Explanability Study

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August 13, 2017

Data Import and Prepration

Import data

In order to appropriately capture the instances where someone did not finish the survey, whether by clicking through to the final page or by stopping midway, I had to export from Qualtrics in a different format that allows us to see what was viewed and what was not. That also changed some other fields, particularly the multiple choice, multiple selection questions.

```
#Import all data
all_content = readLines("Explainability_Study_legacy_export.csv")

#Delete second and third rows of not useful information
skip_second = all_content[-c(2,3)]

#Create table and data.table
d <-read.csv(textConnection(skip_second), header = TRUE, stringsAsFactors = FALSE)
d <- data.table(d)

# Create new data table without fields we are not using
dt <- d[,-c('ResponseSet','IPAddress','StartDate','EndDate','RecipientLastName',
          'RecipientFirstName','RecipientEmail','ExternalDataReference','Status',
          'Q_TotalDuration','Enter.Embedded.Data.Field.Name.Here...','LocationLatitude',
          'LocationLongitude','LocationAccuracy', 'Q3.5', 'Q4.5', 'Q6.5', 'Q7.5', 'Q8.1',
          'Q9.1','Q10.1', 'Q10.3')]

# Rename variables
old_names <- colnames(dt)

##  Key to var names: tc = Twitter control group
#                     tt = Twitter treatment group
#                     rc = recidivism control group
#                     rt = recidivism treatment group

new_names <- c("ResponseID","Finished","First.Context","random","intro","tweet",
               "tControl", 'tcFair', 'tcAcc', 'tcSat', 'tcUseful', 'tcClear',
               'tcMeaningful', 'tcReqInfo', 'tcOther1', 'tcOther2', 'tcOther3', 'tcOther4',
               "tTreat", 'ttFair', 'ttAcc', 'ttSat', 'ttUseful', 'ttClear',
               'ttMeaningful', 'ttReqInfo', 'ttOther1', 'ttOther2', 'ttOther3', 'ttOther4',
               'recidivism',
               'rControl', 'rcFair', 'rcAcc', 'rcSat', 'rcUseful', 'rcClear',
               'rcMeaningful', 'rcReqInfo', 'rcOther1', 'rcOther2', 'rcOther3', 'rcOther4',
               "rTreat", 'rtFair', 'rtAcc', 'rtSat', 'rtUseful', 'rtClear',
               'rtMeaningful', 'rtReqInfo', 'rtOther1', 'rtOther2', 'rtOther3', 'rtOther4',
               'ageGroup', 'white', 'black', 'native', 'asian', 'pac_isle', 'hispanic',
               'other', 'gender', 'socMed', 'educ', 'feedback')
```

```r
setnames(dt, old_names, new_names)
colnames(dt)
```

```
##  [1] "ResponseID"    "Finished"      "First.Context" "random"
##  [5] "intro"         "tweet"         "tControl"      "tcFair"
##  [9] "tcAcc"         "tcSat"         "tcUseful"      "tcClear"
## [13] "tcMeaningful"  "tcReqInfo"     "tcOther1"      "tcOther2"
## [17] "tcOther3"      "tcOther4"      "tTreat"        "ttFair"
## [21] "ttAcc"         "ttSat"         "ttUseful"      "ttClear"
## [25] "ttMeaningful"  "ttReqInfo"     "ttOther1"      "ttOther2"
## [29] "ttOther3"      "ttOther4"      "recidivism"    "rControl"
## [33] "rcFair"        "rcAcc"         "rcSat"         "rcUseful"
## [37] "rcClear"       "rcMeaningful"  "rcReqInfo"     "rcOther1"
## [41] "rcOther2"      "rcOther3"      "rcOther4"      "rTreat"
## [45] "rtFair"        "rtAcc"         "rtSat"         "rtUseful"
## [49] "rtClear"       "rtMeaningful"  "rtReqInfo"     "rtOther1"
## [53] "rtOther2"      "rtOther3"      "rtOther4"      "ageGroup"
## [57] "white"         "black"         "native"        "asian"
## [61] "pac_isle"      "hispanic"      "other"         "gender"
## [65] "socMed"        "educ"          "feedback"
```

```r
#summary(dt)
```

Data Cleanup

```r
# Most Qualtrics questions were set so the extreme positive value was the first choice (1)
# Function to flip the scale to show more positive as larger number
flip <- function(originalScale) {
  x <- originalScale - 3        #  3 is median
  return(3 - x)
}

# For an unknown reason, question 7.2 Fairness for Recidivism Treatment
# the values were offset by 24.  This was cross-checked with the text-based responses.

dt$rtFair <- dt$rtFair - 24      # Qualtrics weirdness

# For the Twitter fairness questions, the Qualtrics survey
# responses were reversed in two instances. All others
# are reversed using the flip function below

# Organize scales so larger values correlate to more fair, more accurate, etc.
dt[, tcAcc        := flip(dt[, tcAcc])]
dt[, tcSat        := flip(dt[, tcSat])]
dt[, tcUseful     := flip(dt[, tcUseful])]
dt[, tcClear      := flip(dt[, tcClear])]
dt[, tcMeaningful := flip(dt[, tcMeaningful])]

dt[, ttFair       := flip(dt[, ttFair])]
dt[, ttAcc        := flip(dt[, ttAcc])]
dt[, ttSat        := flip(dt[, ttSat])]
dt[, ttUseful     := flip(dt[, ttUseful])]
dt[, ttClear      := flip(dt[, ttClear])]
```

```
dt[, ttMeaningful := flip(dt[, ttMeaningful])]

dt[, rcAcc        := flip(dt[, rcAcc])]
dt[, rcSat        := flip(dt[, rcSat])]
dt[, rcUseful     := flip(dt[, rcUseful])]
dt[, rcClear      := flip(dt[, rcClear])]
dt[, rcMeaningful := flip(dt[, rcMeaningful])]

dt[, rtFair       := flip(dt[, rtFair])]
dt[, rtAcc        := flip(dt[, rtAcc])]
dt[, rtSat        := flip(dt[, rtSat])]
dt[, rtUseful     := flip(dt[, rtUseful])]
dt[, rtClear      := flip(dt[, rtClear])]
dt[, rtMeaningful := flip(dt[, rtMeaningful])]
```

Consolidate each metric across treatments

```
# Create consolidated data table

dc <- data.table(tFair = rowSums(dt[, c('tcFair', 'ttFair')], na.rm=T))

dc[, complete := !is.na(dt[, random])]
dc[, tAssign := dt[, tTreat] == 1 | dt[, tControl] == 1]
dc[, tControl := !is.na(dt[, tControl])]
dc[, tTreat := !is.na(dt[, tTreat])]
dc[, rControl := !is.na(dt[, rControl])]
dc[, rTreat := !is.na(dt[, rTreat])]
dc[, rAssign := dt[, rTreat] == 1 | dt[, rControl] == 1]
dc[, tweet := !is.na(dt[, tweet])]
dc[, recidivism := !is.na(dt[, recidivism])]

dc[, tAcc := rowSums(dt[, c('tcAcc', 'ttAcc')], na.rm=T)]
dc[, tSat := rowSums(dt[, c('tcSat', 'ttSat')], na.rm=T) ]
dc[, tUseful := rowSums(dt[, c('tcUseful', 'ttUseful')], na.rm=T)]
dc[, tClear := rowSums(dt[, c('tcClear', 'ttClear')], na.rm=T)]
dc[, tMeaningful := rowSums(dt[, c('tcMeaningful', 'ttMeaningful')], na.rm=T)]

dc[, rFair := rowSums(dt[,c('rcFair', 'rtFair')], na.rm=T)]
dc[, rAcc := rowSums(dt[,c('rcAcc', 'rtAcc')], na.rm=T)]
dc[, rSat := rowSums(dt[,c('rcSat', 'rtSat')], na.rm=T) ]
dc[, rUseful := rowSums(dt[,c('rcUseful', 'rtUseful')], na.rm=T)]
dc[, rClear := rowSums(dt[,c('rcClear', 'rtClear')], na.rm=T)]
dc[, rMeaningful := rowSums(dt[,c('rcMeaningful', 'rtMeaningful')], na.rm=T)]

dc[, tOther1 := rowSums(dt[,c('tcOther1', 'ttOther1')], na.rm=T)]
dc[, tOther2 := rowSums(dt[,c('tcOther2', 'ttOther2')], na.rm=T)]
dc[, tOther3 := rowSums(dt[,c('tcOther3', 'ttOther3')], na.rm=T)]
#dc[, tOther4 := rowSums(dt[,c('tcOther4', 'ttOther4')], na.rm=T)]

dc[, rOther1 := rowSums(dt[,c('rcOther1', 'rtOther1')], na.rm=T)]
dc[, rOther2 := rowSums(dt[,c('rcOther2', 'rtOther2')], na.rm=T)]
dc[, rOther3 := rowSums(dt[,c('rcOther3', 'rtOther3')], na.rm=T)]
```

```
#dc[, rOther4 := rowSums(dt[,c('rcOther4', 'rtOther4')], na.rm=T)]

dc[, white := !is.na(dt[, white])]
dc[, black := !is.na(dt[, black])]
dc[, native := !is.na(dt[, native])]
dc[, asian := !is.na(dt[, asian])]
dc[, pac_isle := !is.na(dt[, pac_isle])]
dc[, hispanic := !is.na(dt[, hispanic])]
dc[, other := !is.na(dt[, other])]

dc[, female := (dt[, gender]==2)]
dc[, gender_nc := (dt[, gender]==3)]


dt1 <- dt[, c('ageGroup', 'socMed', 'educ', 'First.Context')]

dc <- cbind(dc,dt1)

# Converting tTreat and rTreat to binaries instead of logicals
(to.replace <- names(which(sapply(dc, is.logical))))
for (var in to.replace) dc[, var:= as.numeric(get(var)), with=FALSE]

#view dc
head(dc)
```

Randomization Check

Were the two contexts assigned equally?

The first randomization was to assign which context the respondent would see first. Did that work?

```
dc[, .N, by = First.Context]
```

```
##    First.Context   N
## 1:    Recidivism 320
## 2:       Twitter 321
```

320 received the 'Recidivism' context first. 321 received the 'Twitter' context first. This was a pretty even split. Next is worth checking if each context received similar assignment to treatment.

```
dc[, .N, by = .(tTreat, tAssign)]
```

```
##    tTreat tAssign   N
## 1:      0       1 315
## 2:      1       1 312
## 3:      0      NA  14
```

In this instance, we see that of those assigned to the Twitter context (tAssign), it was a pretty even split between treatment and control. However, those 14 that were not assigned to either treatment or control are indicative of attrition that we will need to review in greater detail.

```
dc[, .N, by = .(rTreat, rAssign)]
```

```
##    rTreat rAssign   N
## 1:      0       1 312
## 2:      1       1 316
```

```
## 3:      0      NA  13
```

Similarly, we see a pretty even split between recidivicsm context assignment, with another 13 instances of attrition. These could overlap with the other examples of attrition.

From the analysis above, it appears that 315 respondents were assigned to the Twitter-control group, 312 were assigned to the Twitter-treatment group, 312 were assigned to the recidivism-control group and 316 were assigned to the recidivism-treatment group.

Was treatment assigned equally across contexts?

```
dc[tAssign == 1, .N, by = .(First.Context, tTreat)]
```

```
##    First.Context tTreat   N
## 1:    Recidivism      0 155
## 2:       Twitter      1 158
## 3:    Recidivism      1 154
## 4:       Twitter      0 160
```

```
dc[rAssign ==1, .N, by = .(First.Context, rTreat)]
```

```
##    First.Context rTreat   N
## 1:    Recidivism      0 155
## 2:       Twitter      0 157
## 3:    Recidivism      1 158
## 4:       Twitter      1 158
```

These two tables show that treatment and control were assigned roughly equally across contexts, regardless of order.

Were all questions answered?

```
## Show number of responses for each question
apply(dt, 2, function(x) length(which(!is.na(x))))
```

```
##    ResponseID      Finished First.Context        random         intro
##           641           641           641           622           641
##         tweet      tControl        tcFair         tcAcc         tcSat
##           631           315           315           315           315
##      tcUseful       tcClear  tcMeaningful     tcReqInfo      tcOther1
##           315           315           315            84           173
##      tcOther2      tcOther3      tcOther4        tTreat        ttFair
##           145             9           641           312           312
##         ttAcc         ttSat      ttUseful       ttClear  ttMeaningful
##           312           312           311           311           311
##     ttReqInfo      ttOther1      ttOther2      ttOther3      ttOther4
##            93           144           129            15           641
##    recidivism      rControl        rcFair         rcAcc         rcSat
##           636           312           312           312           312
##      rcUseful       rcClear  rcMeaningful     rcReqInfo      rcOther1
##           310           310           310            90           176
##      rcOther2      rcOther3      rcOther4        rTreat        rtFair
##           175            12           641           316           316
##         rtAcc         rtSat      rtUseful       rtClear  rtMeaningful
##           316           316           315           315           315
##     rtReqInfo      rtOther1      rtOther2      rtOther3      rtOther4
```

```
##           89          165          154           15          641
##     ageGroup        white        black       native        asian
##          622          422           36           14          134
##     pac_isle     hispanic        other       gender       socMed
##            1           30            5          620          622
##         educ     feedback
##          622          637
```

From this, it appears that there were a couple instances of attrition in the middle of answering questions about a treatment. Note the drop from 312 to 311 between ttSat and ttUseful, or the drop from 316 to 315 between rtSat and rtUseful.

Attrition effects

Out of 641 surveys, 622 were completed. Was either context more impacted than the other?

```
dc[ , sum(complete)/.N, by = First.Context]
```

```
##    First.Context        V1
## 1:    Recidivism 0.9656250
## 2:       Twitter 0.9750779
```

Similar ratios completed the survey regardless of which context they started with. This does not seem indicative of a problem with the experiment, but we will need to be careful about how we calculate effects.

Define Metrics

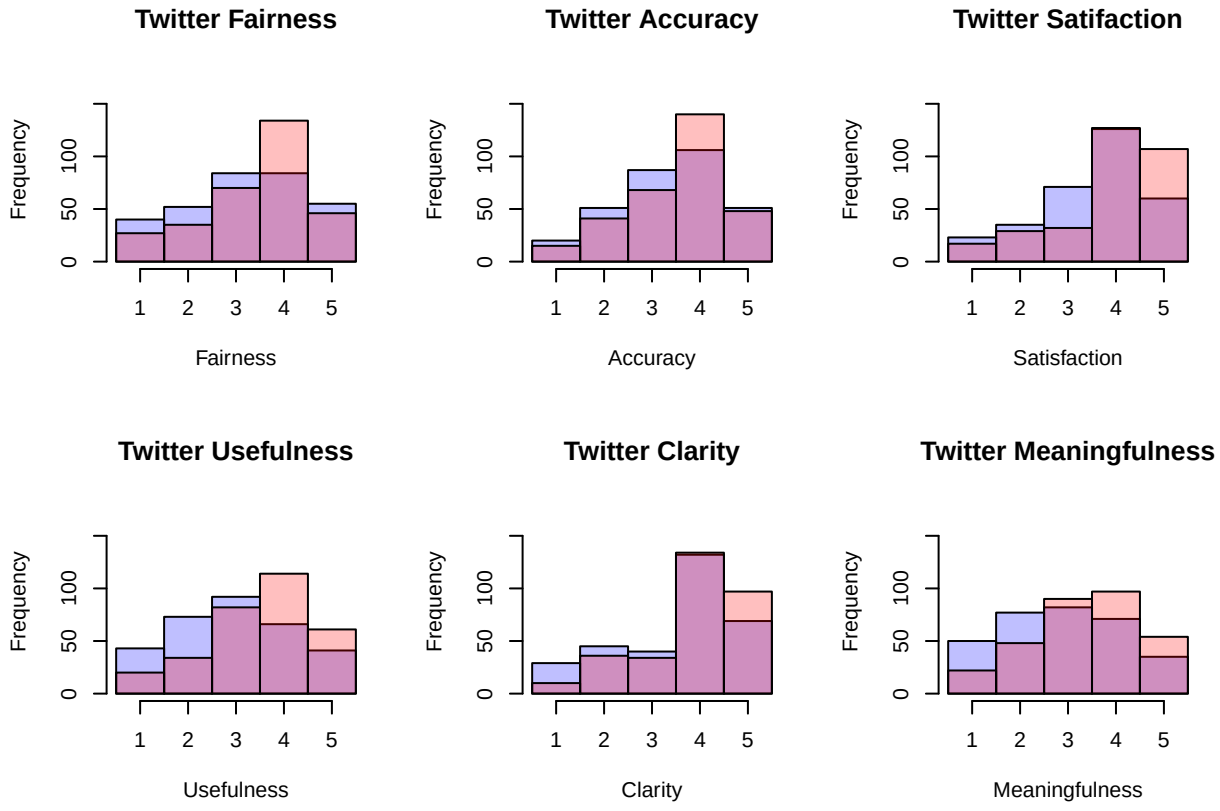
The metrics we evaluated were split into two groups. The first three asked respondents to rate the decision that was made with respect to fairness, accuracy, and their satisfaction with the decision. The second three asked specifically about the explanation itself. Respondents were asked if the explanation was useful, clear, and meaningful.

Visual data exploration, grouped bars

Twitter Response Histograms

```
par(mfrow=c(2,3))
hist(dt$tcFair, col=rgb(0,0,1,1/4), breaks = seq(0.5, 5.5, 1),
     main= "Twitter Fairness", xlab="Fairness", ylim=c(0,175))
hist(dt$ttFair,col=rgb(1,0,0,1/4), breaks = seq(0.5, 5.5, 1), add=T)
#legend("topright", c("Control", "Treatment"), fill=c("blue", "red"))

hist(dt$tcAcc, col=rgb(0,0,1,1/4), breaks = seq(0.5, 5.5, 1),
     main= "Twitter Accuracy", xlab="Accuracy", ylim=c(0,175))
hist(dt$ttAcc,col=rgb(1,0,0,1/4), breaks = seq(0.5, 5.5, 1), add=T)

hist(dt$tcSat, col=rgb(0,0,1,1/4), breaks = seq(0.5, 5.5, 1),
     main= "Twitter Satifaction", xlab="Satisfaction", ylim=c(0,175))
hist(dt$ttSat,col=rgb(1,0,0,1/4), breaks = seq(0.5, 5.5, 1), add=T)

hist(dt$tcUseful, col=rgb(0,0,1,1/4), breaks = seq(0.5, 5.5, 1),
     main= "Twitter Usefulness", xlab="Usefulness", ylim=c(0,175))
hist(dt$ttUseful,col=rgb(1,0,0,1/4), breaks = seq(0.5, 5.5, 1), add=T)
```

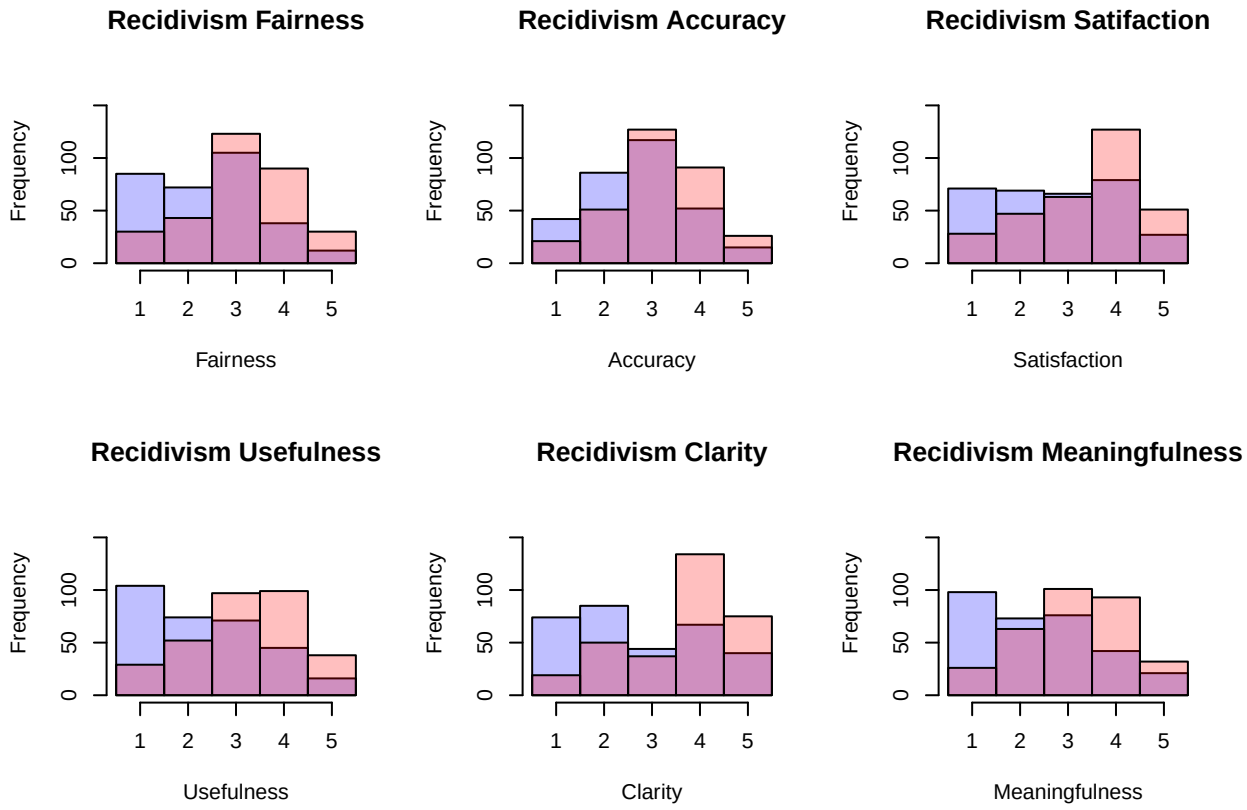
```r
hist(dt$tcClear, col=rgb(0,0,1,1/4), breaks = seq(0.5, 5.5, 1),
     main= "Twitter Clarity", xlab="Clarity", ylim=c(0,175))
hist(dt$ttClear,col=rgb(1,0,0,1/4), breaks = seq(0.5, 5.5, 1), add=T)

hist(dt$tcMeaningful, col=rgb(0,0,1,1/4), breaks = seq(0.5, 5.5, 1),
     main= "Twitter Meaningfulness", xlab="Meaningfulness", ylim=c(0,175))
hist(dt$ttMeaningful,col=rgb(1,0,0,1/4), breaks = seq(0.5, 5.5, 1), add=T)
```



Recidivism Responses Histogram

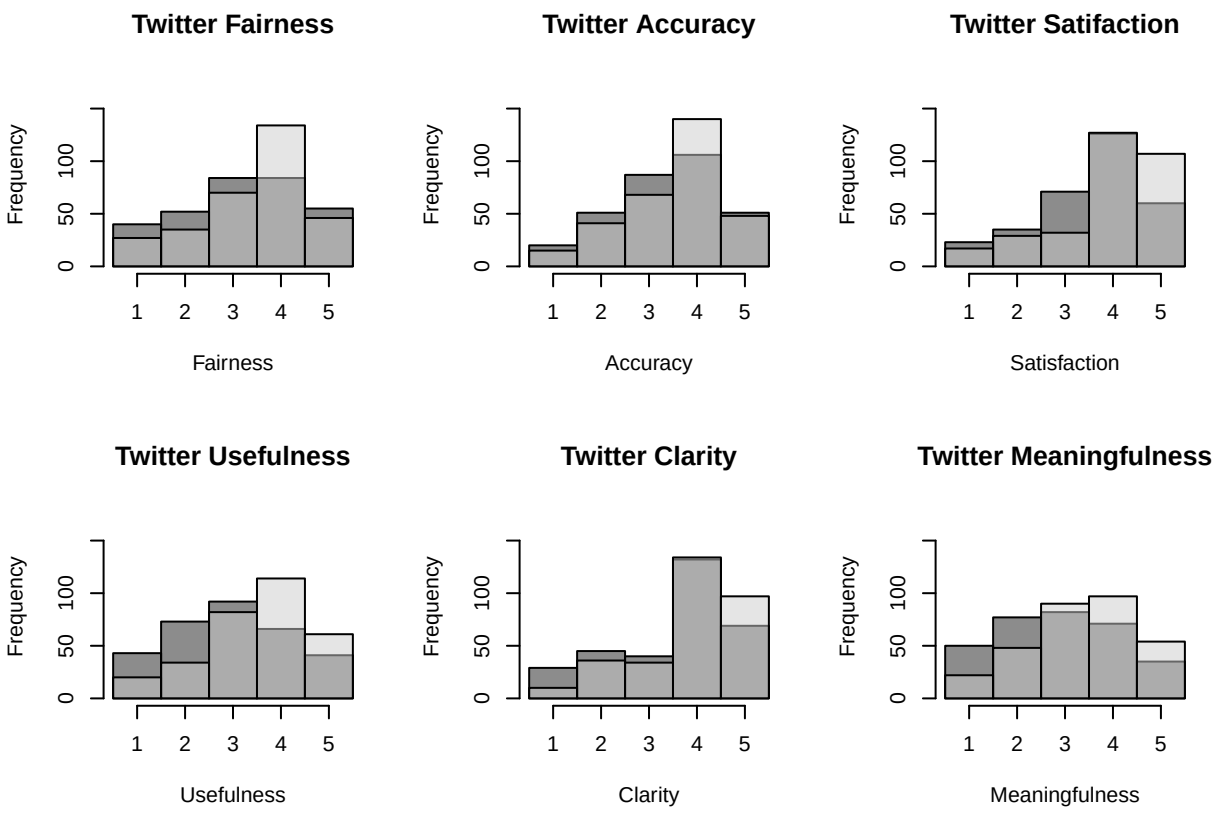
```r
par(mfrow=c(2,3))
hist(dt$rcFair, col=rgb(0,0,1,1/4), breaks = seq(0.5, 5.5, 1), main= "Recidivism Fairness", xlab="Fairn
hist(dt$rtFair,col=rgb(1,0,0,1/4), breaks = seq(0.5, 5.5, 1), add=T)
#legend("topright", c("Control", "Treatment"), fill=c("blue", "red"))

hist(dt$rcAcc, col=rgb(0,0,1,1/4), breaks = seq(0.5, 5.5, 1), main= "Recidivism Accuracy", xlab="Accura
hist(dt$rtAcc,col=rgb(1,0,0,1/4), breaks = seq(0.5, 5.5, 1), add=T)

hist(dt$rcSat, col=rgb(0,0,1,1/4), breaks = seq(0.5, 5.5, 1), main= "Recidivism Satifaction", xlab="Sati
hist(dt$rtSat,col=rgb(1,0,0,1/4), breaks = seq(0.5, 5.5, 1), add=T)

hist(dt$rcUseful, col=rgb(0,0,1,1/4), breaks = seq(0.5, 5.5, 1), main= "Recidivism Usefulness", xlab="Us
hist(dt$rtUseful,col=rgb(1,0,0,1/4), breaks = seq(0.5, 5.5, 1), add=T)

hist(dt$rcClear, col=rgb(0,0,1,1/4), breaks = seq(0.5, 5.5, 1), main= "Recidivism Clarity", xlab="Clarit
hist(dt$rtClear,col=rgb(1,0,0,1/4), breaks = seq(0.5, 5.5, 1), add=T)
```

```
hist(dt$rcMeaningful, col=rgb(0,0,1,1/4), breaks = seq(0.5, 5.5, 1), main= "Recidivism Meaningfulness",
hist(dt$rtMeaningful,col=rgb(1,0,0,1/4), breaks = seq(0.5, 5.5, 1), add=T)
```



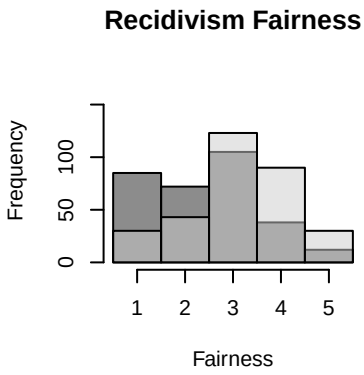
Twitter Histograms Greyscale

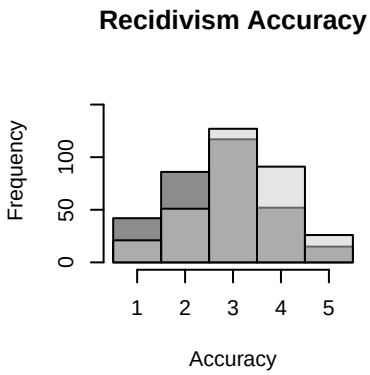
```
par(mfrow=c(2,3))
hist(dt$tcFair, col=rgb(0.1,0.1,0.1,0.5), breaks = seq(0.5, 5.5, 1), main= "Twitter Fairness", xlab="Fa
hist(dt$ttFair,col=rgb(0.8,0.8,0.8,0.5), breaks = seq(0.5, 5.5, 1), add=T)
#legend("topright", c("Control", "Treatment"), fill=c("blue", "red"))

hist(dt$tcAcc, col=rgb(0.1,0.1,0.1,0.5), breaks = seq(0.5, 5.5, 1), main= "Twitter Accuracy", xlab="Accu
hist(dt$ttAcc,col=rgb(0.8,0.8,0.8,0.5), breaks = seq(0.5, 5.5, 1), add=T)

hist(dt$tcSat, col=rgb(0.1,0.1,0.1,0.5), breaks = seq(0.5, 5.5, 1), main= "Twitter Satifaction", xlab="S
hist(dt$ttSat,col=rgb(0.8,0.8,0.8,0.5), breaks = seq(0.5, 5.5, 1), add=T)

hist(dt$tcUseful, col=rgb(0.1,0.1,0.1,0.5), breaks = seq(0.5, 5.5, 1), main= "Twitter Usefulness", xlab=
hist(dt$ttUseful,col=rgb(0.8,0.8,0.8,0.5), breaks = seq(0.5, 5.5, 1), add=T)

hist(dt$tcClear, col=rgb(0.1,0.1,0.1,0.5), breaks = seq(0.5, 5.5, 1), main= "Twitter Clarity", xlab="Cla
hist(dt$ttClear,col=rgb(0.8,0.8,0.8,0.5), breaks = seq(0.5, 5.5, 1), add=T)

hist(dt$tcMeaningful, col=rgb(0.1,0.1,0.1,0.5), breaks = seq(0.5, 5.5, 1), main= "Twitter Meaningfulness
hist(dt$ttMeaningful,col=rgb(0.8,0.8,0.8,0.5), breaks = seq(0.5, 5.5, 1), add=T)
```

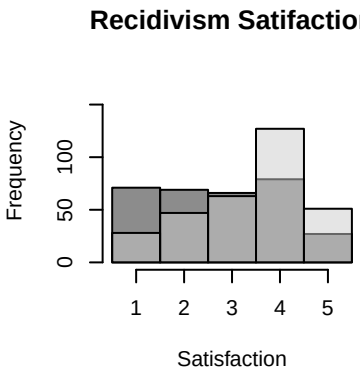


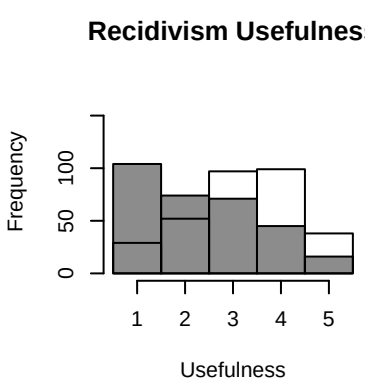
Recidivism Histogram Greyscale

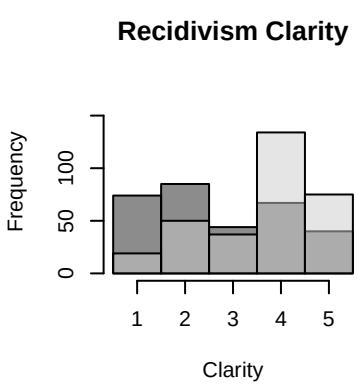
```
par(mfrow=c(2,3))
hist(dt$rcFair, col=rgb(0.1,0.1,0.1,0.5), breaks = seq(0.5, 5.5, 1), main= "Recidivism Fairness", xlab="
hist(dt$rtFair,col=rgb(0.8,0.8,0.8,0.5), breaks = seq(0.5, 5.5, 1), add=T)
#legend("topright", c("Control", "Treatment"), fill=c("blue", "red"))

hist(dt$rcAcc, col=rgb(0.1,0.1,0.1,0.5), breaks = seq(0.5, 5.5, 1), main= "Recidivism Accuracy", xlab="A
hist(dt$rtAcc,col=rgb(0.8,0.8,0.8,0.5), breaks = seq(0.5, 5.5, 1), add=T)

hist(dt$rcSat, col=rgb(0.1,0.1,0.1,0.5), breaks = seq(0.5, 5.5, 1), main= "Recidivism Satifaction", xlab
#legend(4,9, Treat(df),lwd=4, col=c())
hist(dt$rtSat,col=rgb(0.8,0.8,0.8,0.5), breaks = seq(0.5, 5.5, 1), add=T)

hist(dt$rcUseful, col=rgb(0.1,0.1,0.1,0.5), breaks = seq(0.5, 5.5, 1), main= "Recidivism Usefulness", xl
hist(dt$rtUseful,colx=rgb(0.8,0.8,0.8,0.5), breaks = seq(0.5, 5.5, 1), add=T)

hist(dt$rcClear, col=rgb(0.1,0.1,0.1,0.5), breaks = seq(0.5, 5.5, 1), main= "Recidivism Clarity", xlab="
hist(dt$rtClear,col=rgb(0.8,0.8,0.8,0.5), breaks = seq(0.5, 5.5, 1), add=T)

hist(dt$rcMeaningful, col=rgb(0.1,0.1,0.1,0.5), breaks = seq(0.5, 5.5, 1), main= "Recidivism Meaningfuln
hist(dt$rtMeaningful,col=rgb(0.8,0.8,0.8,0.5), breaks = seq(0.5, 5.5, 1), add=T)
```

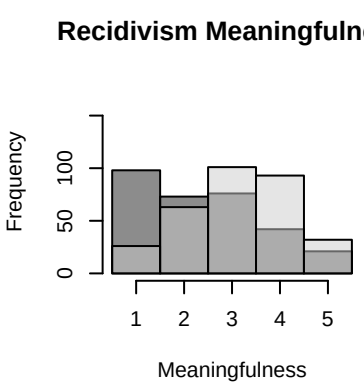












###What Additional Information did respondents want

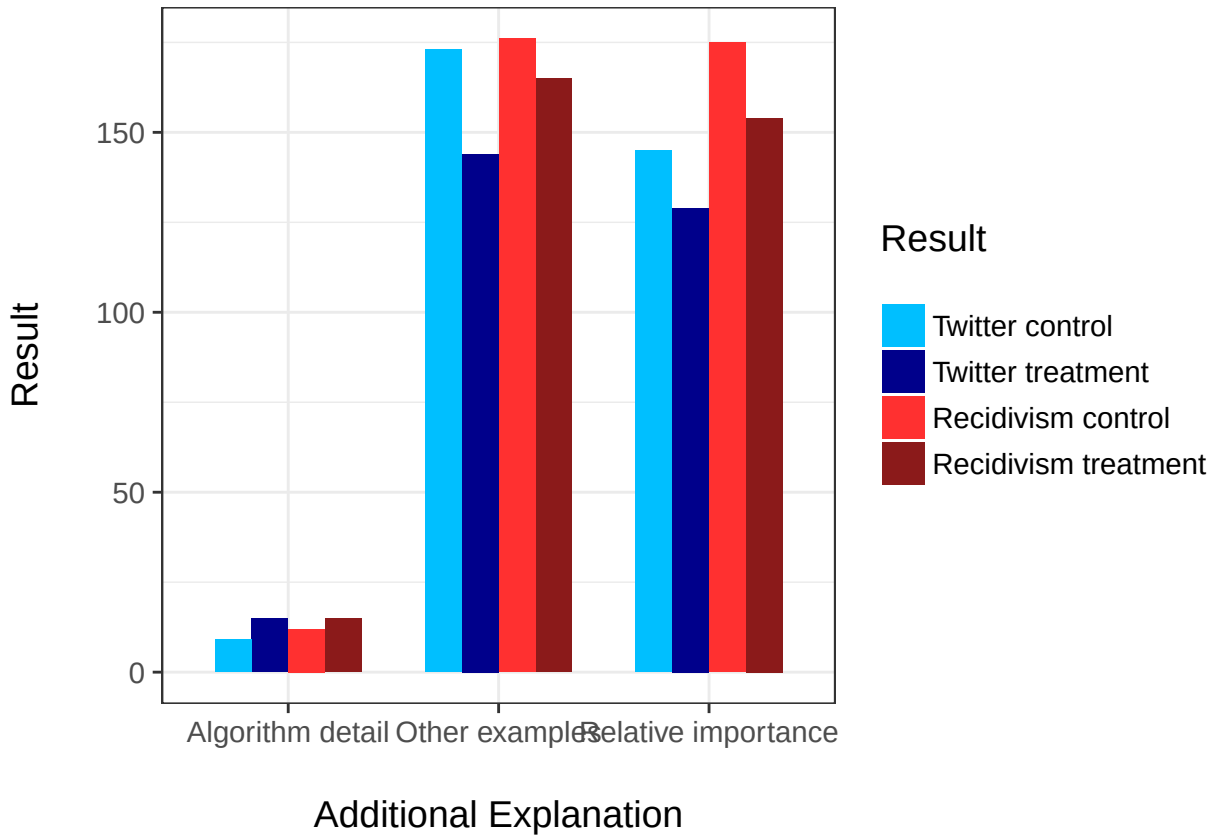
```
tcsumother1<-sum(dt$tcOther1, na.rm=TRUE)
#tcsumother1
tcsumother2<-sum(dt$tcOther2, na.rm=TRUE)
#tcsumother2
tcsumother3<-sum(dt$tcOther3, na.rm=TRUE)
#tcsumother3

ttsumother1<-sum(dt$ttOther1, na.rm=TRUE)
#ttsumother1
ttsumother2<-sum(dt$ttOther2, na.rm=TRUE)
#ttsumother2
ttsumother3<-sum(dt$ttOther3, na.rm=TRUE)
#ttsumother3

rcsumother1<-sum(dt$rcOther1, na.rm=TRUE)
rcsumother2<-sum(dt$rcOther2, na.rm=TRUE)
rcsumother3<-sum(dt$rcOther3, na.rm=TRUE)

rtsumother1<-sum(dt$rtOther1, na.rm=TRUE)
rtsumother2<-sum(dt$rtOther2, na.rm=TRUE)
rtsumother3<-sum(dt$rtOther3, na.rm=TRUE)


Number <- c("Other examples","Relative importance","Algorithm detail")
tc <- c(tcsumother1,tcsumother2,tcsumother3)
tt <- c(ttsumother1,ttsumother2,ttsumother3)
rc <- c(rcsumother1,rcsumother2,rcsumother3)
```

```
rt <- c(rtsumother1,rtsumother2,rtsumother3)
nyx <- data.frame(Number,tc,tt, rc, rt)

# load needed libraries
library(reshape2)
```

```
##
## Attaching package: 'reshape2'
```

```
## The following objects are masked from 'package:data.table':
##
##     dcast, melt
```

```
library(ggplot2)

# reshape your data into long format
nyxlong <- melt(nyx, id=c("Number"))


# make the plot
ggplot(nyxlong) +
  geom_bar(aes(x = Number, y = value, fill = variable),
           stat="identity", position = "dodge", width = 0.7) +
  scale_fill_manual("Result\n", values = c("deepskyblue","blue4", "firebrick1","firebrick4"),
                    labels = c("Twitter control", "Twitter treatment","Recidivism control", "Recidivism
  labs(x="\nAdditional Explanation",y="Result\n") +
  theme_bw(base_size = 14)
```



Not to include in report, but text outputs of Other q 4

Twitter control

again, whether there's any oversight into the decision or any appeals (though in this specific case it was clearly valid) Explanation of why they feel it's right to limit free speech. Freedom of speech infringement, you can not like the guy but twitter shouldn't silence his viewpoint, individuals should block him. When you are a platform for social interaction you shouldn't be allowed to restrict who can say what. None, I am against the restriction of the freedom of speech. none, moderation should be done by humans Statistics on pattern of behavior of banned individual, whether wrong people have ever been flagged What conduct rule in particular was deemed violated by the algorithm.

Twitter treatment

A contextual analysis of the actual subject of the comment an explanation of the 70% threshold Definition of the characteristics Explanation of Sentiment Analysis Explanation on what is sentiment analysis and how it was judged I am perfectly satisfied with the explanation exactly as it is. I'm satisfied with the information. It should be stacked. All of the bars should add together. The way it's set up now, it could be at 69% threshold for all criteria and still would not have any action taken against it. more detailed explanation of the graph No other information required. nothing, it is ridiculous Proper spelling and explanation of sentiment decisions What "sentiment analysis" means. Is this thing reacting to everything it views as expressing a negative or argumentative attitude? when does using offensive vocabulary mean you are guilty, then pretty much all of us would be in jail and not got out of college Why Twitter feels the need to implement an algorithm like this at all.

Recidivism control

A human isn't simple enough, there are going to be many factors that won't be considered. Again - riduculous just as previous answer - doesn't take "person" into account, just numbers An explanation of why and how they use an algorithm in court–and who allowed it. basically, it needs tons more information to make a decision like that none past success percentage Statistics on accuracy the specific information the algorithm uses to make the assessment what happened to innocent until proven guilty? you can not make assessment of someone based on algorithm when they did not do anything wrong whether there's any human oversight into the decision

Recidivism treatment

A possibility of a human psychologist or social worker weighing in on the algorithm results too. An explanation of how level of criminal personality was determined. biases of those who wrote the algorithm Definitions of each How it can assume that everyone is the same based on answers. human evaluation I want to review the source code, the questions, the regression test results (when it was tested on repeat offenders) I would like to know what information the algorithm considered when making the decision. I'm already satisfied with the explanation. More detailed breakdown of what is meant in this context by phrases like "criminal personality" NONE Numbers records showing other uses that turned out to be accurate and the percentage of accuracy overall

Demographic

```
#ageGroup','race','gender','socMed','educ','feedback','duration'
# par(mfrow=c(2,2))
```

```
# hist(dt$gender,  main = "Gender")
# hist(dt$ageGroup, main = "Age")
# hist(dt$socMed, main= "Social Media Usage")
# hist(dt$edu,  main = "Educational level")
#barplot(prop.table(table(dt$race)))
```

Interesting? Our MTers are mostly college students?

Regression Models

Twitter Moderation

Create linear models for each question for both Twitter and recidivism. The models subset the data to look only at those respondents that were assigned to either treatment or control for that context. In this way, someone who attrited in teh first context will not count against the second context.

```
mtFair <- ivreg(tFair ~ tTreat, data = dc[tAssign == 1])
mtAcc <- ivreg(tAcc ~ tTreat, data = dc[tAssign == 1])
mtSat <- ivreg(tSat ~ tTreat, data = dc[tAssign == 1])
mtUseful <- ivreg(tUseful ~ tTreat, data = dc[tAssign == 1])
mtClear <- ivreg(tClear ~ tTreat, data = dc[tAssign == 1])
mtMeaningful <- ivreg(tMeaningful ~ tTreat, data = dc[tAssign == 1])

stargazer(mtFair, mtAcc, mtSat, mtUseful, mtClear, mtMeaningful,
          type = 'text',
          covariate.labels = c("Explanation"),
          dep.var.labels = c("Fairness", "Accuracy", "Satisfaction", "Usefulness",
                             "Clarity", "Meaningfulness"),
          dep.var.caption = "Twitter Moderation")
```

```
##
## ===============================================================================================
##                                              Twitter Moderation
##                                 ------------------------------------------------------------
##                                 Fairness Accuracy Satisfaction Usefulness Clarity  Meaningfulness
##                                   (1)      (2)        (3)         (4)       (5)         (6)
## -----------------------------------------------------------------------------------------------
## Explanation                     0.242**   0.157*    0.367***    0.545***  0.332***    0.467***
##                                 (0.096)  (0.087)    (0.091)     (0.094)   (0.093)     (0.096)
##
## Constant                        3.197*** 3.371***   3.524***    2.965***  3.530***    2.886***
##                                 (0.068)  (0.061)    (0.064)     (0.067)   (0.066)     (0.068)
##
## -----------------------------------------------------------------------------------------------
## Observations                      627      627        627         627       627         627
## R2                               0.010    0.005      0.025       0.050     0.020       0.036
## Adjusted R2                      0.008    0.004      0.024       0.049     0.018       0.035
## Residual Std. Error (df = 625)   1.203    1.091      1.139       1.183     1.170       1.202
## ===============================================================================================
## Note:                                                                 *p<0.1; **p<0.05; ***p<0.01
```

```
dc[(tAssign == 1 & tSat == 0), .N]
```

```
## [1] 0
```

```r
dc[(tAssign == 1 & tMeaningful == 0), .N]
```

```
## [1] 1
```

This shows that 1 person dropped out between seeing the treatment and responding in the Twitter context. This is probably not affecting our last few metrics, but they are all statistically significant by a large margin anyway. This represents our intent to treat effect.

However, they get through all of the first three questions, so those responses are not affected by attrition.

```r
mrFair <- lm(rFair ~ rTreat, data = dc[rAssign == 1])
mrAcc <- lm(rAcc ~ rTreat, data = dc[rAssign == 1])
mrSat <- lm(rSat ~ rTreat, data = dc[rAssign == 1])
mrUseful <- lm(rUseful ~ rTreat, data = dc[rAssign == 1])
mrClear <- lm(rClear ~ rTreat, data = dc[rAssign == 1])
mrMeaningful <- lm(rMeaningful ~ rTreat, data = dc[rAssign == 1])

stargazer(mrFair, mrAcc, mrSat, mrUseful, mrClear, mrMeaningful,
          type = 'text',
          covariate.labels = c("Explanation"),
          dep.var.labels = c("Fairness", "Accuracy", "Satisfaction", "Usefulness",
                             "Clarity", "Meaningfulness"),
          dep.var.caption = "Recidivism Risk Assessment")
```

```
##
## ==========================================================================================
##                                                  Recidivism Risk Assessment
##                                 ------------------------------------------------------------
##                                 Fairness  Accuracy  Satisfaction Usefulness  Clarity  Meaningfulness
##                                    (1)       (2)        (3)         (4)        (5)         (6)
## ------------------------------------------------------------------------------------------
## Explanation                     0.726***  0.440***    0.649***    0.872***  0.906***     0.736***
##                                  (0.088)   (0.082)    (0.099)     (0.095)    (0.103)     (0.095)
##
## Constant                        2.423***  2.718***    2.750***    2.324***  2.705***     2.388***
##                                  (0.062)   (0.058)    (0.070)     (0.068)    (0.073)     (0.067)
##
## ------------------------------------------------------------------------------------------
## Observations                       628       628        628         628        628         628
## R2                                0.098     0.044      0.064       0.118      0.109       0.088
## Adjusted R2                       0.097     0.042      0.063       0.117      0.108       0.086
## Residual Std. Error (df = 626)    1.102     1.029      1.239       1.192      1.295       1.189
## F Statistic (df = 1; 626)       68.079*** 28.723***  43.073***   84.045***  76.767***   60.139***
## ==========================================================================================
## Note:                                                                  *p<0.1; **p<0.05; ***p<0.01
```

```r
dc[(rAssign == 1 & rSat == 0), .N]
```

```
## [1] 0
```

```r
dc[(rAssign == 1 & rMeaningful == 0), .N]
```

```
## [1] 3
```

This shows that 3 people dropped out between seeing the treatment and responding in the recidivism context. This could be throwing off the last few metrics, but those are all statistically significant by a large margin. This represents our intent to treat effect.

Difference in Order

We also discussed looking at the difference in responses depending on the order of contexts.

```
otFair <-       lm(tFair ~ First.Context + tTreat + rTreat + tTreat*rTreat, data = dc[tAssign == 1])
otAcc <-        lm(tAcc ~ First.Context+ tTreat + rTreat + tTreat*rTreat, data = dc[tAssign == 1])
otSat <-        lm(tSat ~ First.Context+ tTreat + rTreat + tTreat*rTreat, data = dc[tAssign == 1])
otUseful <-     lm(tUseful ~ First.Context+ tTreat + rTreat + tTreat*rTreat, data = dc[tAssign == 1])
otClear <-      lm(tClear ~ First.Context+ tTreat + rTreat + tTreat*rTreat, data = dc[tAssign == 1])
otMeaningful <- lm(tMeaningful ~ First.Context+ tTreat + rTreat + tTreat*rTreat, data = dc[tAssign == 1

library(stargazer)
stargazer(otFair, otAcc, otSat, otUseful, otClear, otMeaningful,
          type = 'text',
          dep.var.labels = c("Fairness", "Accuracy", "Satisfaction", "Usefulness",
                             "Clarity", "Meaningfulness"),
          dep.var.caption = "Twitter Moderation")
```

```
##
## ==========================================================================================
##                                                    Twitter Moderation
##                                 ------------------------------------------------------------
##                                 Fairness Accuracy Satisfaction Usefulness Clarity  Meaningfulness
##                                   (1)      (2)        (3)         (4)       (5)         (6)
## ------------------------------------------------------------------------------------------
## First.ContextTwitter             0.102    0.153*     0.160*      0.012     0.018       -0.112
##                                 (0.096)  (0.087)    (0.091)     (0.095)   (0.094)     (0.096)
##
## tTreat                          0.268**   0.224*    0.517***    0.656***  0.448***    0.629***
##                                 (0.136)  (0.123)    (0.128)     (0.134)   (0.132)     (0.136)
##
## rTreat                           -0.050   0.110      0.123       0.108     0.124       0.254*
##                                 (0.136)  (0.123)    (0.128)     (0.133)   (0.132)     (0.135)
##
## tTreat:rTreat                    -0.050   -0.133     -0.298      -0.223    -0.231     -0.324*
##                                 (0.192)  (0.174)    (0.182)     (0.189)   (0.187)     (0.192)
##
## Constant                        3.170*** 3.239***   3.381***    2.905***  3.459***    2.816***
##                                 (0.107)  (0.097)    (0.101)     (0.106)   (0.105)     (0.107)
##
## ------------------------------------------------------------------------------------------
## Observations                      627      627        627         627       627         627
## R2                               0.013    0.011      0.035       0.053     0.022       0.044
## Adjusted R2                      0.007    0.005      0.028       0.047     0.016       0.038
## Residual Std. Error (df = 622)   1.204    1.090      1.136       1.184     1.171       1.200
## F Statistic (df = 4; 622)        2.040*   1.801     5.585***    8.635***  3.541***    7.214***
## ==========================================================================================
## Note:                                                                *p<0.1; **p<0.05; ***p<0.01
```

In the case of Twitter moderation, there does not seem to be a difference based on order of context.

```
orFair <-       lm(rFair ~ First.Context + rTreat + tTreat + rTreat*tTreat, data = dc[rAssign == 1])
orAcc <-        lm(rAcc ~ First.Context + rTreat + tTreat + rTreat*tTreat, data = dc[rAssign == 1])
orSat <-        lm(rSat ~ First.Context + rTreat + tTreat + rTreat*tTreat, data = dc[rAssign == 1])
orUseful <-     lm(rUseful ~ First.Context + rTreat + tTreat + rTreat*tTreat, data = dc[rAssign == 1])
```

```r
orClear <-      lm(rClear ~ First.Context + rTreat + tTreat + rTreat*tTreat, data = dc[rAssign == 1])
orMeaningful <- lm(rMeaningful ~ First.Context + rTreat + tTreat + rTreat*tTreat, data = dc[rAssign ==

library(stargazer)
stargazer(orFair, orAcc, orSat, orUseful, orClear, orMeaningful,
          type = 'text',
          dep.var.labels = c("Fairness", "Accuracy", "Satisfaction", "Usefulness",
                             "Clarity", "Meaningfulness"),
          dep.var.caption = "Recidivism Risk Assessment")
```

```
##
## ==========================================================================================
##                                          Recidivism Risk Assessment
##                                 ------------------------------------------------------------
##                                 Fairness  Accuracy Satisfaction Usefulness  Clarity  Meaningfulness
##                                    (1)       (2)        (3)         (4)        (5)         (6)
## ------------------------------------------------------------------------------------------
## First.ContextTwitter             -0.063    -0.043     -0.140     -0.191**  -0.263**      -0.110
##                                  (0.088)   (0.082)    (0.099)     (0.095)    (0.103)     (0.095)
##
## rTreat                          0.608***  0.430***   0.658***    0.862***  0.885***     0.716***
##                                  (0.124)   (0.116)    (0.139)     (0.134)    (0.145)     (0.134)
##
## tTreat                           0.012     0.019      0.201       0.159      0.100       -0.020
##                                  (0.125)   (0.117)    (0.140)     (0.135)    (0.146)     (0.135)
##
## rTreat:tTreat                    0.236     0.020      -0.020      0.019      0.039       0.040
##                                  (0.176)   (0.165)    (0.197)     (0.190)    (0.206)     (0.190)
##
## Constant                        2.449***  2.730***   2.721***    2.341***  2.788***     2.453***
##                                  (0.098)   (0.092)    (0.110)     (0.106)    (0.115)     (0.106)
##
## ------------------------------------------------------------------------------------------
## Observations                       628       628        628         628        628         628
## R2                                0.105     0.045      0.073       0.128      0.120       0.090
## Adjusted R2                       0.099     0.038      0.067       0.123      0.115       0.084
## Residual Std. Error (df = 623)    1.101     1.031      1.236       1.188      1.290       1.190
## F Statistic (df = 4; 623)      18.199*** 7.255***  12.252***   22.951***  21.312***   15.347***
## ==========================================================================================
## Note:                                                          *p<0.1; **p<0.05; ***p<0.01
```

Other Factors

```r
otFair <-       lm(tFair ~ tTreat + ageGroup + educ + socMed + black + asian + hispanic + other + pac_is
otAcc <-        lm(tAcc ~ tTreat + ageGroup + educ + socMed + black + asian + hispanic + other + pac_isl
otSat <-        lm(tSat ~ tTreat + ageGroup + educ + socMed + black + asian + hispanic + other + pac_isl
otUseful <-     lm(tUseful ~ tTreat + ageGroup + educ + socMed + black + asian + hispanic + other + pac
otClear <-      lm(tClear ~ tTreat + ageGroup + educ + socMed + black + asian + hispanic + other + pac_i
otMeaningful <- lm(tMeaningful ~ tTreat + ageGroup + educ + socMed + black + asian + hispanic + other +

library(stargazer)
stargazer(otFair, otAcc, otSat, otUseful, otClear, otMeaningful,
```

```r
        type = 'text',
        covariate.labels = c("Explanation", "Age Group", "Education", "Social Media"),
        dep.var.labels = c("Fairness", "Accuracy", "Satisfaction", "Usefulness",
                           "Clarity", "Meaningfulness"),
        dep.var.caption = "Twitter Moderation")
```

```
##
## ==========================================================================================
##                                                    Twitter Moderation
##                                 ---------------------------------------------------------------
##                                 Fairness  Accuracy Satisfaction Usefulness Clarity  Meaningfulness
##                                    (1)      (2)        (3)         (4)       (5)         (6)
## ------------------------------------------------------------------------------------------
## Explanation                     0.219**   0.148*    0.347***    0.555***  0.350***    0.489***
##                                 (0.096)  (0.088)    (0.092)     (0.094)   (0.093)     (0.096)
##
## Age Group                        0.016    0.036      0.008       -0.025    0.004       0.025
##                                 (0.043)  (0.039)    (0.041)     (0.042)   (0.042)     (0.043)
##
## Education                        0.031    0.004      0.022       0.037     0.004       0.026
##                                 (0.037)  (0.034)    (0.036)     (0.037)   (0.036)     (0.037)
##
## Social Media                     0.022    0.041     -0.097*      -0.077   -0.142**    -0.102*
##                                 (0.062)  (0.056)    (0.059)     (0.061)   (0.060)     (0.061)
##
## black                           -0.203    -0.174     -0.116      -0.236    -0.328      -0.182
##                                 (0.207)  (0.188)    (0.197)     (0.203)   (0.200)     (0.205)
##
## asian                           -0.130    -0.031     0.054       0.078     0.057       0.227*
##                                 (0.127)  (0.115)    (0.121)     (0.124)   (0.123)     (0.126)
##
## hispanic                        -0.429*   -0.252     -0.135     -0.406*    -0.157     -0.548**
##                                 (0.230)  (0.209)    (0.219)     (0.226)   (0.223)     (0.228)
##
## other                          -1.579***  -0.680     -0.459      -0.208    -0.464      -0.637
##                                 (0.538)  (0.489)    (0.513)     (0.528)   (0.520)     (0.534)
##
## pac_isle                         0.714    0.591      1.093      -2.649**  -1.945*     -2.630**
##                                 (1.199)  (1.090)    (1.143)     (1.175)   (1.159)     (1.189)
##
## female                         0.265***  0.269***   0.224**      0.117     0.188*      0.025
##                                 (0.102)  (0.093)    (0.097)     (0.100)   (0.099)     (0.101)
##
## gender_nc                        0.600    0.596      0.154       0.405     0.117       -0.378
##                                 (1.199)  (1.090)    (1.143)     (1.175)   (1.159)     (1.189)
##
## Constant                       2.666***  3.088***   3.250***    2.613***  3.602***    2.552***
##                                 (0.539)  (0.490)    (0.514)     (0.528)   (0.521)     (0.535)
##
## ------------------------------------------------------------------------------------------
## Observations                      620      620        620         620       620         620
## R2                               0.044    0.030      0.042       0.077     0.048       0.073
## Adjusted R2                      0.027    0.012      0.025       0.060     0.031       0.056
## Residual Std. Error (df = 608)   1.193    1.085      1.137       1.170     1.154       1.183
```

```
## F Statistic (df = 11; 608)     2.549***   1.699*    2.442***    4.603***  2.780***    4.347***
## ==========================================================================================
## Note:                                                                  *p<0.1; **p<0.05; ***p<0.01
```

Women were statistically significantly more likely than men to agree with the Twitter decision. Pacific Islanders did not like the explanation.

```
orFair <-       lm(rFair ~ rTreat + ageGroup + educ + socMed + socMed^2 + black + asian + hispanic + otl
orAcc <-        lm(rAcc ~ rTreat + ageGroup + educ + socMed + socMed^2 + black + asian + hispanic + othe
orSat <-        lm(rSat ~ rTreat + ageGroup + educ + socMed + socMed^2 + black + asian + hispanic + othe
orUseful <-     lm(rUseful ~ rTreat + ageGroup + educ + socMed + socMed^2 + black + asian + hispanic + o
orClear <-      lm(rClear ~ rTreat + ageGroup + educ + socMed + socMed^2 + black + asian + hispanic + ot
orMeaningful <- lm(rMeaningful ~ rTreat + ageGroup + educ + socMed + socMed^2 + black + asian + hispanic

library(stargazer)
stargazer(otFair, otAcc, otSat, otUseful, otClear, otMeaningful,
          type = 'text',
          covariate.labels = c("Explanation", "Age Group", "Education", "Social Media", "Social Media2")
          dep.var.labels = c("Fairness", "Accuracy", "Satisfaction", "Usefulness",
                             "Clarity", "Meaningfulness"),
          dep.var.caption = "Recidivism Risk Assessment")
```

```
##
## ==========================================================================================
##                                                  Recidivism Risk Assessment
##                                 ---------------------------------------------------------------
##                                 Fairness  Accuracy Satisfaction Usefulness Clarity  Meaningfulness
##                                    (1)      (2)        (3)         (4)       (5)         (6)
## ------------------------------------------------------------------------------------------
## Explanation                     0.219**   0.148*    0.347***    0.555***  0.350***    0.489***
##                                 (0.096)  (0.088)    (0.092)     (0.094)   (0.093)     (0.096)
##
## Age Group                        0.016    0.036      0.008       -0.025    0.004       0.025
##                                 (0.043)  (0.039)    (0.041)     (0.042)   (0.042)     (0.043)
##
## Education                        0.031    0.004      0.022       0.037     0.004       0.026
##                                 (0.037)  (0.034)    (0.036)     (0.037)   (0.036)     (0.037)
##
## Social Media                     0.022    0.041     -0.097*      -0.077   -0.142**    -0.102*
##                                 (0.062)  (0.056)    (0.059)     (0.061)   (0.060)     (0.061)
##
## Social Media2                   -0.203    -0.174     -0.116      -0.236    -0.328      -0.182
##                                 (0.207)  (0.188)    (0.197)     (0.203)   (0.200)     (0.205)
##
## asian                           -0.130    -0.031     0.054       0.078     0.057       0.227*
##                                 (0.127)  (0.115)    (0.121)     (0.124)   (0.123)     (0.126)
##
## hispanic                        -0.429*   -0.252     -0.135     -0.406*    -0.157     -0.548**
##                                 (0.230)  (0.209)    (0.219)     (0.226)   (0.223)     (0.228)
##
## other                          -1.579***  -0.680     -0.459      -0.208    -0.464      -0.637
##                                 (0.538)  (0.489)    (0.513)     (0.528)   (0.520)     (0.534)
##
## pac_isle                         0.714    0.591      1.093      -2.649**  -1.945*     -2.630**
##                                 (1.199)  (1.090)    (1.143)     (1.175)   (1.159)     (1.189)
```

```
##
## female                          0.265***  0.269***   0.224**     0.117     0.188*      0.025
##                                  (0.102)  (0.093)    (0.097)     (0.100)   (0.099)     (0.101)
##
## gender_nc                        0.600    0.596      0.154       0.405     0.117       -0.378
##                                  (1.199)  (1.090)    (1.143)     (1.175)   (1.159)     (1.189)
##
## Constant                        2.666***  3.088***   3.250***    2.613***  3.602***    2.552***
##                                  (0.539)  (0.490)    (0.514)     (0.528)   (0.521)     (0.535)
##
## ------------------------------------------------------------------------------------------------
## Observations                      620      620        620         620       620         620
## R2                                0.044    0.030      0.042       0.077     0.048       0.073
## Adjusted R2                       0.027    0.012      0.025       0.060     0.031       0.056
## Residual Std. Error (df = 608)    1.193    1.085      1.137       1.170     1.154       1.183
## F Statistic (df = 11; 608)      2.549***   1.699*    2.442***    4.603***  2.780***    4.347***
## ================================================================================================
## Note:                                                                *p<0.1; **p<0.05; ***p<0.01
```

Again, Pacific Islanders rated the explanation worse than others.

Data Checks

```
d[is.na(random)]
```

```
##            ResponseID          ResponseSet       IPAddress
##  1: R_2v69taLV3v9B0JK Default Response Set  141.211.120.79
##  2: R_1FOGRrdExvqmcfB Default Response Set 108.247.233.242
##  3: R_3n7z1iEjtdM6j4r Default Response Set     59.97.52.72
##  4: R_1mQbHGvzBLwjXT3 Default Response Set   73.178.168.46
##  5: R_2Cdm5f3dzUPOQCx Default Response Set    71.83.244.72
##  6: R_ZfPoGNloc70vd3X Default Response Set  117.216.30.200
##  7: R_zUXTmV9teb5ve0x Default Response Set    50.88.107.50
##  8: R_5iL3KkeDppmQH9n Default Response Set  68.101.202.229
##  9: R_1lyMJTGEG3AOpXI Default Response Set  182.65.174.207
## 10: R_2qxBAAwrhLPEnsW Default Response Set   73.188.87.107
## 11: R_z73qJd4VX50kZGN Default Response Set  14.195.229.229
## 12: R_RKASQRmCFO5750B Default Response Set   74.109.193.29
## 13: R_2qrChwva1dZ0l9j Default Response Set  75.129.219.187
## 14: R_RhlTsv6w4kYfqxz Default Response Set    69.11.148.23
## 15: R_1PdZqzrj9445W2n Default Response Set   66.68.202.189
## 16: R_SOXL0vUKRIeYRMt Default Response Set  24.186.101.183
## 17: R_1rHbD3PtawzKeC2 Default Response Set   198.24.30.133
## 18: R_2UbwResocVbp6aA Default Response Set   157.50.15.145
## 19: R_ZJmNWyfdlFJsjD3 Default Response Set  162.95.216.224
##               StartDate             EndDate RecipientLastName
##  1: 2017-08-04 17:38:59 2017-08-04 17:39:06                NA
##  2: 2017-08-04 17:39:20 2017-08-04 17:39:25                NA
##  3: 2017-08-04 17:40:24 2017-08-04 17:40:45                NA
##  4: 2017-08-04 17:41:35 2017-08-04 17:42:54                NA
##  5: 2017-08-04 17:43:07 2017-08-04 17:43:17                NA
##  6: 2017-08-04 17:50:04 2017-08-04 17:50:51                NA
##  7: 2017-08-04 17:51:09 2017-08-04 17:52:43                NA
```

```
##  8: 2017-08-04 18:05:04 2017-08-04 18:06:09                NA
##  9: 2017-08-04 17:49:20 2017-08-04 18:09:16                NA
## 10: 2017-08-04 18:11:07 2017-08-04 18:11:32                NA
## 11: 2017-08-04 17:39:56 2017-08-04 18:13:05                NA
## 12: 2017-08-04 18:15:45 2017-08-04 18:16:41                NA
## 13: 2017-08-04 18:17:58 2017-08-04 18:18:16                NA
## 14: 2017-08-04 18:24:19 2017-08-04 18:24:45                NA
## 15: 2017-08-04 18:26:22 2017-08-04 18:26:37                NA
## 16: 2017-08-04 18:27:37 2017-08-04 18:28:15                NA
## 17: 2017-08-04 18:28:37 2017-08-04 18:29:04                NA
## 18: 2017-08-04 17:55:07 2017-08-04 18:37:43                NA
## 19: 2017-08-04 18:07:35 2017-08-04 18:38:05                NA
##     RecipientFirstName RecipientEmail ExternalDataReference Finished
##  1:                 NA             NA                     NA        0
##  2:                 NA             NA                     NA        0
##  3:                 NA             NA                     NA        0
##  4:                 NA             NA                     NA        0
##  5:                 NA             NA                     NA        0
##  6:                 NA             NA                     NA        0
##  7:                 NA             NA                     NA        0
##  8:                 NA             NA                     NA        0
##  9:                 NA             NA                     NA        0
## 10:                 NA             NA                     NA        0
## 11:                 NA             NA                     NA        0
## 12:                 NA             NA                     NA        0
## 13:                 NA             NA                     NA        0
## 14:                 NA             NA                     NA        0
## 15:                 NA             NA                     NA        0
## 16:                 NA             NA                     NA        0
## 17:                 NA             NA                     NA        0
## 18:                 NA             NA                     NA        0
## 19:                 NA             NA                     NA        0
##     Status Q_TotalDuration First.Context
##  1:      0               7    Recidivism
##  2:      0               4       Twitter
##  3:      0              20       Twitter
##  4:      0              78       Twitter
##  5:      0               9    Recidivism
##  6:      0              46    Recidivism
##  7:      0              93       Twitter
##  8:      0              64       Twitter
##  9:      0            1195    Recidivism
## 10:      0              24    Recidivism
## 11:      0            1989    Recidivism
## 12:      0              56    Recidivism
## 13:      0              18    Recidivism
## 14:      0              25    Recidivism
## 15:      0              15       Twitter
## 16:      0              37    Recidivism
## 17:      0              26       Twitter
## 18:      0            2555       Twitter
## 19:      0            1829    Recidivism
##     Enter.Embedded.Data.Field.Name.Here... random Q1.1 Q2.1 Q3.1 Q3.2 Q3.3
##  1:                                     NA     NA    1   NA   NA   NA   NA
```

```
##  2:                                        NA     NA    1   NA   NA   NA   NA
##  3:                                        NA     NA    1    1   NA   NA   NA
##  4:                                        NA     NA    1    1    1    3    3
##  5:                                        NA     NA    1   NA   NA   NA   NA
##  6:                                        NA     NA    1   NA   NA   NA   NA
##  7:                                        NA     NA    1    1    1    1    5
##  8:                                        NA     NA    1    1   NA   NA   NA
##  9:                                        NA     NA    1   NA   NA   NA   NA
## 10:                                        NA     NA    1    1   NA   NA   NA
## 11:                                        NA     NA    1    1   NA   NA   NA
## 12:                                        NA     NA    1   NA   NA   NA   NA
## 13:                                        NA     NA    1   NA   NA   NA   NA
## 14:                                        NA     NA    1   NA   NA   NA   NA
## 15:                                        NA     NA    1    1   NA   NA   NA
## 16:                                        NA     NA    1   NA   NA   NA   NA
## 17:                                        NA     NA    1    1    1    2    3
## 18:                                        NA     NA    1    1   NA   NA   NA
## 19:                                        NA     NA    1   NA   NA   NA   NA
##     Q3.4 Q3.5 Q3.6 Q3.7 Q3.8 Q3.9_1 Q3.9_2 Q3.9_3 Q3.9_4 Q3.9_4_TEXT Q4.1
##  1:   NA   NA   NA   NA   NA     NA     NA     NA     NA                NA
##  2:   NA   NA   NA   NA   NA     NA     NA     NA     NA                NA
##  3:   NA   NA   NA   NA   NA     NA     NA     NA     NA                NA
##  4:    3    1    4    3    4     NA     NA      1     NA                NA
##  5:   NA   NA   NA   NA   NA     NA     NA     NA     NA                NA
##  6:   NA   NA   NA   NA   NA     NA     NA     NA     NA                NA
##  7:    5    1    5    5    5     NA      1     NA     NA                NA
##  8:   NA   NA   NA   NA   NA     NA     NA     NA     NA                 1
##  9:   NA   NA   NA   NA   NA     NA     NA     NA     NA                NA
## 10:   NA   NA   NA   NA   NA     NA     NA     NA     NA                NA
## 11:   NA   NA   NA   NA   NA     NA     NA     NA     NA                NA
## 12:   NA   NA   NA   NA   NA     NA     NA     NA     NA                NA
## 13:   NA   NA   NA   NA   NA     NA     NA     NA     NA                NA
## 14:   NA   NA   NA   NA   NA     NA     NA     NA     NA                NA
## 15:   NA   NA   NA   NA   NA     NA     NA     NA     NA                NA
## 16:   NA   NA   NA   NA   NA     NA     NA     NA     NA                NA
## 17:    3    1    2    2    2     NA     NA      1     NA                NA
## 18:   NA   NA   NA   NA   NA     NA     NA     NA     NA                 1
## 19:   NA   NA   NA   NA   NA     NA     NA     NA     NA                NA
##     Q4.2 Q4.3 Q4.4 Q4.5 Q4.6 Q4.7 Q4.8 Q4.9_1 Q4.9_2 Q4.9_3 Q4.9_4
##  1:   NA   NA   NA   NA   NA   NA   NA     NA     NA     NA     NA
##  2:   NA   NA   NA   NA   NA   NA   NA     NA     NA     NA     NA
##  3:   NA   NA   NA   NA   NA   NA   NA     NA     NA     NA     NA
##  4:   NA   NA   NA   NA   NA   NA   NA     NA     NA     NA     NA
##  5:   NA   NA   NA   NA   NA   NA   NA     NA     NA     NA     NA
##  6:   NA   NA   NA   NA   NA   NA   NA     NA     NA     NA     NA
##  7:   NA   NA   NA   NA   NA   NA   NA     NA     NA     NA     NA
##  8:    2    2    1   NA   NA   NA   NA     NA     NA     NA     NA
##  9:   NA   NA   NA   NA   NA   NA   NA     NA     NA     NA     NA
## 10:   NA   NA   NA   NA   NA   NA   NA     NA     NA     NA     NA
## 11:   NA   NA   NA   NA   NA   NA   NA     NA     NA     NA     NA
## 12:   NA   NA   NA   NA   NA   NA   NA     NA     NA     NA     NA
## 13:   NA   NA   NA   NA   NA   NA   NA     NA     NA     NA     NA
## 14:   NA   NA   NA   NA   NA   NA   NA     NA     NA     NA     NA
## 15:   NA   NA   NA   NA   NA   NA   NA     NA     NA     NA     NA
```

```
## 16:   NA   NA   NA   NA   NA   NA   NA     NA     NA     NA     NA
## 17:   NA   NA   NA   NA   NA   NA   NA     NA     NA     NA     NA
## 18:    2    2    2    1    4    3    4     NA      1     NA     NA
## 19:   NA   NA   NA   NA   NA   NA   NA     NA     NA     NA     NA
##     Q4.9_4_TEXT Q8.1 Q5.1 Q6.1 Q6.2 Q6.3 Q6.4 Q6.5 Q6.6 Q6.7 Q6.8 Q6.9_1
##  1:               NA    1   NA   NA   NA   NA   NA   NA   NA   NA     NA
##  2:               NA   NA   NA   NA   NA   NA   NA   NA   NA   NA     NA
##  3:               NA   NA   NA   NA   NA   NA   NA   NA   NA   NA     NA
##  4:                1   NA   NA   NA   NA   NA   NA   NA   NA   NA     NA
##  5:               NA    1   NA   NA   NA   NA   NA   NA   NA   NA     NA
##  6:               NA    1   NA   NA   NA   NA   NA   NA   NA   NA     NA
##  7:                1    1   NA   NA   NA   NA   NA   NA   NA   NA     NA
##  8:               NA   NA   NA   NA   NA   NA   NA   NA   NA   NA     NA
##  9:               NA    1   NA   NA   NA   NA   NA   NA   NA   NA     NA
## 10:                1    1   NA   NA   NA   NA   NA   NA   NA   NA     NA
## 11:                1    1    1    4    3    1    1    2    2    2     NA
## 12:               NA    1   NA   NA   NA   NA   NA   NA   NA   NA     NA
## 13:               NA    1   NA   NA   NA   NA   NA   NA   NA   NA     NA
## 14:               NA    1   NA   NA   NA   NA   NA   NA   NA   NA     NA
## 15:               NA   NA   NA   NA   NA   NA   NA   NA   NA   NA     NA
## 16:               NA    1    1    5    1    1   NA   NA   NA   NA     NA
## 17:                1    1   NA   NA   NA   NA   NA   NA   NA   NA     NA
## 18:                1    1    1    3    2    2   NA   NA   NA   NA     NA
## 19:               NA    1   NA   NA   NA   NA   NA   NA   NA   NA     NA
##     Q6.9_2 Q6.9_3 Q6.9_4 Q6.9_4_TEXT Q7.1 Q7.2 Q7.3 Q7.4 Q7.5 Q7.6 Q7.7
##  1:     NA     NA     NA              NA   NA   NA   NA   NA   NA   NA
##  2:     NA     NA     NA              NA   NA   NA   NA   NA   NA   NA
##  3:     NA     NA     NA              NA   NA   NA   NA   NA   NA   NA
##  4:     NA     NA     NA              NA   NA   NA   NA   NA   NA   NA
##  5:     NA     NA     NA              NA   NA   NA   NA   NA   NA   NA
##  6:     NA     NA     NA              NA   NA   NA   NA   NA   NA   NA
##  7:     NA     NA     NA              NA   NA   NA   NA   NA   NA   NA
##  8:     NA     NA     NA              NA   NA   NA   NA   NA   NA   NA
##  9:     NA     NA     NA               1   27    3    3   NA   NA   NA
## 10:     NA     NA     NA               1   28    4    4    1    2    2
## 11:      1     NA     NA              NA   NA   NA   NA   NA   NA   NA
## 12:     NA     NA     NA              NA   NA   NA   NA   NA   NA   NA
## 13:     NA     NA     NA              NA   NA   NA   NA   NA   NA   NA
## 14:     NA     NA     NA              NA   NA   NA   NA   NA   NA   NA
## 15:     NA     NA     NA              NA   NA   NA   NA   NA   NA   NA
## 16:     NA     NA     NA              NA   NA   NA   NA   NA   NA   NA
## 17:     NA     NA     NA               1   26    3    3    1    3    2
## 18:     NA     NA     NA              NA   NA   NA   NA   NA   NA   NA
## 19:     NA     NA     NA              NA   NA   NA   NA   NA   NA   NA
##     Q7.8 Q7.9_1 Q7.9_2 Q7.9_3 Q7.9_4 Q7.9_4_TEXT Q9.1 Q9.2 Q9.3_1 Q9.3_2
##  1:   NA     NA     NA     NA     NA              NA   NA     NA     NA
##  2:   NA     NA     NA     NA     NA              NA   NA     NA     NA
##  3:   NA     NA     NA     NA     NA              NA   NA     NA     NA
##  4:   NA     NA     NA     NA     NA              NA   NA     NA     NA
##  5:   NA     NA     NA     NA     NA              NA   NA     NA     NA
##  6:   NA     NA     NA     NA     NA              NA   NA     NA     NA
##  7:   NA     NA     NA     NA     NA              NA   NA     NA     NA
##  8:   NA     NA     NA     NA     NA              NA   NA     NA     NA
##  9:   NA     NA     NA     NA     NA              NA   NA     NA     NA
```

```
## 10:    3      1     NA      1     NA              NA   NA     NA     NA
## 11:   NA     NA     NA     NA     NA              NA   NA     NA     NA
## 12:   NA     NA     NA     NA     NA              NA   NA     NA     NA
## 13:   NA     NA     NA     NA     NA              NA   NA     NA     NA
## 14:   NA     NA     NA     NA     NA              NA   NA     NA     NA
## 15:   NA     NA     NA     NA     NA              NA   NA     NA     NA
## 16:   NA     NA     NA     NA     NA              NA   NA     NA     NA
## 17:    2     NA     NA      1     NA              NA   NA     NA     NA
## 18:   NA     NA     NA     NA     NA              NA   NA     NA     NA
## 19:   NA     NA     NA     NA     NA              NA   NA     NA     NA
##     Q9.3_3 Q9.3_4 Q9.3_5 Q9.3_6 Q9.3_7 Q9.4 Q9.5 Q9.6 Q10.1 Q10.2 Q10.3
##  1:     NA     NA     NA     NA     NA   NA   NA   NA    NA          NA
##  2:     NA     NA     NA     NA     NA   NA   NA   NA    NA          NA
##  3:     NA     NA     NA     NA     NA   NA   NA   NA    NA          NA
##  4:     NA     NA     NA     NA     NA   NA   NA   NA    NA          NA
##  5:     NA     NA     NA     NA     NA   NA   NA   NA    NA          NA
##  6:     NA     NA     NA     NA     NA   NA   NA   NA    NA          NA
##  7:     NA     NA     NA     NA     NA   NA   NA   NA    NA          NA
##  8:     NA     NA     NA     NA     NA   NA   NA   NA    NA          NA
##  9:     NA     NA     NA     NA     NA   NA   NA   NA    NA          NA
## 10:     NA     NA     NA     NA     NA   NA   NA   NA    NA          NA
## 11:     NA     NA     NA     NA     NA   NA   NA   NA    NA          NA
## 12:     NA     NA     NA     NA     NA   NA   NA   NA    NA          NA
## 13:     NA     NA     NA     NA     NA   NA   NA   NA    NA          NA
## 14:     NA     NA     NA     NA     NA   NA   NA   NA    NA          NA
## 15:     NA     NA     NA     NA     NA   NA   NA   NA    NA          NA
## 16:     NA     NA     NA     NA     NA   NA   NA   NA    NA          NA
## 17:     NA     NA     NA     NA     NA   NA   NA   NA    NA          NA
## 18:     NA     NA     NA     NA     NA   NA   NA   NA    NA          NA
## 19:     NA     NA     NA     NA     NA   NA   NA   NA    NA          NA
##     LocationLatitude LocationLongitude LocationAccuracy
##  1:               NA                NA               -1
##  2:               NA                NA               -1
##  3:               NA                NA               -1
##  4:               NA                NA               -1
##  5:               NA                NA               -1
##  6:               NA                NA               -1
##  7:               NA                NA               -1
##  8:               NA                NA               -1
##  9:               NA                NA               -1
## 10:               NA                NA               -1
## 11:               NA                NA               -1
## 12:               NA                NA               -1
## 13:               NA                NA               -1
## 14:               NA                NA               -1
## 15:               NA                NA               -1
## 16:               NA                NA               -1
## 17:               NA                NA               -1
## 18:               NA                NA               -1
## 19:               NA                NA               -1
```