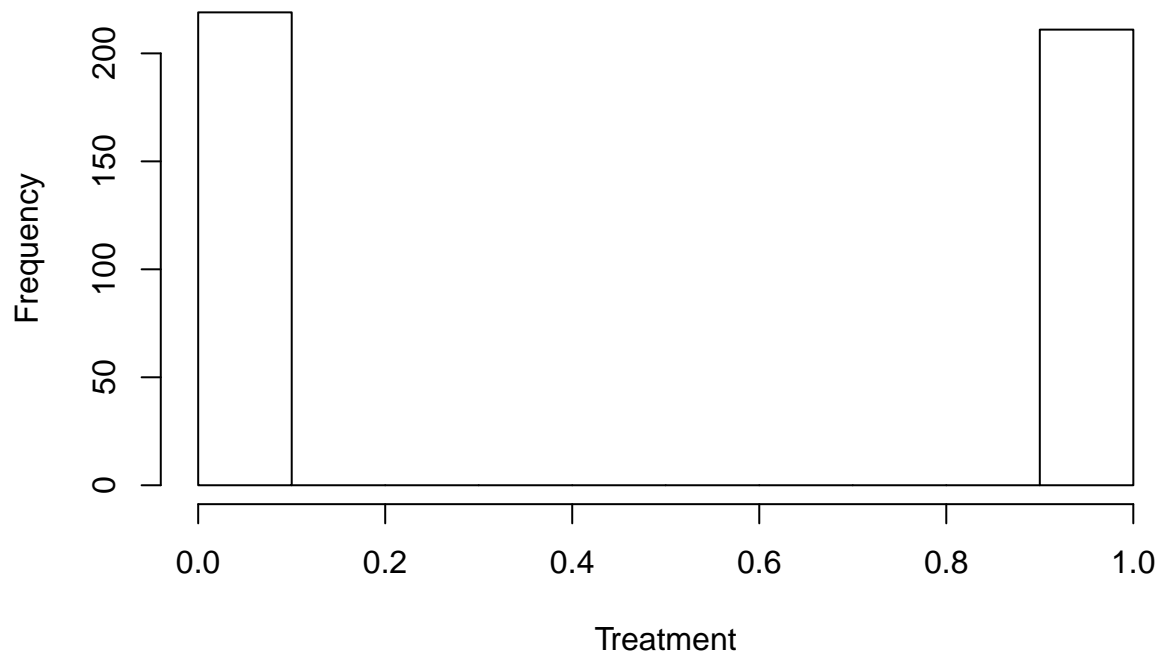

```r
# Distribution of male vs female
hist(dmt$female, main='Gender Distribution', xlab='Gender, 1 is female')
```

Gender Distribution
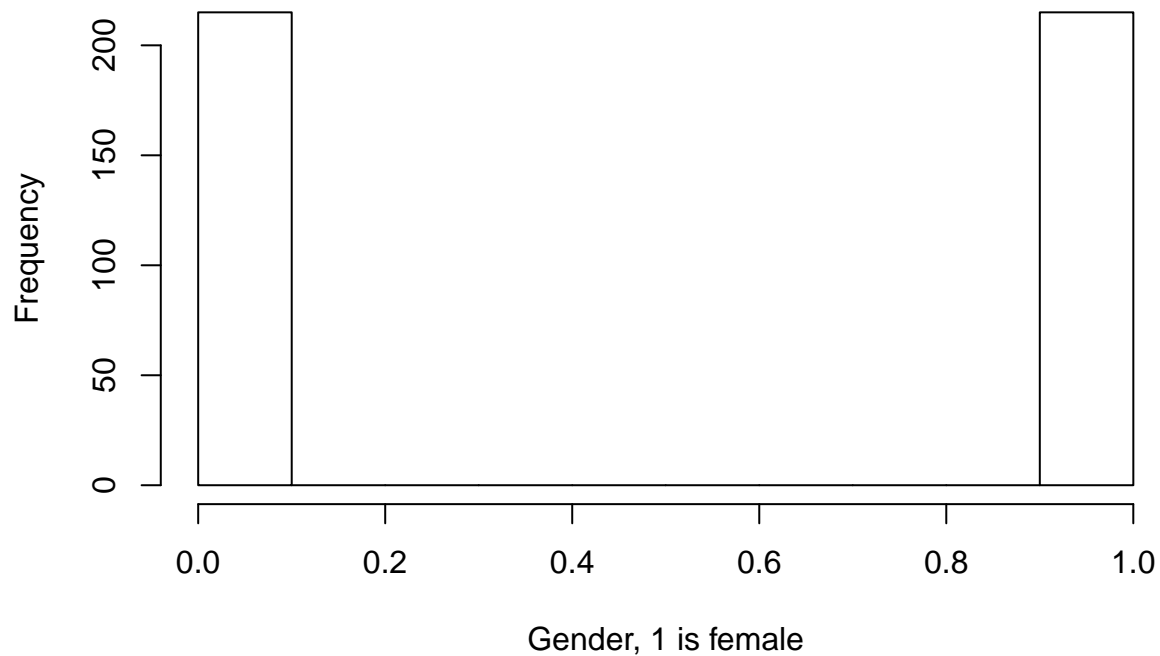
These distributions are fine

```r
# Regressing trust on treatment
lrmt = lm(trust ~ treat, data = dmt)
```

```
summary(lrmt)
```

```
##
## Call:
## lm(formula = trust ~ treat, data = dmt)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.97368  0.02632  0.02632  0.37179  0.37179
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)  0.97368    0.04178  23.305  < 2e-16 ***
## treat       -0.34548    0.05871  -5.885 2.45e-08 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.3642 on 152 degrees of freedom
##   (276 observations deleted due to missingness)
## Multiple R-squared:  0.1856, Adjusted R-squared:  0.1802
## F-statistic: 34.63 on 1 and 152 DF,  p-value: 2.453e-08
```

```
ate = lrmt$coefficients['treat']
paste0('The ATE of the dissonace video is: ', ate)
```

```
## [1] "The ATE of the dissonace video is: -0.345479082321188"
```

```
# Adding Female as the covariate
lrmt1 = lm(trust ~ treat + female * treat, data = dmt)
summary(lrmt1)
```

```
##
## Call:
## lm(formula = trust ~ treat + female * treat, data = dmt)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.93939  0.00000  0.06061  0.32500  0.42105
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)  0.93939    0.06343  14.809  < 2e-16 ***
## treat       -0.36045    0.08671  -4.157  5.4e-05 ***
## female       0.06061    0.08433   0.719    0.473
## treat:female 0.03545    0.11801   0.300    0.764
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.3644 on 150 degrees of freedom
##   (276 observations deleted due to missingness)
## Multiple R-squared:  0.1956, Adjusted R-squared:  0.1795
## F-statistic: 12.16 on 3 and 150 DF,  p-value: 3.63e-07
```

```
# Randomization inference
# Creating new variables for randomizing run and run_lag
dmt$treat_rnd = sample(dmt$treat)
```

```
head(dmt)
```

```
##          Q6                                             Q7      FL_3_DO treat
## 1 Ketogenic                                                    MControl     0
## 2  Pritikin I do not trust what the speaker was saying. FTreatment     1
## 3  Pritikin         I trust what the speaker was saying.  FControl     0
## 4  Pritikin I do not trust what the speaker was saying. FTreatment     1
## 5  Pritikin         I trust what the speaker was saying.  FControl     0
## 6     Paleo                                                    MTreatment     1
##   female trust treat_rnd
## 1      0    NA         1
## 2      1     0         0
## 3      1     1         0
## 4      1     0         1
## 5      1     1         0
## 6      0    NA         0
```

```
summary(dmt)
```

```
##          Q6                                             Q7
##          :  4                                                     :276
##  Ketogenic:144    I do not trust what the speaker was saying.: 31
##  Paleo    :127    I trust what the speaker was saying.        :123
##  Pritikin :155
##
##
##
##         FL_3_DO          treat             female          trust
##  FControl  :109    Min.   :0.0000   Min.   :0.0   Min.   :0.0000
##  FTreatment:106    1st Qu.:0.0000   1st Qu.:0.0   1st Qu.:1.0000
##  MControl  :110    Median :0.0000   Median :0.5   Median :1.0000
##  MTreatment:105    Mean   :0.4907   Mean   :0.5   Mean   :0.7987
##                    3rd Qu.:1.0000   3rd Qu.:1.0   3rd Qu.:1.0000
##                    Max.   :1.0000   Max.   :1.0   Max.   :1.0000
##                                                   NA's   :276
##    treat_rnd
##  Min.   :0.0000
##  1st Qu.:0.0000
##  Median :0.0000
##  Mean   :0.4907
##  3rd Qu.:1.0000
##  Max.   :1.0000
##
```

```
# Repeating the regression with the randomized treatment variable
# Regressing trust on treatment
lrmt2 = lm(trust ~ treat_rnd, data = dmt, na.action = na.omit)
summary(lrmt2)
```

```
##
## Call:
## lm(formula = trust ~ treat_rnd, data = dmt, na.action = na.omit)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
```

```
## -0.8313   0.1687   0.1687   0.2394   0.2394
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)  0.83133    0.04413  18.838   <2e-16 ***
## treat_rnd   -0.07076    0.06499  -1.089    0.278
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.402 on 152 degrees of freedom
##   (276 observations deleted due to missingness)
## Multiple R-squared:  0.007739,   Adjusted R-squared:  0.001211
## F-statistic: 1.185 on 1 and 152 DF,  p-value: 0.278
```

```r
names(summary(lrmt2))
```

```
## [1] "call"          "terms"         "residuals"     "coefficients"
## [5] "aliased"       "sigma"         "df"            "r.squared"
## [9] "adj.r.squared" "fstatistic"    "cov.unscaled"  "na.action"
```

```r
summary(lrmt2)$coefficients
```

```
##                Estimate Std. Error    t value      Pr(>|t|)
## (Intercept)  0.83132530 0.04412912 18.838476 1.359259e-41
## treat_rnd   -0.07076192 0.06499148 -1.088788 2.779708e-01
```

```r
summary(lrmt2)$coefficients[,2]['treat_rnd']
```

```
##  treat_rnd
## 0.06499148
```

```r
# Generic function to randomly(pseudo) pick the treatment assignments
coeff_treat_rnd <- function(d) {
  d$treat_rnd = sample(d$treat)
  lmr = lm(trust ~ treat_rnd, data=dmt, na.action = na.omit)
  return (lmr$coefficients['treat_rnd'])
}

# Trying another randomization
coeff_treat_rnd(dmt)
```

```
##   treat_rnd
## -0.07076192
```

```r
# 1K Randomizations
h.distribution.under.sharp.null <- replicate(10000, coeff_treat_rnd(dmt))
h.ate.mean <- mean(h.distribution.under.sharp.null)
paste0("Mean fromm 1k randomizations: ", h.ate.mean)
```
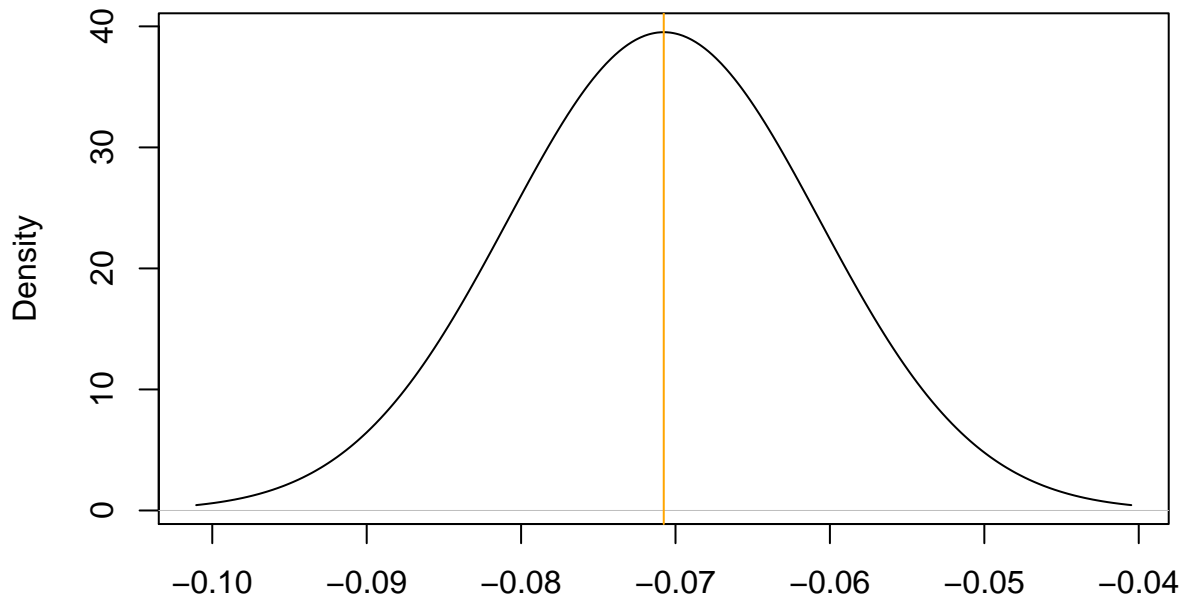
```
## [1] "Mean fromm 1k randomizations: -0.0707619209231295"
```

```r
# Graph for the estimates
plot(density(h.distribution.under.sharp.null),
     main = "Density under Sharp Null")

# Adding our original ATE to the plot
abline(v = ate, col = "blue")
```

```
# Adding the mean to the plot
abline(v = mean(h.distribution.under.sharp.null), col = 'orange')
```

Density under Sharp Null

N = 10000   Bandwidth = 0.01009

```
# p value
pv = mean(h.distribution.under.sharp.null >= ate)
paste0('p value: ', pv)
```

```
## [1] "p value: 1"
```

```
# num of assignments that generate an estimated ATE at least as large as the actual
n <- sum(h.distribution.under.sharp.null >= ate)
paste0("Number of assignments that generate an ATE at least as large as what we got from the experiment
```

```
## [1] "Number of assignments that generate an ATE at least as large as what we got from the experiment
```

```
# Standard error
se = sd(h.distribution.under.sharp.null)/sqrt(length(h.distribution.under.sharp.null))
paste0('Standard error: ', se)
```

```
## [1] "Standard error: 0"
```