ImpactDataViz 241 Final Project

```r
# load packages
library(data.table)
library(foreign)
library(sandwich)
library(stargazer)
```

```
##
## Please cite as:

##  Hlavac, Marek (2018). stargazer: Well-Formatted Regression and Summary Statistics Tables.

##  R package version 5.2.2. https://CRAN.R-project.org/package=stargazer
```

```r
library(lmtest)
```

```
## Loading required package: zoo

## Warning: package 'zoo' was built under R version 3.6.2

##
## Attaching package: 'zoo'

## The following objects are masked from 'package:base':
##
##     as.Date, as.Date.numeric
```

```r
library(tidyr)
```

```
## Warning: package 'tidyr' was built under R version 3.6.2
```

```r
library(knitr)
library('ggplot2')
library(fastDummies)
```

Common functions

```
# function to return confidence intervals with bust se
get_confint_robust = function(model, vcovCL) {
  t<-qt(.975, model$df.residual)
  ct<-coeftest(model, vcovCL)
  est<-cbind(ct[,1], ct[,1]-t*ct[,2], ct[,1]+t*ct[,2], ct[,4])
  colnames(est)<-c("Estimate","LowerCI","UpperCI","pValue")
  return(est)
}

# parse out the regression results using robust standard errors
get_regression_results_robust_se = function(model, df, variable_names, showAsTibble) {
  model$vcovHC = vcovHC(model,type="HC1")

  robust_se_all    <- sqrt(diag(model$vcovHC))

  est = get_confint_robust(model,model$vcovHC)

  robust_se = c(rep(0, length(variable_names)))
  i = 1
  for (variable_name in variable_names) {
    robust_se_single <- sqrt(diag( model$vcovHC))[variable_name]
    robust_se[i] = robust_se_single
    i = i + 1
  }

  coef = est[variable_names, ’Estimate’]
  ci_lower_robust = est[variable_names, ’LowerCI’]
  ci_lower_robust = est[variable_names, ’LowerCI’]
  ci_upper_robust = est[variable_names, ’UpperCI’]
  p_value = est[variable_names, ’pValue’]
  results = data.table(id = variable_names)
  results[, coef := round(coef,4)]
  results[, ci_lower := round(ci_lower_robust,4)]
  results[, ci_upper := round(ci_upper_robust,4)]
  results[, p_value := signif(p_value, 5)]
  results[, robust_se := round(robust_se,4)]

  if (showAsTibble) {
    print(as_tibble(results))
  }
  return( list(’estimates’=results, ’robust_se_all’=robust_se_all))
}
# Multiple plot function
#
# ggplot objects can be passed in ..., or to plotlist (as a list of ggplot objects)
# - cols:   Number of columns in layout
# - layout: A matrix specifying the layout. If present, ’cols’ is ignored.
#
# If the layout is something like matrix(c(1,2,3,3), nrow=2, byrow=TRUE),
# then plot 1 will go in the upper left, 2 will go in the upper right, and
# 3 will go all the way across the bottom.
#
multiplot <- function(..., plotlist=NULL, file, cols=1, layout=NULL) {
  library(grid)

  # Make a list from the ... arguments and plotlist
  plots <- c(list(...), plotlist)

  numPlots = length(plots)

  # If layout is NULL, then use ’cols’ to determine layout
  if (is.null(layout)) {
    # Make the panel
    # ncol: Number of columns of plots
    # nrow: Number of rows needed, calculated from # of cols
    layout <- matrix(seq(1, cols * ceiling(numPlots/cols)),
                    ncol = cols, nrow = ceiling(numPlots/cols))
  }

 if (numPlots==1) {
    print(plots[[1]])

  } else {
    # Set up the page
    grid.newpage()
    pushViewport(viewport(layout = grid.layout(nrow(layout), ncol(layout))))

    # Make each plot, in the correct location
    for (i in 1:numPlots) {
      # Get the i,j matrix positions of the regions that contain this subplot
      matchidx <- as.data.frame(which(layout == i, arr.ind = TRUE))

      print(plots[[i]], vp = viewport(layout.pos.row = matchidx$row,
                                      layout.pos.col = matchidx$col))
    }
  }
}
```

1. Parse the survey data into a data.table

```
parse_survey_data = function(filename, treatment_only=FALSE) {
  cat(filename, "\n")
  raw <- fread(filename)

  # covariates
  setnames(raw, ’Q3’, ’state’)
  setnames(raw, ’Q4’, ’gender’)
  setnames(raw, ’Q5’, ’age’)
  setnames(raw, ’Q6’, ’ethnicity_multi’)
  setnames(raw, ’Q7’, ’political_party’)
  setnames(raw, ’Q8’, ’education’)
  setnames(raw, ’Q9’, ’covid_sick’)
  setnames(raw, ’Q10’, ’covid_hospitalized’)
  setnames(raw, ’Q11’, ’covid_died’)
  # duration of survey time
  setnames(raw, ’Duration (in seconds)’, ’duration_of_survey’)

  # which block was active? (did the user see the treatment or
  # control data viz)
  setnames(raw, ’Q15’, ’treatment_viz_is_accurate’)
  if (!treatment_only) {
    setnames(raw, ’Q17’, ’control_viz_is_accurate’)
  }

  # outcome questions about COVID attitudes
  setnames(raw, ’Q18’, ’outcome_spread’)
  setnames(raw, ’Q19’, ’outcome_death’)

  # which block was active determines if
  # subject received treatment data viz or control
  # data viz
  cat(" number of responses", nrow(raw), ’\n’)
  raw[, treatment := ifelse(is.na(treatment_viz_is_accurate), 0, 1)]
  cleaned = raw[!is.na(outcome_spread) & !is.na(outcome_death),]
  cat(" number of responses after dropping na", nrow(cleaned), ’\n’)

  # ethnicity allows for multiple choice
  # for covariates, just grab the first one
  ethnicity_single = rep(0,nrow(cleaned))
  i = 1
  for (eth_entry in cleaned[,ethnicity_multi]) {
    eth_tokens = unlist(strsplit(eth_entry, ","))
    ethnicity_single[i] = as.numeric(eth_tokens[1])
    i = i + 1
  }
  cleaned[, ethnicity := ethnicity_single ]


  # counts in control vs treatment
  n_control = nrow(cleaned[treatment == 0, ])
  n_treatment = nrow(cleaned[treatment == 1, ])

  cat(" number in treatment", n_treatment, "\n")
  cat(" number in control", n_control, "\n\n")

  return(cleaned)
}
```

```
# A large run of 260 subjects run on 7/21
run1 <- parse_survey_data("data/run1.2020.07.21.csv")
```

```
## data/run1.2020.07.21.csv
##  number of responses 265
##  number of responses after dropping na 259
##  number in treatment 131
##  number in control 128
```

```
run1 = run1[, run := 0]
run1[, condition := treatment]


# One small run was done in evening 7/24 treatment only
run2_small <- parse_survey_data("data/run2.small.2020.07.24.csv", TRUE)
```

```
## data/run2.small.2020.07.24.csv
##  number of responses 33
##  number of responses after dropping na 30
##  number in treatment 30
##  number in control 0
```

```
run2_small[, run := 1]
run2_small[, condition := treatment]
run2_small[, control_viz_is_accurate := ""]

# A large run of 270 run on 7/25 treatment and control
run2_large <- parse_survey_data("data/run2.2020.07.25.csv")
```

```
## data/run2.2020.07.25.csv
##  number of responses 270
##  number of responses after dropping na 262
##  number in treatment 130
##  number in control 132
```

```
run2_large = run2_large[, run :=1]
run2_large[, condition := treatment]
run2 = rbind(run2_small, run2_large)


# Combine the runs on 7/21 and 7/25
combined = rbind(run1, run2)
```

2. EDA

2.1 Check Duration of Survey

```
show_duration = function(d) {
  cat('duration for control  ', mean(d[condition == 0,duration_of_survey]), '\n')
  cat('duration for treatment', mean(d[condition == 1,duration_of_survey]), '\n\n')
}
show_duration(run1)
```

```
## duration for control   153.1875
## duration for treatment 172.2061
```

```
show_duration(run2)
```

```
## duration for control   136.7955
## duration for treatment 205.5813
```

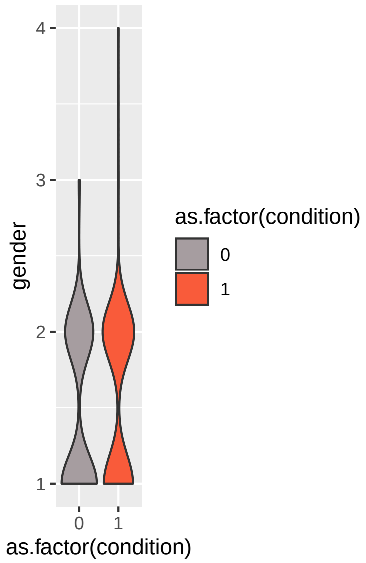
```
show_duration(combined)
```

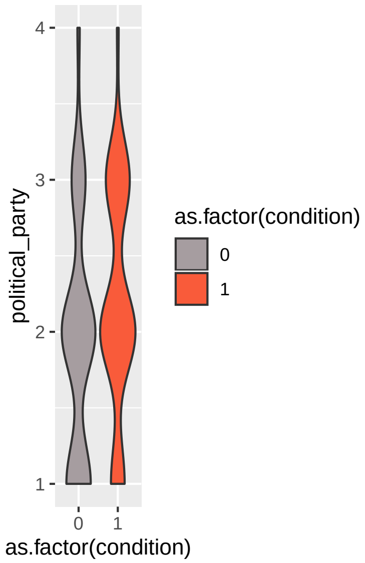
```
## duration for control   144.8654
## duration for treatment 190.5567
```

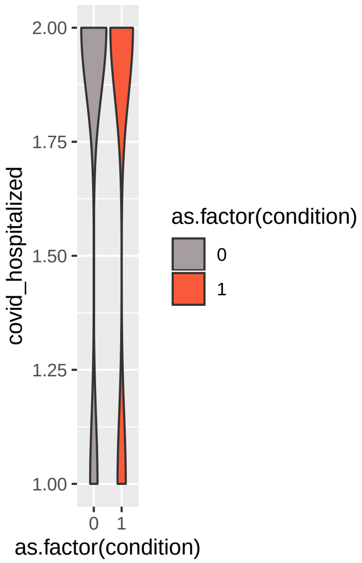
3. Covariate balance

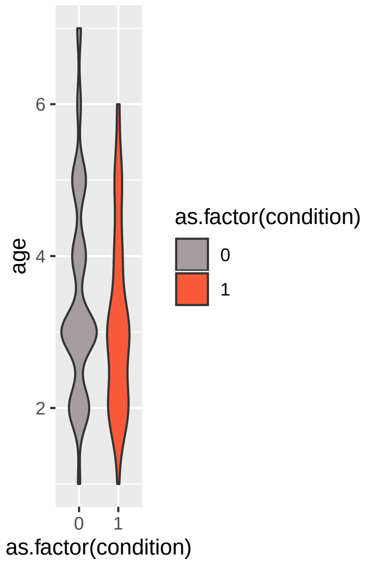
3.1 Compare distributions using violin plote

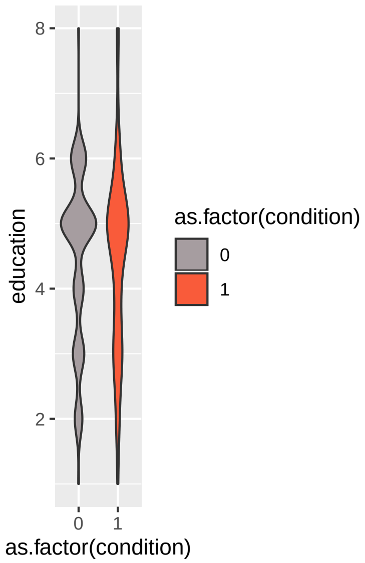
```
check_covariate_balance = function(d) {
  options(repr.plot.width = 14, repr.plot.height = 8)

  p1 = ggplot(d, aes(x=as.factor(condition), y=gender, fill=as.factor(condition))) +
    geom_violin() +  scale_fill_manual(values=c("#a69da0", "#f95b3a"))

  p2 = ggplot(d, aes(x=as.factor(condition), y=age, fill=as.factor(condition))) +
    geom_violin()  +  scale_fill_manual(values=c("#a69da0", "#f95b3a"))

  p3 = ggplot(d, aes(x=as.factor(condition), y=as.numeric(ethnicity),  fill=as.factor(condition))) +
    geom_violin() +  scale_fill_manual(values=c("#a69da0", "#f95b3a"))

  p4 = ggplot(d, aes(x=as.factor(condition), y=political_party,  fill=as.factor(condition))) +
    geom_violin() +  scale_fill_manual(values=c("#a69da0", "#f95b3a"))

  p5 = ggplot(d, aes(x=as.factor(condition), y=education,  fill=as.factor(condition))) +
    geom_violin() +  scale_fill_manual(values=c("#a69da0", "#f95b3a"))

  p6 = ggplot(d, aes(x=as.factor(condition), y=covid_sick,  fill=as.factor(condition))) +
    geom_violin() +  scale_fill_manual(values=c("#a69da0", "#f95b3a"))

  p7 = ggplot(d, aes(x=as.factor(condition), y=covid_hospitalized,  fill=as.factor(condition))) +
    geom_violin() +  scale_fill_manual(values=c("#a69da0", "#f95b3a"))

  p8 = ggplot(d, aes(x=as.factor(condition), y=covid_died, fill=as.factor(condition))) +
    geom_violin() +  scale_fill_manual(values=c("#a69da0", "#f95b3a"))

  p9 = ggplot(d, aes(x=as.factor(condition), y=state, fill=as.factor(condition))) +
    geom_violin() +  scale_fill_manual(values=c("#a69da0", "#f95b3a"))

  multiplot(p1, p2, p3, p4, p5, p6, p7, p8, p9, cols=3)
}
check_covariate_balance(run1)
```

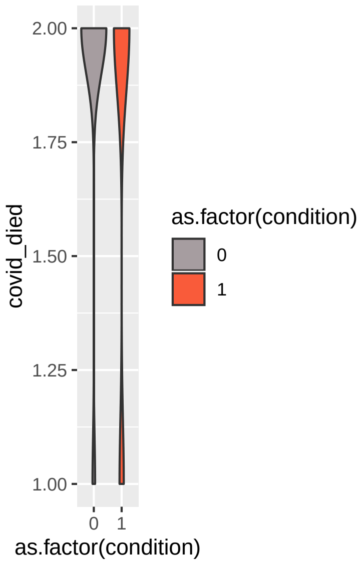

gender
4
3
2
1
0
1
as.factor(condition)
as.factor(condition)
0
1

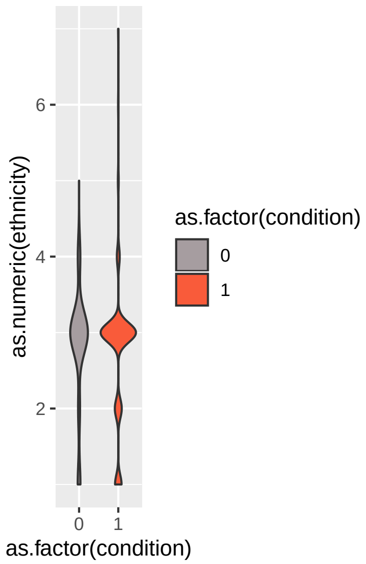

political_party
4
3
2
1
0
1
as.factor(condition)
as.factor(condition)
0
1

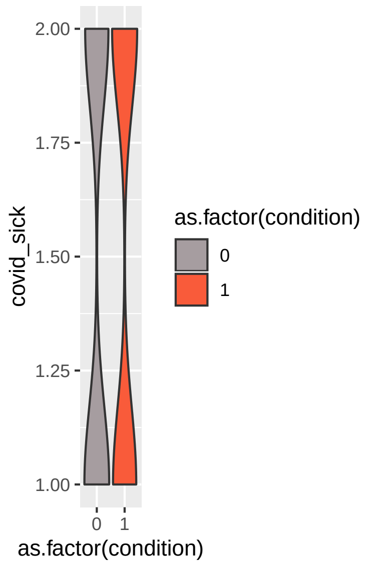

covid_hospitalized
2.00
1.75
1.50
1.25
1.00
0
1
as.factor(condition)
as.factor(condition)
0
1

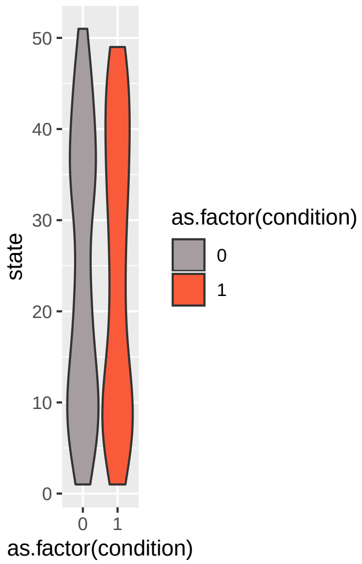

age
6
4
2
0
1
as.factor(condition)
as.factor(condition)
0
1


education
8
6
4
2
0
1
as.factor(condition)
as.factor(condition)
0
1

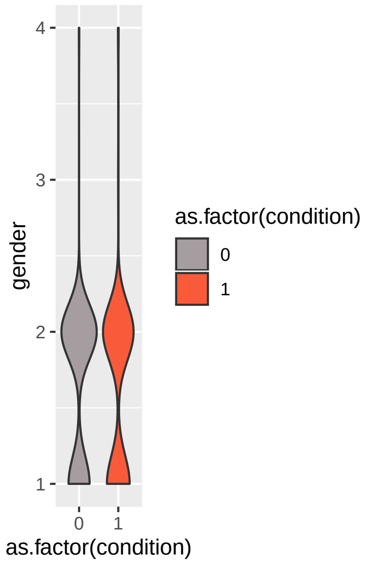

covid_died
2.00
1.75
1.50
1.25
1.00
0
1
as.factor(condition)
as.factor(condition)
0
1

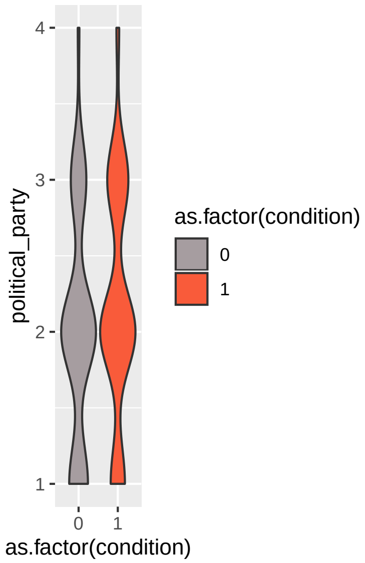

as.numeric(ethnicity)
6
4
2
0
1
as.factor(condition)
as.factor(condition)
0
1

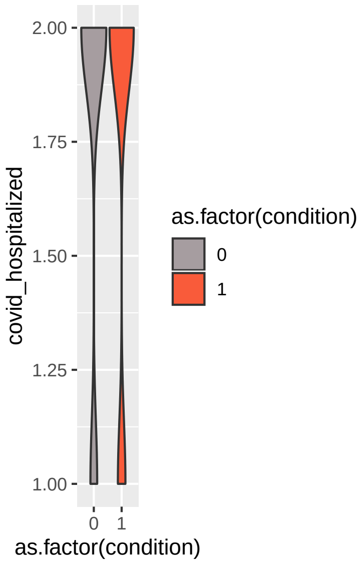

covid_sick
2.00
1.75
1.50
1.25
1.00
0
1
as.factor(condition)
as.factor(condition)
0
1

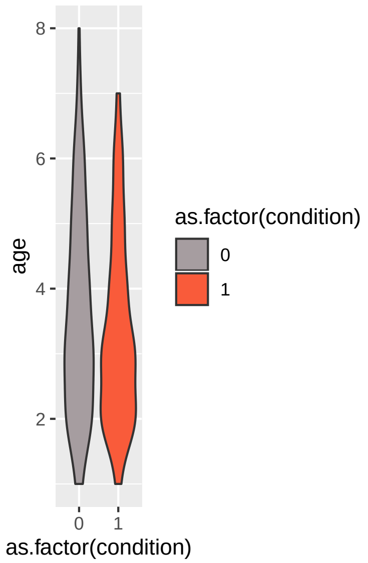

state
50
40
30
20
10
0
0
1
as.factor(condition)
as.factor(condition)
0
1

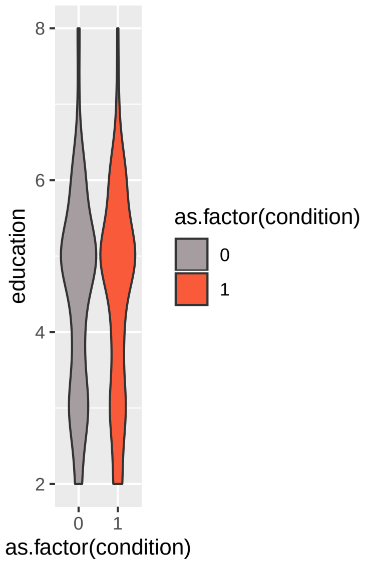
```
check_covariate_balance(run2)
```

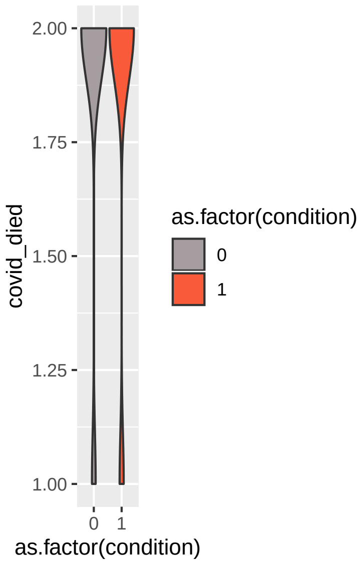

gender
4
3
2
1
0
1
as.factor(condition)
as.factor(condition)
0
1

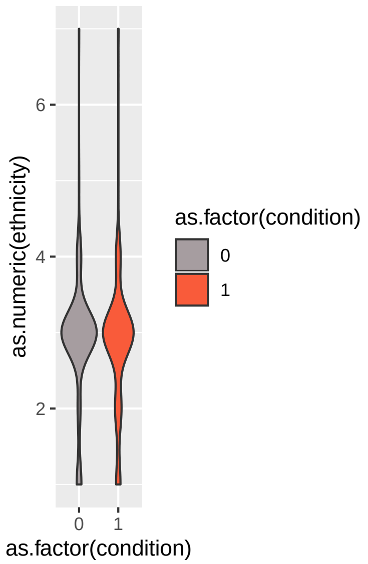

political_party
4
3
2
1
0
1
as.factor(condition)
as.factor(condition)
0
1

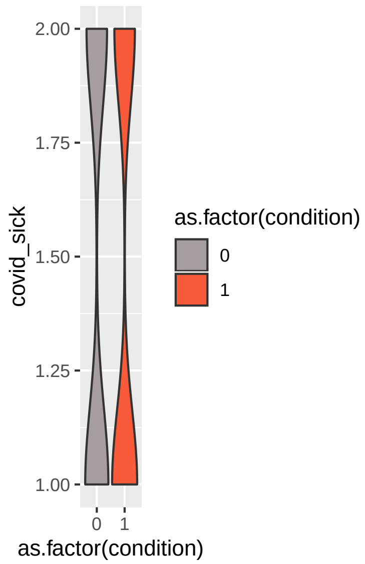

covid_hospitalized
2.00
1.75
1.50
1.25
1.00
0
1
as.factor(condition)
as.factor(condition)
0
1

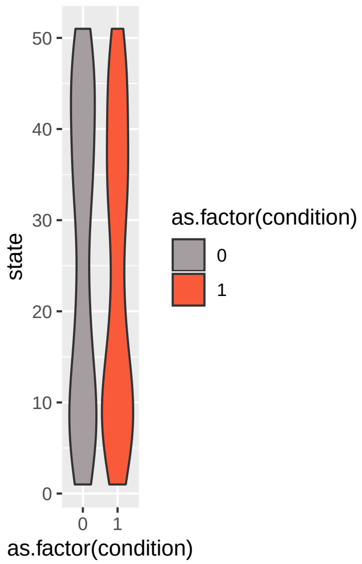

age
8
6
4
2
0
1
as.factor(condition)
as.factor(condition)
0
1


education
8
6
4
2
0
1
as.factor(condition)
as.factor(condition)
0
1

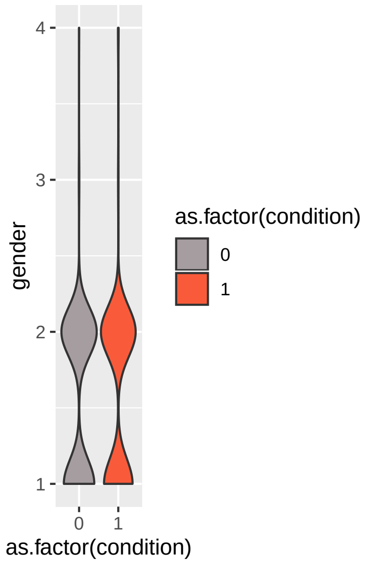

covid_died
2.00
1.75
1.50
1.25
1.00
0
1
as.factor(condition)
as.factor(condition)
0
1

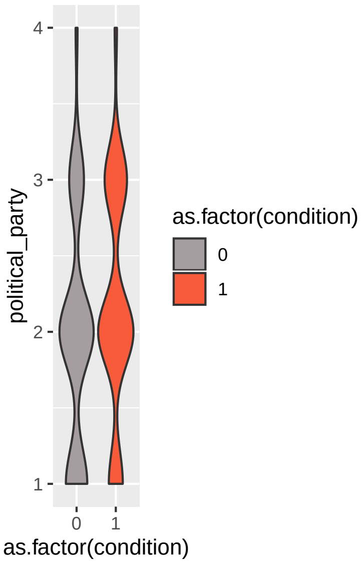

as.numeric(ethnicity)
6
4
2
0
1
as.factor(condition)
as.factor(condition)
0
1

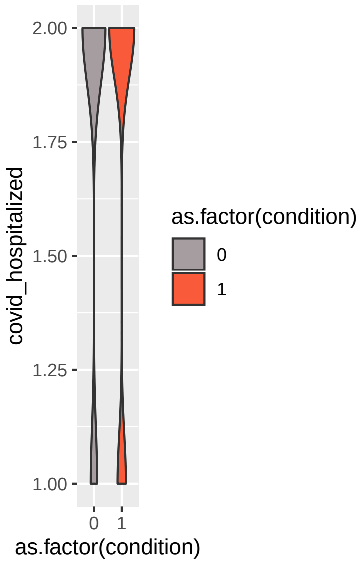

covid_sick
2.00
1.75
1.50
1.25
1.00
0
1
as.factor(condition)
as.factor(condition)
0
1

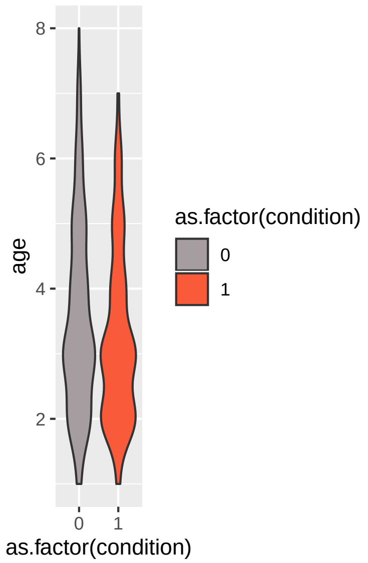

state
50
40
30
20
10
0
0
1
as.factor(condition)
as.factor(condition)
0
1

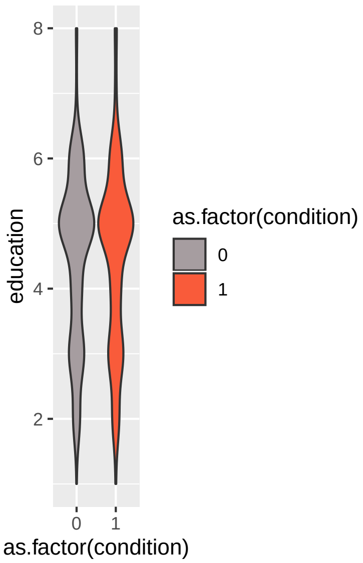
```
check_covariate_balance(combined)
```

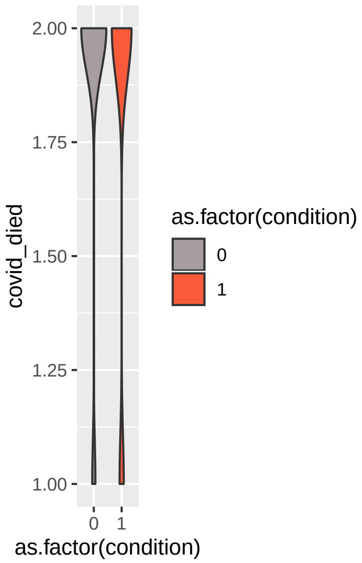

gender
4
3
2
1
0
1
as.factor(condition)
as.factor(condition)
0
1

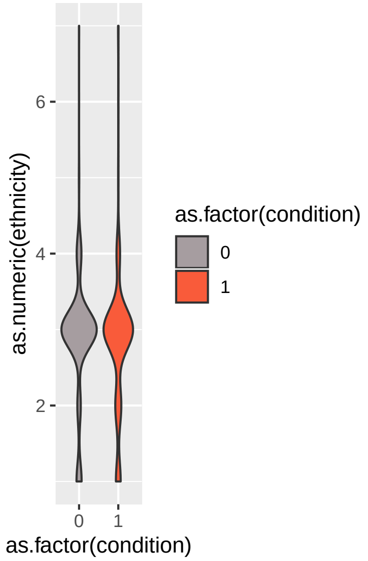

political_party
4
3
2
1
0
1
as.factor(condition)
as.factor(condition)
0
1

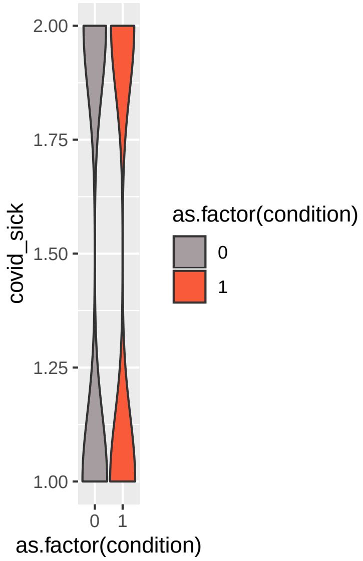

covid_hospitalized
2.00
1.75
1.50
1.25
1.00
0
1
as.factor(condition)
as.factor(condition)
0
1

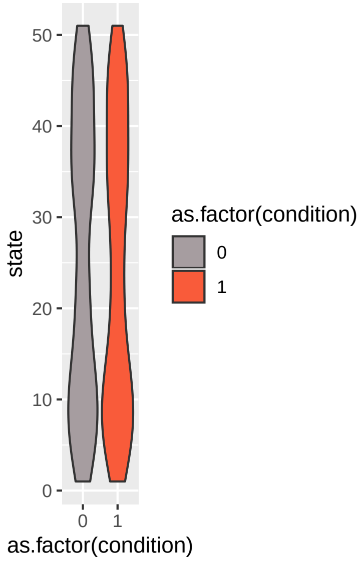

age
8
6
4
2
0
1
as.factor(condition)
as.factor(condition)
0
1


education
8
6
4
2
0
1
as.factor(condition)
as.factor(condition)
0
1


covid_died
2.00
1.75
1.50
1.25
1.00
0
1
as.factor(condition)
as.factor(condition)
0
1


as.numeric(ethnicity)
6
4
2
0
1
as.factor(condition)
as.factor(condition)
0
1


covid_sick
2.00
1.75
1.50
1.25
1.00
0
1
as.factor(condition)
as.factor(condition)
0
1


state
50
40
30
20
10
0
0
1
as.factor(condition)
as.factor(condition)
0
1

4. Estimate ATE

4.1 Estimate the ATE for both outcomes

```
estimate_ate = function(d, outcome_field) {
  g <- d[ , .(group_mean = mean(get(outcome_field))), keyby = .(condition)]


  ate <- g[ , diff(group_mean)]

  res <- NA
  for (i in 1:10000) {
      res[i] <- d[ , .(group_mean = mean(get(outcome_field))), keyby = .(sample(condition))][ , diff(gr
  }
  dist_sharp_null <- res
  #hist(dist_sharp_null)
  #abline(v=ate, lwd=3, col=’blue’)
  #abline(v=abs(ate), lwd=3, col=’blue’)
  p_value_one_tailed <- mean(dist_sharp_null >= ate)
  p_value_two_tailed <- mean(abs(dist_sharp_null) >= abs(ate))


  cat(outcome_field, ’\n’)
  cat(’ mean control    ’, g[condition == ’0’, group_mean], ’\n’)
  cat(’ mean treatement ’, g[condition == ’1’, group_mean], ’\n’)
  cat(’ ATE             ’, ate, ’\n’)
  cat(’ p_value 1-tailed’, p_value_one_tailed, ’\n’)
  cat(’ p_value 2-tailed’, p_value_two_tailed, ’\n\n’)
}



cat(’run1’, ’\n’)
```

```
## run1
```

```
cat(’********************’, ’\n’)
```

```
## ********************
```

```
estimate_ate(run1, ’outcome_spread’)
```

```
## outcome_spread
##  mean control     3.132812
##  mean treatement  3.473282
##  ATE              0.3404699
##  p_value 1-tailed 0.0013
##  p_value 2-tailed 0.0022
```

```r
estimate_ate(run1, 'outcome_death')
```

```
## outcome_death
##  mean control     2.398438
##  mean treatement  2.656489
##  ATE              0.258051
##  p_value 1-tailed 0.0013
##  p_value 2-tailed 0.0021
```

```r
cat('run2', '\n')
```

```
## run2
```

```r
cat('********************', '\n')
```

```
## ********************
```

```r
estimate_ate(run2, 'outcome_spread')
```

```
## outcome_spread
##  mean control     3.151515
##  mean treatement  3.30625
##  ATE              0.1547348
##  p_value 1-tailed 0.0876
##  p_value 2-tailed 0.1659
```

```r
estimate_ate(run2, 'outcome_death')
```

```
## outcome_death
##  mean control     2.5
##  mean treatement  2.60625
##  ATE              0.10625
##  p_value 1-tailed 0.1059
##  p_value 2-tailed 0.1922
```

```r
cat('combined', '\n')
```

```
## combined
```

```r
cat('********************', '\n')
```

```
## ********************
```

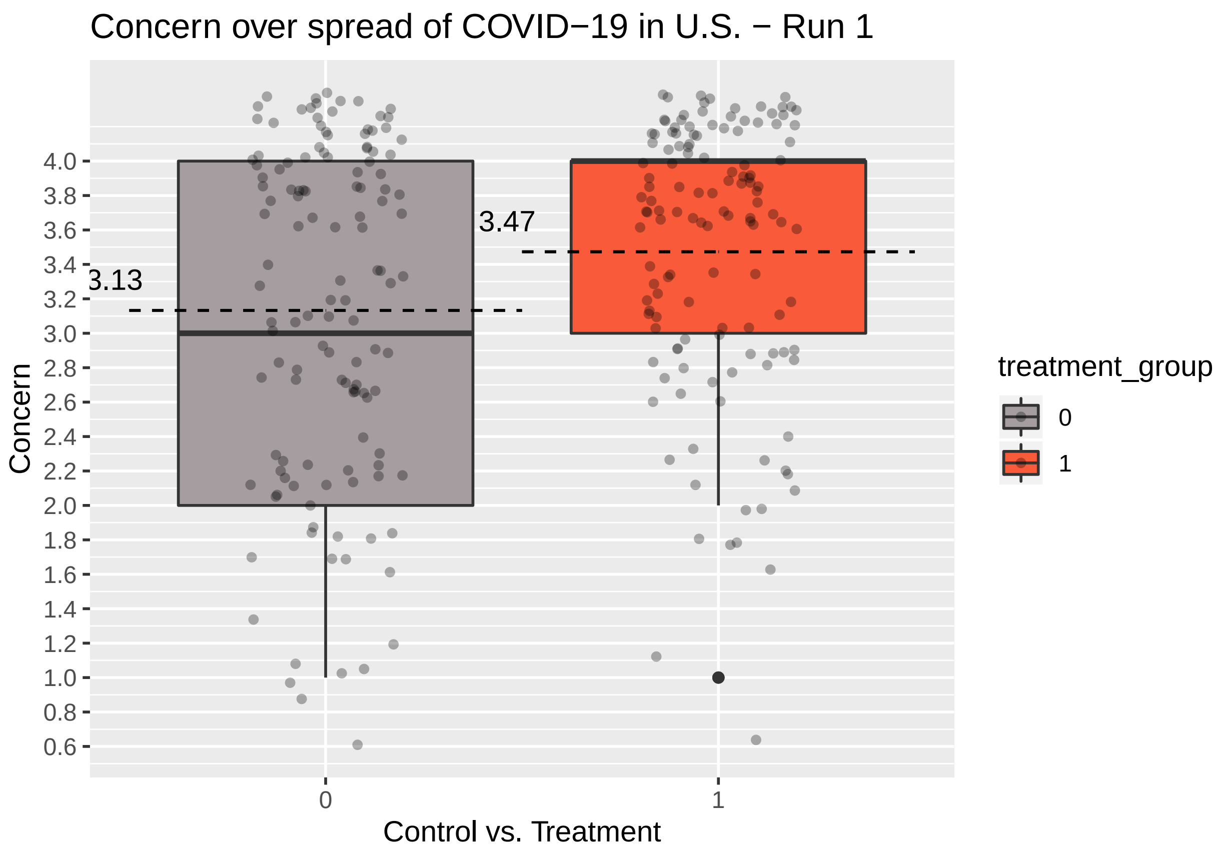
```r
estimate_ate(combined, 'outcome_spread')
```

```
## outcome_spread
##  mean control     3.142308
##  mean treatement  3.381443
##  ATE              0.2391356
##  p_value 1-tailed 0.0022
##  p_value 2-tailed 0.0034
```

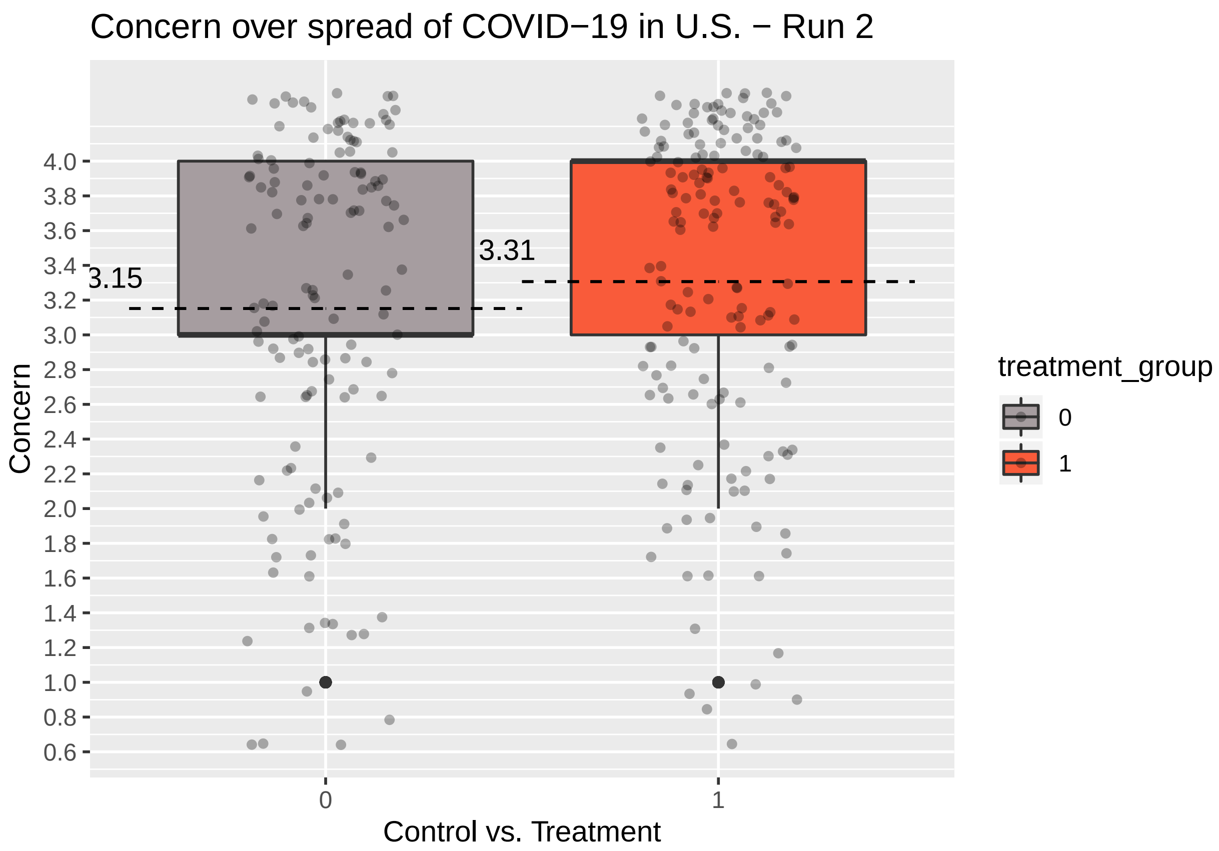
```r
estimate_ate(combined, 'outcome_death')
```

```
## outcome_death
##  mean control     2.45
##  mean treatement  2.628866
##  ATE              0.178866
##  p_value 1-tailed 0.0016
##  p_value 2-tailed 0.0024
```

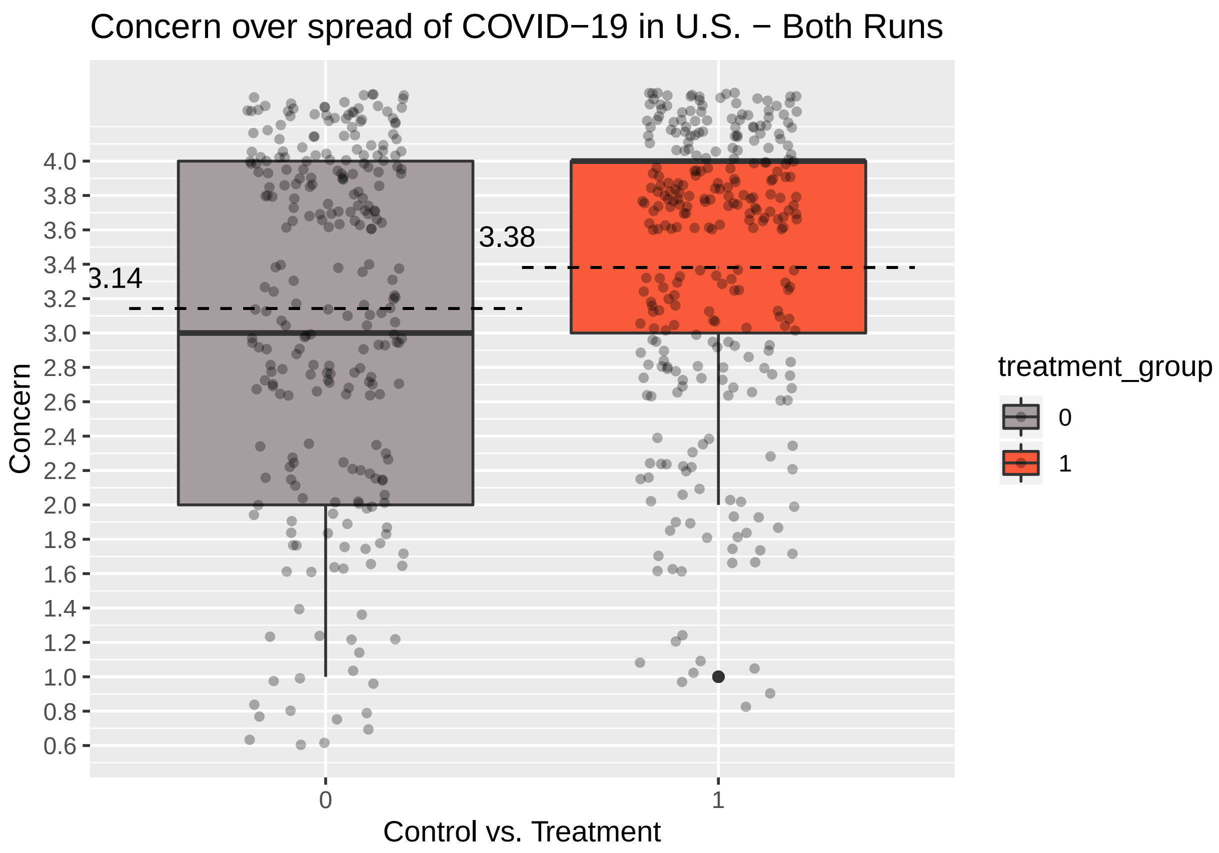
```r
meanFunction <- function(x){
return(data.frame(y=round(mean(x),2),label=round(mean(x,na.rm=T),2)))
}

show_box_plot_spread = function(df, title) {
  df$treatment_group <- as.factor(df$condition)
  p = ggplot(df, aes(x=treatment_group, y=outcome_spread, fill=treatment_group)) + geom_boxplot()  +
    scale_fill_manual(values=c("#a69da0", "#f95b3a")) + labs(title=title, x="Control vs. Treatment", y =
                 width = 1, linetype = "dashed") + stat_summary(fun.data = meanFunction, geom="text", si

  p + geom_jitter(shape=16, alpha=.3, position=position_jitter(0.2))
}

show_box_plot_death= function(df, title) {
  df$treatment_group <- as.factor(df$condition)
  p = ggplot(df, aes(x=treatment_group, y=outcome_death, fill=treatment_group)) + geom_boxplot()  +
    scale_fill_manual(values=c("#a69da0", "#f95b3a")) + labs(title=title, x="Control vs. Treatment", y =
                 width = 1, linetype = "dashed") + stat_summary(fun.data = meanFunction, geom="text", si


    #stat_summary(fun.y=mean, geom="line", shape=10, size=14, color="black", fill="red")

  p + geom_jitter(shape=16, size=2, alpha=.3, position=position_jitter(0.2) )
}

meanFunction1 <- function(x){
return(data.frame(y=round(mean(x),0),label=round(mean(x,na.rm=T),0)))
}
show_box_plot_duration= function(df, title) {
  df$treatment_group <- as.factor(df$condition)
  p = ggplot(df, aes(x=treatment_group, y=duration_of_survey, fill=treatment_group)) + geom_boxplot()  +
    scale_fill_manual(values=c("#a69da0", "#f95b3a")) + labs(title=title, x="Control vs. Treatment", y =
                 width = 1, linetype = "dashed") + stat_summary(fun.data = meanFunction1, geom="text", s

  p + geom_jitter(shape=16, size=2, alpha=.3, position=position_jitter(0.2) )
}


show_box_plot_spread(run1, "Concern over spread of COVID-19 in U.S. - Run 1")
```



```r
show_box_plot_spread(run2, "Concern over spread of COVID-19 in U.S. - Run 2")
```

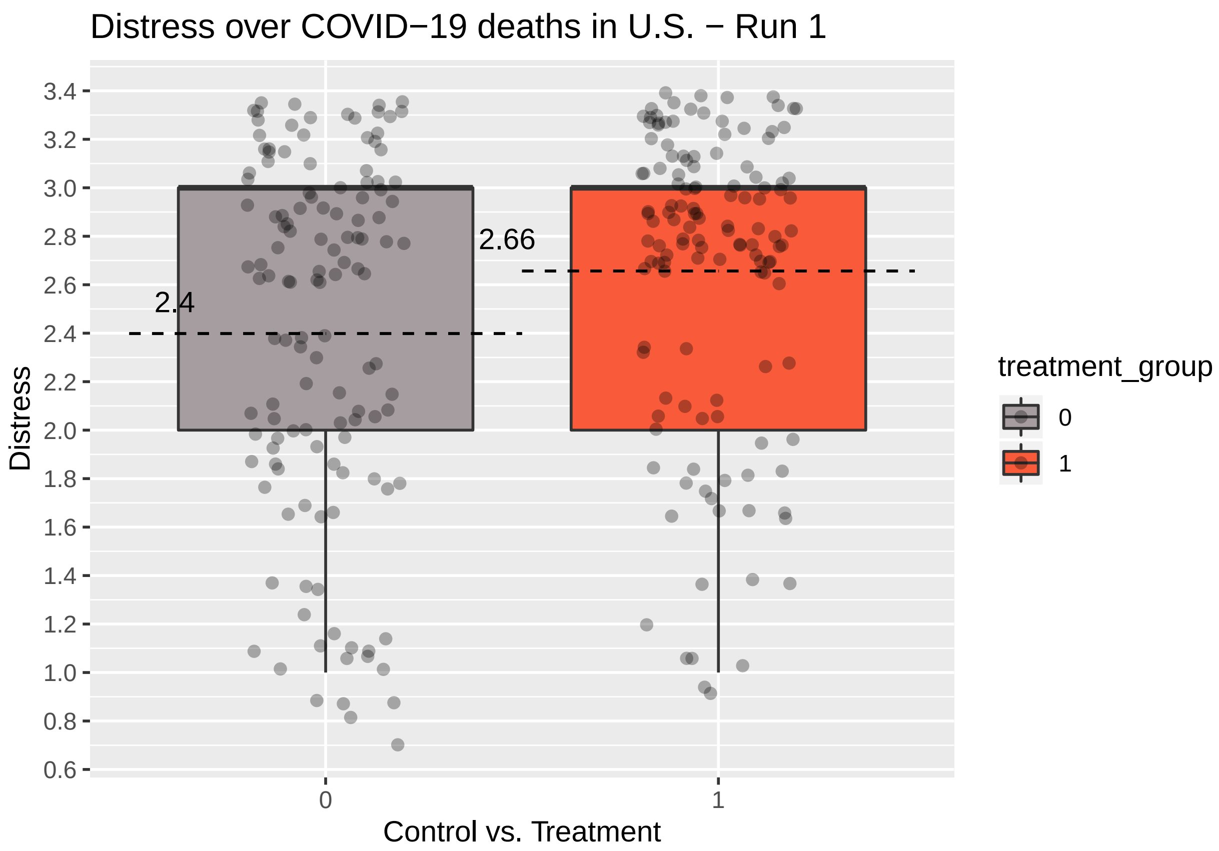


```
show_box_plot_spread(combined, "Concern over spread of COVID-19 in U.S. - Both Runs")
```



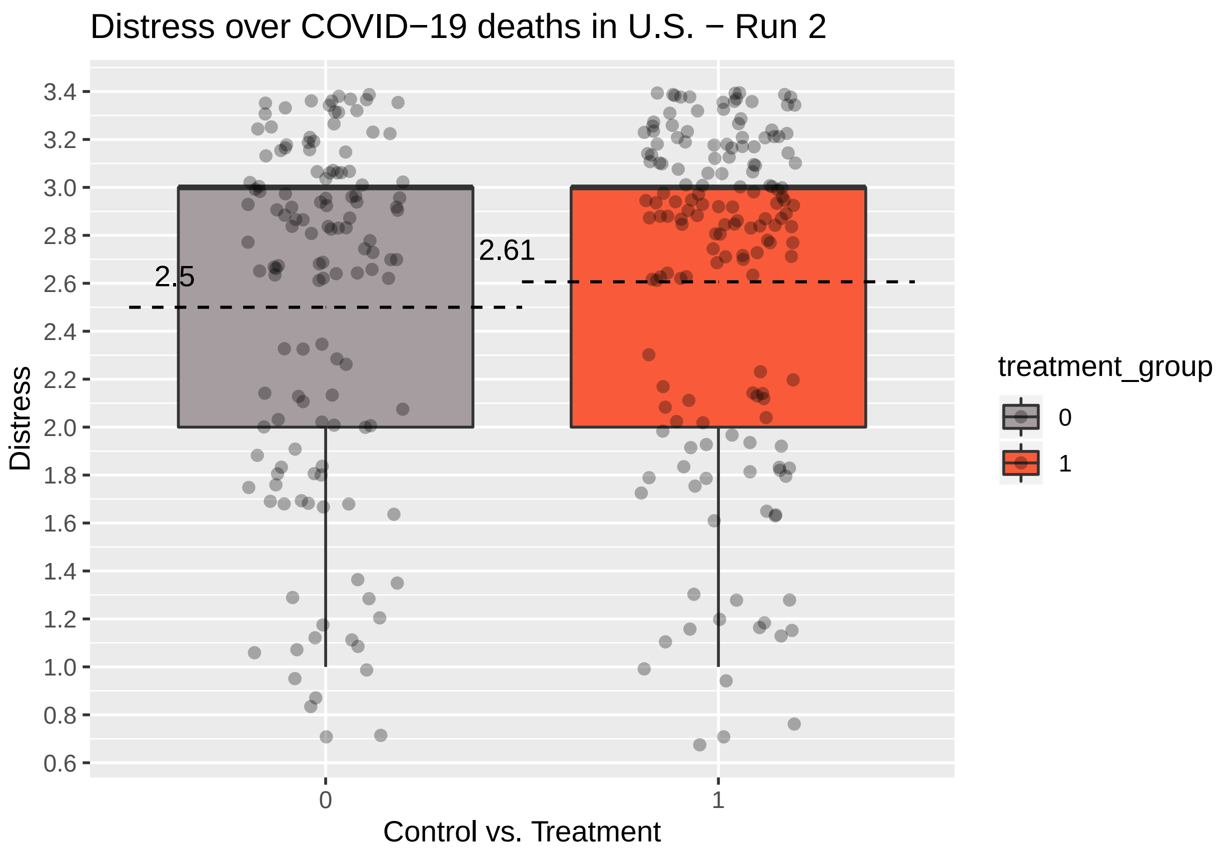
```
show_box_plot_death(run1, "Distress over COVID-19 deaths in U.S. - Run 1")
```

```
## No summary function supplied, defaulting to ‘mean_se()
```



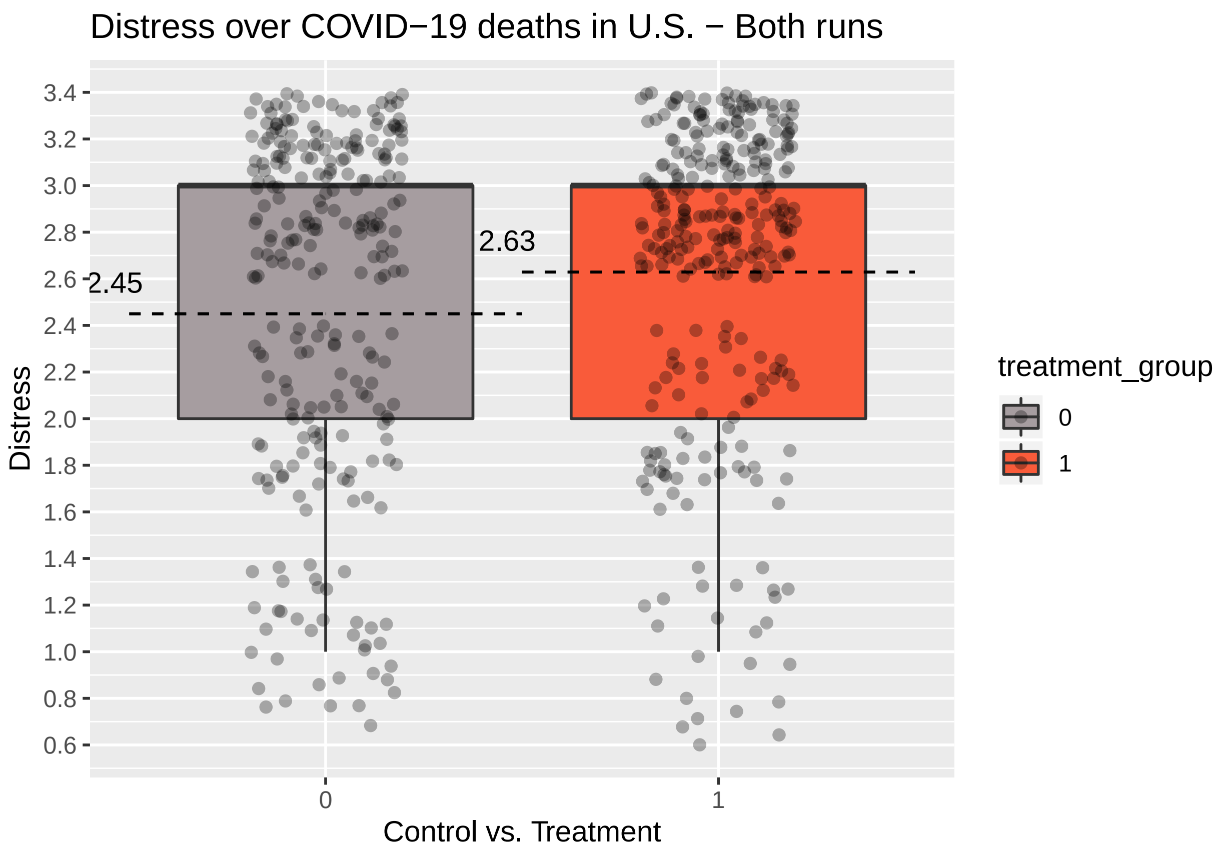
```
show_box_plot_death(run2, "Distress over COVID-19 deaths in U.S. - Run 2")
```

```
## No summary function supplied, defaulting to ‘mean_se()
```



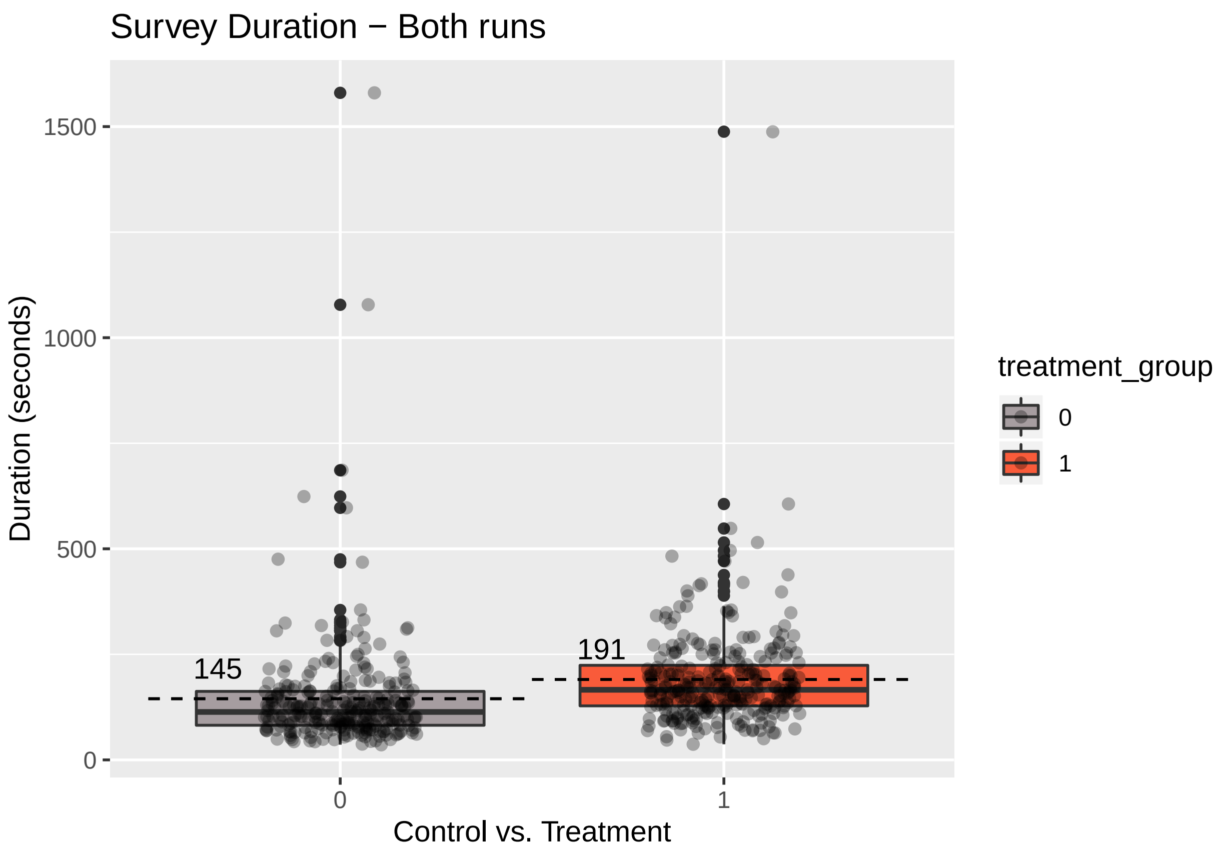
```
show_box_plot_death(combined, "Distress over COVID-19 deaths in U.S. - Both runs")
```

```
## No summary function supplied, defaulting to ‘mean_se()
```



```r
show_box_plot_duration(combined, "Survey Duration - Both runs")
```

```
## No summary function supplied, defaulting to ‘mean_se()
```



```
cat(combined[treatment == 0, mean(duration_of_survey)], '\n')
```

```
## 144.8654
```

```
cat(combined[treatment == 1, mean(duration_of_survey)], '\n')
```

```
## 190.5567
```

5. Linear Regression

5.1 Perform linear regression the two outcomens (concern about COVID-19 spread, concern about COVID-19 deaths)

```
run_regression_outcome1 = function(d, control_for_run=FALSE) {
  model_spread = lm(outcome_spread ~ condition, d)
  if (control_for_run) {
    model_spread_adv = lm(outcome_spread ~ condition
                          + run
                          + as.factor(gender)
                          + as.factor(age)
                          + as.factor(ethnicity)
                          + as.factor(political_party)
```

```
                       + as.factor(education)
                       + as.factor(covid_sick)
                       + as.factor(covid_hospitalized)
                       + as.factor(covid_died), d)

  } else {
    model_spread_adv = lm(outcome_spread ~ condition
                       + as.factor(gender)
                       + as.factor(age)
                       + as.factor(ethnicity)
                       + as.factor(political_party)
                       + as.factor(education)
                       + as.factor(covid_sick)
                       + as.factor(covid_hospitalized)
                       + as.factor(covid_died), d)

  }
  est_spread     = get_regression_results_robust_se(model_spread,  d, c('condition'), FALSE)
  est_spread_adv = get_regression_results_robust_se(model_spread_adv, d, c('condition'), FALSE)
  return ( list('model'= model_spread,
                'model_adv'=model_spread_adv,
                'est'=est_spread,
                'est_adv'=est_spread_adv))
}



run_regression_outcome2 = function(d, control_for_run) {
  model_spread = lm(outcome_spread ~ condition, d)
  if (control_for_run) {
    model_spread_adv = lm(outcome_death ~ condition
                       + run
                       + as.factor(gender)
                       + as.factor(age)
                       + as.factor(ethnicity)
                       + as.factor(political_party)
                       + as.factor(education)
                       + as.factor(covid_sick)
                       + as.factor(covid_hospitalized)
                       + as.factor(covid_died), d)

  } else {
    model_spread_adv = lm(outcome_death ~ condition
                       + as.factor(gender)
                       + as.factor(age)
                       + as.factor(ethnicity)
                       + as.factor(political_party)
                       + as.factor(education)
                       + as.factor(covid_sick)
                       + as.factor(covid_hospitalized)
                       + as.factor(covid_died), d)

  }
  est_spread     = get_regression_results_robust_se(model_spread,  d, c(’condition’), FALSE)
  est_spread_adv = get_regression_results_robust_se(model_spread_adv, d, c(’condition’), FALSE)
  return ( list(’model’= model_spread,
                ’model_adv’=model_spread_adv,
                ’est’=est_spread,
                ’est_adv’=est_spread_adv))
}

aggregate_covariates = function(df) {
  df[, college_educated := ifelse(education > 4, 1, 0)]
  df[, caucasian := ifelse(ethnicity == 3, 1, 0)]
  df[, age_under_40 := ifelse(age < 4, 1, 0)]
  df[, age_40_60 := ifelse(age > 4 & age <= 6, 1, 0)]
  df[, age_over_60 := ifelse(age >= 7, 1, 0)]

}
```

```
regression_labels_run = c(’Treatment’,
      ’Run’,
      ’Female’, ’Non-binary’, ’Gender not answered’,
      ’20-29’, ’30-39’, ’40-49’, ’50-59’, ’60-69’, ’70-79’, ’Over 80’,
      ’Black/African American’, ’Caucasian’, ’Hispanic/Latinx’,
        ’Native American’, ’Pacific Islander’, ’Ethnicity not answered’,
      ’Democrat’, ’Independent’, ’Party other’,
      ’High school’, ’Some college’, ’Associates’, ’Bachelors’, ’Masters’, ’Doctoral’, ’JD/MD’,
      ’Sick from COVID-19’,
      ’Hospitalized from COVID-19’,
      ’Died COVID-19’)



mi_spread_run1 = run_regression_outcome1(run1, TRUE)
mi_spread_run2 = run_regression_outcome1(run2, TRUE)
mi_spread_combined_run = run_regression_outcome1(combined, TRUE)


stargazer(mi_spread_run1$model, mi_spread_run1$model_adv,
          mi_spread_run2$model_adv,
          mi_spread_combined_run$model_adv,
          type="text",
          se = list(mi_spread_run1$est$robust_se_all, mi_spread_run1$est_adv$robust_se_all,
                    mi_spread_run2$est_adv$robust_se_all,
                    mi_spread_combined_run$est_adv$robust_se_all),
          title=paste(’Response to COVID-19 Spread’),
          dep.var.caption  = "Response to COVID-19 Spread",
          dep.var.labels.include = FALSE, model.numbers=FALSE,
          column.labels = c("July 21, 2020", "July 21, 2020", "July 25, 2020", "Both dates"),
          align=TRUE,
          covariate.labels = regression_labels_run)
```

```
##
## Response to COVID-19 Spread
## ====================================================================================================
##                                                               Response to COVID-19 Spread
##                            --------------------------------------------------------------------------
##                                 July 21, 2020          July 21, 2020           July 25, 2020
## -----------------------------------------------------------------------------------------------------
## Treatment                            0.340***                0.339***                 0.172*
##                                       (0.107)                 (0.106)                 (0.095)
##
## Run
##
##
## Female                                                        -0.063                  0.187*
##                                                               (0.105)                 (0.107)
##
## Non-binary                                                    0.886**                1.742***
##                                                               (0.420)                 (0.409)
##
## Gender not answered                                          0.646***                 0.629**
##                                                               (0.192)                 (0.292)
##
## 20-29                                                          0.323                  -0.454*
##                                                               (0.380)                 (0.234)
##
## 30-39                                                          0.295                  -0.209
##                                                               (0.381)                 (0.264)
##
## 40-49                                                          0.181                  -0.460*
##                                                               (0.402)                 (0.272)
##
## 50-59                                                          0.370                  -0.246
##                                                               (0.412)                 (0.255)
##
## 60-69                                                          0.393                   0.096
##                                                               (0.441)                 (0.267)
##
## 70-79                                                        1.156***                 -0.458
##                                                               (0.437)                 (0.336)
##
## Over 80                                                                               1.121**
##                                                                                       (0.463)
##
## Black/African American                                         0.195                  -0.100
##                                                               (0.201)                 (0.217)
##
## Caucasian                                                     -0.087                   0.060
##                                                               (0.165)                 (0.187)
##
## Hispanic/Latinx                                                0.230                   0.184
##                                                               (0.205)                 (0.252)
##
## Native American                                               -0.471                   0.482
##                                                               (0.513)                 (0.316)
##
## Pacific Islander                                             -2.519***
##                                                               (0.232)
```

```
##
## Ethnicity not answered                                     0.715**                 -0.121
##                                                            (0.304)                 (0.585)
##
## Democrat                                                  0.675***                1.118***
##                                                            (0.141)                 (0.134)
##
## Independent                                                0.357**                0.602***
##                                                            (0.171)                 (0.162)
##
## Party other                                                -0.222                  -0.318
##                                                            (0.370)                 (0.376)
##
## High school                                                -0.050
##                                                            (0.800)
##
## Some college                                                0.194                   0.135
##                                                            (0.791)                 (0.191)
##
## Associates                                                  0.017                  -0.020
##                                                            (0.795)                 (0.207)
##
## Bachelors                                                   0.188                   0.125
##                                                            (0.781)                 (0.174)
##
## Masters                                                     0.337                   0.223
##                                                            (0.786)                 (0.195)
##
## Doctoral                                                   -0.166                   0.029
##                                                            (0.780)                 (0.337)
##
## JD/MD                                                       0.502                  0.842**
##                                                            (0.778)                 (0.339)
##
## Sick from COVID-19                                         -0.200*                 -0.162
##                                                            (0.119)                 (0.117)
##
## Hospitalized from COVID-19                                 -0.166                  -0.056
##                                                            (0.165)                 (0.161)
##
## Died COVID-19                                               0.092                  -0.110
##                                                            (0.158)                 (0.157)
##
## Constant                          3.133***                2.450***                2.660***
##                                    (0.085)                 (0.896)                 (0.321)
##
## ----------------------------------------------------------------------------------------------------
## Observations                         259                     259                     292
## R2                                  0.038                   0.314                   0.351
## Adjusted R2                         0.034                   0.227                   0.282
## Residual Std. Error           0.858 (df = 257)        0.768 (df = 229)        0.796 (df = 263)
## F Statistic                10.183*** (df = 1; 257) 3.614*** (df = 29; 229) 5.084*** (df = 28; 263) 7
## ====================================================================================================
## Note:                                                                                           *p<0.
```

```
mi_death_run1 = run_regression_outcome2(run1, TRUE)
mi_death_run2 = run_regression_outcome2(run2, TRUE)
mi_death_combined_run = run_regression_outcome2(combined, TRUE)


stargazer(mi_death_run1$model, mi_death_run1$model_adv,
          mi_death_run2$model_adv,
          mi_death_combined_run$model_adv,
          type="text",
          se = list(mi_death_run1$est$robust_se_all, mi_death_run1$est_adv$robust_se_all,
                    mi_death_run2$est_adv$robust_se_all,
                    mi_death_combined_run$est_adv$robust_se_all),
          title=paste('Response to COVID-19 Death'),
          dep.var.caption  = "Response to COVID-19 Death",
          dep.var.labels.include = FALSE, model.numbers=FALSE,
          column.labels = c("July 21, 2020", "July 21, 2020", "July 25, 2020", "Both dates"),
          align=TRUE,
          covariate.labels = regression_labels_run)
```

```
##
## Response to COVID-19 Death
## ====================================================================================================
##                                                               Response to COVID-19 Death
##                            ------------------------------------------------------------------------
##                                 July 21, 2020           July 21, 2020           July 25, 2020
## ----------------------------------------------------------------------------------------------------
## Treatment                          0.340***                0.250***                  0.109
##                                    (0.107)                 (0.090)                 (0.072)
##
## Run
##
##
## Female                                                      0.050                    0.082
##                                                            (0.085)                 (0.079)
##
## Non-binary                                                 0.573*                 0.899***
##                                                            (0.308)                 (0.308)
##
## Gender not answered                                       0.437***                 0.454**
##                                                            (0.159)                 (0.207)
##
## 20-29                                                      -0.371*                 -0.083
##                                                            (0.191)                 (0.175)
##
## 30-39                                                      -0.323*                  0.071
##                                                            (0.186)                 (0.190)
##
## 40-49                                                      -0.345*                  0.142
##                                                            (0.209)                 (0.195)
##
## 50-59                                                      -0.258                   0.153
##                                                            (0.211)                 (0.195)
##
```

```
## 60-69                                                      -0.279                  0.370*
##                                                            (0.260)                 (0.213)
##
## 70-79                                                       0.170                  -0.288
##                                                            (0.254)                 (0.295)
##
## Over 80                                                                            0.873***
##                                                                                    (0.256)
##
## Black/African American                                      0.041                  -0.022
##                                                            (0.168)                 (0.147)
##
## Caucasian                                                  -0.103                  -0.016
##                                                            (0.134)                 (0.118)
##
## Hispanic/Latinx                                            -0.019                   0.193
##                                                            (0.212)                 (0.160)
##
## Native American                                            -0.261                  -0.020
##                                                            (0.289)                 (0.218)
##
## Pacific Islander                                          -1.667***
##                                                            (0.176)
##
## Ethnicity not answered                                      0.374                  -0.169
##                                                            (0.239)                 (0.291)
##
## Democrat                                                  0.543***                0.811***
##                                                            (0.117)                 (0.108)
##
## Independent                                                0.340**                0.414***
##                                                            (0.134)                 (0.132)
##
## Party other                                                -0.107                   0.141
##                                                            (0.302)                 (0.291)
##
## High school                                                 0.233
##                                                            (0.530)
##
## Some college                                                0.216                   0.040
##                                                            (0.516)                 (0.137)
##
## Associates                                                  0.135                  -0.095
##                                                            (0.524)                 (0.166)
##
## Bachelors                                                   0.088                  -0.071
##                                                            (0.512)                 (0.133)
##
## Masters                                                     0.263                  -0.036
##                                                            (0.517)                 (0.142)
##
## Doctoral                                                   -0.475                   0.041
##                                                            (0.512)                 (0.141)
##
```

```
## JD/MD                                                       0.290                  0.469*
##                                                            (0.513)                 (0.239)
##
## Sick from COVID-19                                         -0.102                  -0.097
##                                                            (0.098)                 (0.084)
##
## Hospitalized from COVID-19                                 -0.084                   0.003
##                                                            (0.125)                 (0.116)
##
## Died COVID-19                                               0.067                  -0.090
##                                                            (0.128)                 (0.118)
##
## Constant                          3.133***                2.327***                2.017***
##                                    (0.085)                 (0.570)                 (0.239)
##
## ----------------------------------------------------------------------------------------------------
## Observations                         259                     259                     292
## R2                                  0.038                   0.252                   0.325
## Adjusted R2                         0.034                   0.157                   0.254
## Residual Std. Error           0.858 (df = 257)        0.628 (df = 229)        0.591 (df = 263)
## F Statistic               10.183*** (df = 1; 257) 2.657*** (df = 29; 229) 4.533*** (df = 28; 263) 5
## ====================================================================================================
## Note:                                                                                          *p<0.
```

```r
state_ordinals <- fread('data/state_ordinals.csv')
states_northeast = c('Connecticut','Maine','Massachusetts','New Hampshire','Rhode Island','Vermont','Ne
states_midwest  = c('Illinois','Indiana','Michigan','Ohio','Wisconsin', 'Iowa', 'Kansas', 'Minnesota',
states_south = c('Delaware', 'Florida', 'Georgia', 'Maryland', 'North Carolina', 'South Carolina', 'Vir
states_west = c('Arizona', 'Colorado', 'Idaho', 'Montana', 'Nevada', 'New Mexico', 'Utah', 'Wyoming', '
states_other = c('Puerto Rico')


get_region_for_state = function(ordinal) {
  state_name = state_ordinals[ordinal, V1]
  if (is.element(state_name, states_northeast)) {
    return("northeast")
  } else  if (is.element(state_name, states_midwest)) {
     return("midwest")
  } else  if (is.element(state_name, states_south)) {
    return("south")
  } else  if (is.element(state_name, states_west)) {
    return("west")
  } else  if (is.element(state_name, states_other)) {
    return ("other")
  } else {
    return("other")
  }
}
get_region_for_state(5)
```

```
## [1] "west"
```

```
regions = c(rep(’’,53))
i = 1
for (ordinal in state_ordinals$V2) {
  the_region = get_region_for_state(ordinal)
  cat(the_region, i, ’\n’)
  regions[i] = the_region
  i = i + 1
}
```

```
## south 1
## west 2
## west 3
## south 4
## west 5
## west 6
## northeast 7
## south 8
## south 9
## south 10
## south 11
## west 12
## west 13
## midwest 14
## midwest 15
## midwest 16
## midwest 17
## south 18
## south 19
## northeast 20
## south 21
## northeast 22
## midwest 23
## midwest 24
## south 25
## midwest 26
## west 27
## midwest 28
## west 29
## northeast 30
## northeast 31
## west 32
## northeast 33
## south 34
## midwest 35
## midwest 36
## south 37
## west 38
## northeast 39
## other 40
## northeast 41
## south 42
## midwest 43
## south 44
## south 45
## west 46
## northeast 47
## south 48
## west 49
## south 50
## midwest 51
## west 52
## other 53
```

```
state_ordinals[, region:= regions]

state_ordinals
```

```
##                       V1 V2    region
##  1:              Alabama  1     south
##  2:               Alaska  2      west
##  3:              Arizona  3      west
##  4:             Arkansas  4     south
##  5:           California  5      west
##  6:             Colorado  6      west
##  7:          Connecticut  7 northeast
##  8: District of Columbia  8     south
##  9:             Delaware  9     south
## 10:              Florida 10     south
## 11:              Georgia 11     south
## 12:               Hawaii 12      west
## 13:                Idaho 13      west
## 14:             Illinois 14   midwest
## 15:              Indiana 15   midwest
## 16:                 Iowa 16   midwest
## 17:               Kansas 17   midwest
## 18:             Kentucky 18     south
## 19:            Louisiana 19     south
## 20:                Maine 20 northeast
## 21:             Maryland 21     south
## 22:        Massachusetts 22 northeast
## 23:             Michigan 23   midwest
## 24:            Minnesota 24   midwest
## 25:          Mississippi 25     south
## 26:             Missouri 26   midwest
## 27:              Montana 27      west
## 28:             Nebraska 28   midwest
## 29:               Nevada 29      west
## 30:        New Hampshire 30 northeast
## 31:           New Jersey 31 northeast
## 32:           New Mexico 32      west
## 33:             New York 33 northeast
## 34:       North Carolina 34     south
## 35:         North Dakota 35   midwest
## 36:                 Ohio 36   midwest
## 37:             Oklahoma 37     south
## 38:               Oregon 38      west
## 39:         Pennsylvania 39 northeast
## 40:          Puerto Rico 40     other
## 41:         Rhode Island 41 northeast
## 42:       South Carolina 42     south
## 43:         South Dakota 43   midwest
## 44:            Tennessee 44     south
## 45:                Texas 45     south
## 46:                 Utah 46      west
## 47:              Vermont 47 northeast
## 48:             Virginia 48     south
## 49:           Washington 49      west
## 50:        West Virginia 50     south
## 51:            Wisconsin 51   midwest
## 52:              Wyoming 52      west
## 53:            Not in US 53     other
##                       V1 V2    region
```

```
aggregate_covariates = function(df) {
  df[, gender_male := ifelse(gender == 1, 1, 0)]
  df[, gender_female := ifelse(gender == 2, 1, 0)]
  df[, gender_other := ifelse(gender == 3 | gender == 4, 1, 0)]
  df[, college_educated := ifelse(education > 4, 1, 0)]
  df[, not_caucasian := ifelse(ethnicity != 3, 1, 0)]
  df[, age_under_40 := ifelse(age < 4, 1, 0)]
  df[, age_40_60 := ifelse(age > 4 & age <= 6, 1, 0)]
  df[, age_over_60 := ifelse(age >= 7, 1, 0)]
  df[, party_republican := ifelse(political_party == 1, 1, 0)]
  df[, party_democrat := ifelse(political_party == 2, 1, 0)]
  df[, party_other := ifelse(political_party == 3 | political_party == 4, 1, 0)]
  df[, party_non_republican := ifelse( political_party == 1, 0, 1)]
  df[, treatment_assignment := condition]
  df[, state_name :=  state_ordinals[state, V1]]
  df[, region:= state_ordinals[state, region]]
  df[, region_northeast := ifelse(region == ’northeast’, 1,0)]
  df[, region_midwest   := ifelse(region == ’midwest’, 1,0)]
  df[, region_south     := ifelse(region == ’south’, 1,0)]
  df[, region_west      := ifelse(region == ’west’, 1,0)]
  df[, region_other     := ifelse(region == ’other’, 1,0)]

}

aggregate_covariates(run1)
aggregate_covariates(run2)
aggregate_covariates(combined)

head(combined[, c(’state’, ’state_name’, ’region’, ’region_northeast’, ’region_midwest’)])
```

```
##    state   state_name    region region_northeast region_midwest
## 1:    36         Ohio   midwest                0              1
## 2:    39 Pennsylvania northeast                1              0
## 3:    38       Oregon      west                0              0
## 4:    45        Texas     south                0              0
## 5:    13        Idaho      west                0              0
## 6:    36         Ohio   midwest                0              1
```

```
nrow(combined[covid_died == 1,])
```

```
## [1] 80
```

```
run_regression_outcome1_simplified = function(d, control_for_run=FALSE) {
  model_spread = lm(outcome_spread ~ treatment_assignment, d)
  if (control_for_run) {
    model_spread_adv = lm(outcome_spread ~ treatment_assignment
                          + run
                          + gender_female
                          + gender_other
                          + age_40_60
                          + age_over_60
                          + party_democrat
                          + party_other
                          + not_caucasian
                          + college_educated
                          + region_south
                          + region_midwest
                          + region_west
                          + covid_sick
                          + covid_hospitalized
                          + covid_died, d)

  } else {
    model_spread_adv = lm(outcome_spread ~ treatment_assignment
                          + gender_female
                          + gender_other
                          + age_under_40
                          + age_40_60
                          + age_over_60
                          + party_democrat
                          + party_other
                          + not_caucasian
                          + college_educated
                          + region_south
                          + region_midwest
                          + region_west
                          + covid_sick
                          + covid_hospitalized
                          + covid_died, d)
  }
  est_spread     = get_regression_results_robust_se(model_spread,  d, c(’treatment_assignment’), FALSE)
  est_spread_adv = get_regression_results_robust_se(model_spread_adv, d, c(’treatment_assignment’), FALS
  return ( list(’model’= model_spread,
                ’model_adv’=model_spread_adv,
                ’est’=est_spread,
                ’est_adv’=est_spread_adv))
}

run_regression_outcome2_simplified = function(d, control_for_run=FALSE) {
  model_spread = lm(outcome_spread ~ treatment_assignment, d)
  if (control_for_run) {
    model_spread_adv = lm(outcome_death ~ treatment_assignment
                          + run
                          + gender_female
                          + gender_other
                          + age_40_60
                          + age_over_60
                          + party_democrat
                          + party_other
                          + not_caucasian
                          + college_educated
                          + region_south
                          + region_midwest
                          + region_west
                          + covid_sick
                          + covid_hospitalized
                          + covid_died, d)

  } else {
    model_spread_adv = lm(outcome_death ~ treatment_assignment
                          + gender_female
                          + gender_other
                          + age_40_60
                          + age_over_60
                          + party_democrat
                          + party_other
                          + not_caucasian
                          + college_educated
                          + region_south
                          + region_midwest
                          + region_west
                          + covid_sick
                          + covid_hospitalized
                          + covid_died, d)
  }
  est_spread     = get_regression_results_robust_se(model_spread,  d, c(’treatment_assignment’), FALSE)
  est_spread_adv = get_regression_results_robust_se(model_spread_adv, d, c(’treatment_assignment’), FALS
  return ( list(’model’= model_spread,
                ’model_adv’=model_spread_adv,
                ’est’=est_spread,
                ’est_adv’=est_spread_adv))
}
```

```
mi_spread_run1 = run_regression_outcome1_simplified(run1, TRUE)
mi_spread_run2 = run_regression_outcome1_simplified(run2, TRUE)
mi_spread_combined_run = run_regression_outcome1_simplified(combined, TRUE)


stargazer(mi_spread_run1$model, mi_spread_run1$model_adv,
          mi_spread_run2$model_adv,
          mi_spread_combined_run$model_adv,
          type="text",  out="output/model1_regression.html", report="vcsp*",
          se = list(mi_spread_run1$est$robust_se_all, mi_spread_run1$est_adv$robust_se_all,
                    mi_spread_run2$est_adv$robust_se_all,
                    mi_spread_combined_run$est_adv$robust_se_all),
          title=paste('Concerned over COVID-19 Spread in U.S.'),
          dep.var.caption  = "Concerned over COVID-19 Spread in U.S.",
          dep.var.labels.include = FALSE, model.numbers=FALSE,
          column.labels = c("July 21, 2020", "July 21, 2020", "July 25, 2020", "Both dates"),
          align=TRUE)
```

```
##
## Concerned over COVID-19 Spread in U.S.
## =====================================================================================================
##                                                   Concerned over COVID-19 Spread in U.S.
##                      --------------------------------------------------------------------------------
##                           July 21, 2020           July 21, 2020           July 25, 2020             B
## -----------------------------------------------------------------------------------------------------
## treatment_assignment          0.340                   0.334                   0.146
##                              (0.107)                 (0.104)                 (0.096)
##                           p = 0.002***            p = 0.002***              p = 0.128              p
##
## run
##
##                                                                                                     p
##
## gender_female                                        -0.091                   0.166
##                                                      (0.105)                 (0.106)
##                                                     p = 0.388               p = 0.117               p
##
## gender_other                                          0.645                   0.930
##                                                      (0.214)                 (0.248)
##                                                   p = 0.003***            p = 0.0002***           p =
##
## age_40_60                                             0.143                   0.232
##                                                      (0.125)                 (0.112)
##                                                     p = 0.254              p = 0.040**             p
##
## age_over_60                                           0.940                   0.017
##                                                      (0.221)                 (0.259)
##                                                  p = 0.00003***             p = 0.947               p
##
## party_democrat                                        0.681                   1.053
##                                                      (0.133)                 (0.132)
##                                                  p = 0.00000***           p = 0.000***             p
##
## party_other                                           0.261                   0.438
##                                                      (0.167)                 (0.156)
##                                                     p = 0.118             p = 0.006***             p
##
## not_caucasian                                         0.171                  -0.052
##                                                      (0.104)                 (0.109)
##                                                    p = 0.099*               p = 0.635               p
##
## college_educated                                      0.153                   0.071
##                                                      (0.102)                 (0.102)
##                                                     p = 0.134               p = 0.491               p
```

```
##
## region_south                                          0.054                   0.044
##                                                      (0.137)                 (0.141)
##                                                     p = 0.695               p = 0.755              p
##
## region_midwest                                        0.098                  -0.206
##                                                      (0.147)                 (0.175)
##                                                     p = 0.509               p = 0.239              p
##
## region_west                                           0.280                   0.077
##                                                      (0.139)                 (0.166)
##                                                    p = 0.045**              p = 0.643              p
##
## covid_sick                                           -0.225                  -0.176
##                                                      (0.120)                 (0.118)
##                                                    p = 0.062*               p = 0.137             p
##
## covid_hospitalized                                   -0.186                  -0.070
##                                                      (0.155)                 (0.156)
##                                                     p = 0.231               p = 0.657              p
##
## covid_died                                            0.051                  -0.117
##                                                      (0.153)                 (0.160)
##                                                     p = 0.741               p = 0.465              p
##
## Constant                      3.133                   3.057                   2.922
##                              (0.085)                 (0.283)                 (0.306)
##                           p = 0.000***            p = 0.000***            p = 0.000***             p
##
## ----------------------------------------------------------------------------------------------------
## Observations                   259                     259                     292
## R2                            0.038                   0.263                   0.291
## Adjusted R2                   0.034                   0.218                   0.252
## Residual Std. Error      0.858 (df = 257)        0.773 (df = 243)        0.812 (df = 276)         0.79
## F Statistic          10.183*** (df = 1; 257) 5.782*** (df = 15; 243) 7.541*** (df = 15; 276) 11.367**
## ====================================================================================================
## Note:                                                                                     *p<0.1; **
```

```
mi_spread_run1 = run_regression_outcome2_simplified(run1, TRUE)
mi_spread_run2 = run_regression_outcome2_simplified(run2, TRUE)
mi_spread_combined_run = run_regression_outcome2_simplified(combined, TRUE)


stargazer(mi_spread_run1$model, mi_spread_run1$model_adv,
          mi_spread_run2$model_adv,
          mi_spread_combined_run$model_adv,
          type="html",  out="output/model2_regression.html", report="vcsp*",
          se = list(mi_spread_run1$est$robust_se_all, mi_spread_run1$est_adv$robust_se_all,
                    mi_spread_run2$est_adv$robust_se_all,
                    mi_spread_combined_run$est_adv$robust_se_all),
          title=paste('Distressed by COVID-19 Deaths in U.S.'),
          dep.var.caption  = "Distressed by COVID-19 Deaths in U.S.",
          dep.var.labels.include = FALSE, model.numbers=FALSE,
          column.labels = c("July 21, 2020", "July 21, 2020", "July 25, 2020", "Both dates"),
          align=TRUE)
```

```
##
## <table style="text-align:center"><caption><strong>Distressed by COVID-19 Deaths in U.S.</strong></ca
## <tr><td colspan="5" style="border-bottom: 1px solid black"></td></tr><tr><td style="text-align:left"
## <tr><td></td><td colspan="4" style="border-bottom: 1px solid black"></td></tr>
## <tr><td style="text-align:left"></td><td>July 21, 2020</td><td>July 21, 2020</td><td>July 25, 2020</
## <tr><td colspan="5" style="border-bottom: 1px solid black"></td></tr><tr><td style="text-align:left"
## <tr><td style="text-align:left"></td><td>(0.107)</td><td>(0.085)</td><td>(0.072)</td><td>(0.054)</td
## <tr><td style="text-align:left"></td><td>p = 0.002<sup>***</sup></td><td>p = 0.006<sup>***</sup></td
## <tr><td style="text-align:left"></td><td></td><td></td><td></td><td></td></tr>
## <tr><td style="text-align:left">run</td><td></td><td></td><td></td><td>-0.017</td></tr>
## <tr><td style="text-align:left"></td><td></td><td></td><td></td><td>(0.054)</td></tr>
## <tr><td style="text-align:left"></td><td></td><td></td><td></td><td>p = 0.752</td></tr>
## <tr><td style="text-align:left"></td><td></td><td></td><td></td><td></td></tr>
## <tr><td style="text-align:left">gender_female</td><td></td><td>0.023</td><td>0.105</td><td>0.067</td
## <tr><td style="text-align:left"></td><td></td><td>(0.085)</td><td>(0.074)</td><td>(0.055)</td></tr>
## <tr><td style="text-align:left"></td><td></td><td>p = 0.784</td><td>p = 0.155</td><td>p = 0.227</td>
## <tr><td style="text-align:left"></td><td></td><td></td><td></td><td></td></tr>
## <tr><td style="text-align:left">gender_other</td><td></td><td>0.486</td><td>0.586</td><td>0.526</td>
## <tr><td style="text-align:left"></td><td></td><td>(0.137)</td><td>(0.174)</td><td>(0.102)</td></tr>
## <tr><td style="text-align:left"></td><td></td><td>p = 0.0004<sup>***</sup></td><td>p = 0.001<sup>***
## <tr><td style="text-align:left"></td><td></td><td></td><td></td><td></td></tr>
## <tr><td style="text-align:left">age_40_60</td><td></td><td>0.110</td><td>0.200</td><td>0.161</td></t
## <tr><td style="text-align:left"></td><td></td><td>(0.091)</td><td>(0.087)</td><td>(0.063)</td></tr>
## <tr><td style="text-align:left"></td><td></td><td>p = 0.227</td><td>p = 0.022<sup>**</sup></td><td>p
## <tr><td style="text-align:left"></td><td></td><td></td><td></td><td></td></tr>
## <tr><td style="text-align:left">age_over_60</td><td></td><td>0.570</td><td>-0.268</td><td>0.011</td>
## <tr><td style="text-align:left"></td><td></td><td>(0.181)</td><td>(0.253)</td><td>(0.197)</td></tr>
## <tr><td style="text-align:left"></td><td></td><td>p = 0.002<sup>***</sup></td><td>p = 0.289</td><td>
## <tr><td style="text-align:left"></td><td></td><td></td><td></td><td></td></tr>
## <tr><td style="text-align:left">party_democrat</td><td></td><td>0.559</td><td>0.769</td><td>0.663</t
## <tr><td style="text-align:left"></td><td></td><td>(0.110)</td><td>(0.105)</td><td>(0.076)</td></tr>
## <tr><td style="text-align:left"></td><td></td><td>p = 0.00000<sup>***</sup></td><td>p = 0.000<sup>**
## <tr><td style="text-align:left"></td><td></td><td></td><td></td><td></td></tr>
## <tr><td style="text-align:left">party_other</td><td></td><td>0.274</td><td>0.344</td><td>0.294</td><
## <tr><td style="text-align:left"></td><td></td><td>(0.129)</td><td>(0.127)</td><td>(0.091)</td></tr>
## <tr><td style="text-align:left"></td><td></td><td>p = 0.035<sup>**</sup></td><td>p = 0.007<sup>***</
## <tr><td style="text-align:left"></td><td></td><td></td><td></td><td></td></tr>
## <tr><td style="text-align:left">not_caucasian</td><td></td><td>0.116</td><td>0.034</td><td>0.058</td
## <tr><td style="text-align:left"></td><td></td><td>(0.089)</td><td>(0.077)</td><td>(0.058)</td></tr>
## <tr><td style="text-align:left"></td><td></td><td>p = 0.192</td><td>p = 0.660</td><td>p = 0.318</td>
## <tr><td style="text-align:left"></td><td></td><td></td><td></td><td></td></tr>
## <tr><td style="text-align:left">college_educated</td><td></td><td>-0.082</td><td>-0.013</td><td>-0.0
## <tr><td style="text-align:left"></td><td></td><td>(0.081)</td><td>(0.070)</td><td>(0.054)</td></tr>
## <tr><td style="text-align:left"></td><td></td><td>p = 0.311</td><td>p = 0.856</td><td>p = 0.310</td>
## <tr><td style="text-align:left"></td><td></td><td></td><td></td><td></td></tr>
## <tr><td style="text-align:left">region_south</td><td></td><td>0.006</td><td>0.102</td><td>0.051</td>
## <tr><td style="text-align:left"></td><td></td><td>(0.108)</td><td>(0.099)</td><td>(0.072)</td></tr>
## <tr><td style="text-align:left"></td><td></td><td>p = 0.957</td><td>p = 0.302</td><td>p = 0.478</td>
## <tr><td style="text-align:left"></td><td></td><td></td><td></td><td></td></tr>
## <tr><td style="text-align:left">region_midwest</td><td></td><td>0.052</td><td>-0.174</td><td>-0.068<
## <tr><td style="text-align:left"></td><td></td><td>(0.111)</td><td>(0.137)</td><td>(0.087)</td></tr>
## <tr><td style="text-align:left"></td><td></td><td>p = 0.644</td><td>p = 0.204</td><td>p = 0.437</td>
## <tr><td style="text-align:left"></td><td></td><td></td><td></td><td></td></tr>
## <tr><td style="text-align:left">region_west</td><td></td><td>0.030</td><td>0.076</td><td>0.049</td><
## <tr><td style="text-align:left"></td><td></td><td>(0.120)</td><td>(0.123)</td><td>(0.086)</td></tr>
## <tr><td style="text-align:left"></td><td></td><td>p = 0.806</td><td>p = 0.536</td><td>p = 0.568</td>
## <tr><td style="text-align:left"></td><td></td><td></td><td></td><td></td></tr>
## <tr><td style="text-align:left">covid_sick</td><td></td><td>-0.093</td><td>-0.110</td><td>-0.111</td
## <tr><td style="text-align:left"></td><td></td><td>(0.096)</td><td>(0.082)</td><td>(0.062)</td></tr>
## <tr><td style="text-align:left"></td><td></td><td>p = 0.330</td><td>p = 0.181</td><td>p = 0.075<sup>
## <tr><td style="text-align:left"></td><td></td><td></td><td></td><td></td></tr>
## <tr><td style="text-align:left">covid_hospitalized</td><td></td><td>-0.111</td><td>0.031</td><td>-0.
## <tr><td style="text-align:left"></td><td></td><td>(0.114)</td><td>(0.112)</td><td>(0.077)</td></tr>
## <tr><td style="text-align:left"></td><td></td><td>p = 0.332</td><td>p = 0.783</td><td>p = 0.752</td>
## <tr><td style="text-align:left"></td><td></td><td></td><td></td><td></td></tr>
## <tr><td style="text-align:left">covid_died</td><td></td><td>0.054</td><td>-0.106</td><td>-0.056</td>
## <tr><td style="text-align:left"></td><td></td><td>(0.123)</td><td>(0.119)</td><td>(0.082)</td></tr>
## <tr><td style="text-align:left"></td><td></td><td>p = 0.664</td><td>p = 0.371</td><td>p = 0.497</td>
## <tr><td style="text-align:left"></td><td></td><td></td><td></td><td></td></tr>
## <tr><td style="text-align:left">Constant</td><td>3.133</td><td>2.255</td><td>2.192</td><td>2.310</td
## <tr><td style="text-align:left"></td><td>(0.085)</td><td>(0.242)</td><td>(0.225)</td><td>(0.165)</td
## <tr><td style="text-align:left"></td><td>p = 0.000<sup>***</sup></td><td>p = 0.000<sup>***</sup></td
## <tr><td style="text-align:left"></td><td></td><td></td><td></td><td></td></tr>
## <tr><td colspan="5" style="border-bottom: 1px solid black"></td></tr><tr><td style="text-align:left"
## <tr><td style="text-align:left">R<sup>2</sup></td><td>0.038</td><td>0.198</td><td>0.295</td><td>0.22
## <tr><td style="text-align:left">Adjusted R<sup>2</sup></td><td>0.034</td><td>0.149</td><td>0.257</td
## <tr><td style="text-align:left">Residual Std. Error</td><td>0.858 (df = 257)</td><td>0.631 (df = 243
## <tr><td style="text-align:left">F Statistic</td><td>10.183<sup>***</sup> (df = 1; 257)</td><td>4.004
## <tr><td colspan="5" style="border-bottom: 1px solid black"></td></tr><tr><td style="text-align:left"
## </table>
```

```
run_regression_outcome1_hte = function(d) {

    model_spread_adv = lm(outcome_spread ~ treatment_assignment
                       + gender_female
                       + gender_other
                       + age_40_60
                       + age_over_60
                       + party_democrat
                       + party_other
                       + party_other:treatment_assignment
                       + not_caucasian
                       + college_educated
                       + region_south
                       + region_midwest
                       + region_west
                       + covid_sick
                       + covid_hospitalized
                       + covid_died, d)

  est_spread_adv = get_regression_results_robust_se(model_spread_adv, d, c(’treatment_assignment’), FALS
  return ( list(’model_adv’=model_spread_adv,
                ’est_adv’=est_spread_adv))
}
```

```
run_regression_outcome2_hte = function(d) {

    model_spread_adv = lm(outcome_death ~ treatment_assignment
                       + gender_female
                       + gender_other
                       + age_40_60
                       + age_over_60
                       + party_democrat
                       + party_other
                       + party_other:treatment_assignment
                       + not_caucasian
                       + college_educated
                       + region_south
                       + region_midwest
                       + region_west
                       + covid_sick
                       + covid_hospitalized
                       + covid_died, d)

  est_spread_adv = get_regression_results_robust_se(model_spread_adv, d, c(’treatment_assignment’), FALS
  return ( list(’model_adv’=model_spread_adv,
                ’est_adv’=est_spread_adv))
}
```

```
mi_spread_combined_run = run_regression_outcome1_hte(combined)
mi_death_combined_run  = run_regression_outcome2_hte(combined)


stargazer(mi_spread_combined_run$model_adv,
          #type = "text",
          type="html",  out="output/model_combined_spread_hte_regression.html", report="vcsp*",
          se = list(mi_spread_combined_run$est_adv$robust_se_all),
          dep.var.caption  = "Concerned over COVID-19 Spread in U.S. - HTE",
          dep.var.labels.include = FALSE, model.numbers=FALSE,
          column.labels = c("Both dates"),
          align=TRUE)
```

```
##
## <table style="text-align:center"><tr><td colspan="2" style="border-bottom: 1px solid black"></td></t
## <tr><td></td><td colspan="1" style="border-bottom: 1px solid black"></td></tr>
## <tr><td style="text-align:left"></td><td>Both dates</td></tr>
## <tr><td colspan="2" style="border-bottom: 1px solid black"></td></tr><tr><td style="text-align:left"
## <tr><td style="text-align:left"></td><td>(0.078)</td></tr>
## <tr><td style="text-align:left"></td><td>p = 0.053<sup>*</sup></td></tr>
## <tr><td style="text-align:left"></td><td></td></tr>
## <tr><td style="text-align:left">gender_female</td><td>0.043</td></tr>
## <tr><td style="text-align:left"></td><td>(0.072)</td></tr>
## <tr><td style="text-align:left"></td><td>p = 0.555</td></tr>
## <tr><td style="text-align:left"></td><td></td></tr>
## <tr><td style="text-align:left">gender_other</td><td>0.802</td></tr>
## <tr><td style="text-align:left"></td><td>(0.149)</td></tr>
## <tr><td style="text-align:left"></td><td>p = 0.00000<sup>***</sup></td></tr>
## <tr><td style="text-align:left"></td><td></td></tr>
## <tr><td style="text-align:left">age_40_60</td><td>0.188</td></tr>
## <tr><td style="text-align:left"></td><td>(0.084)</td></tr>
## <tr><td style="text-align:left"></td><td>p = 0.025<sup>**</sup></td></tr>
## <tr><td style="text-align:left"></td><td></td></tr>
## <tr><td style="text-align:left">age_over_60</td><td>0.297</td></tr>
## <tr><td style="text-align:left"></td><td>(0.204)</td></tr>
## <tr><td style="text-align:left"></td><td>p = 0.147</td></tr>
## <tr><td style="text-align:left"></td><td></td></tr>
## <tr><td style="text-align:left">party_democrat</td><td>0.881</td></tr>
## <tr><td style="text-align:left"></td><td>(0.094)</td></tr>
## <tr><td style="text-align:left"></td><td>p = 0.000<sup>***</sup></td></tr>
## <tr><td style="text-align:left"></td><td></td></tr>
## <tr><td style="text-align:left">party_other</td><td>0.244</td></tr>
## <tr><td style="text-align:left"></td><td>(0.153)</td></tr>
## <tr><td style="text-align:left"></td><td>p = 0.110</td></tr>
## <tr><td style="text-align:left"></td><td></td></tr>
## <tr><td style="text-align:left">not_caucasian</td><td>0.048</td></tr>
## <tr><td style="text-align:left"></td><td>(0.075)</td></tr>
## <tr><td style="text-align:left"></td><td>p = 0.521</td></tr>
## <tr><td style="text-align:left"></td><td></td></tr>
## <tr><td style="text-align:left">college_educated</td><td>0.093</td></tr>
## <tr><td style="text-align:left"></td><td>(0.073)</td></tr>
## <tr><td style="text-align:left"></td><td>p = 0.202</td></tr>
## <tr><td style="text-align:left"></td><td></td></tr>
## <tr><td style="text-align:left">region_south</td><td>0.032</td></tr>
## <tr><td style="text-align:left"></td><td>(0.097)</td></tr>
## <tr><td style="text-align:left"></td><td>p = 0.744</td></tr>
## <tr><td style="text-align:left"></td><td></td></tr>
## <tr><td style="text-align:left">region_midwest</td><td>-0.059</td></tr>
## <tr><td style="text-align:left"></td><td>(0.113)</td></tr>
## <tr><td style="text-align:left"></td><td>p = 0.606</td></tr>
## <tr><td style="text-align:left"></td><td></td></tr>
## <tr><td style="text-align:left">region_west</td><td>0.148</td></tr>
## <tr><td style="text-align:left"></td><td>(0.110)</td></tr>
## <tr><td style="text-align:left"></td><td>p = 0.178</td></tr>
## <tr><td style="text-align:left"></td><td></td></tr>
## <tr><td style="text-align:left">covid_sick</td><td>-0.185</td></tr>
## <tr><td style="text-align:left"></td><td>(0.085)</td></tr>
## <tr><td style="text-align:left"></td><td>p = 0.030<sup>**</sup></td></tr>
## <tr><td style="text-align:left"></td><td></td></tr>
## <tr><td style="text-align:left">covid_hospitalized</td><td>-0.127</td></tr>
## <tr><td style="text-align:left"></td><td>(0.106)</td></tr>
## <tr><td style="text-align:left"></td><td>p = 0.233</td></tr>
## <tr><td style="text-align:left"></td><td></td></tr>
## <tr><td style="text-align:left">covid_died</td><td>-0.067</td></tr>
## <tr><td style="text-align:left"></td><td>(0.103)</td></tr>
## <tr><td style="text-align:left"></td><td>p = 0.520</td></tr>
## <tr><td style="text-align:left"></td><td></td></tr>
## <tr><td style="text-align:left">treatment_assignment:party_other</td><td>0.172</td></tr>
## <tr><td style="text-align:left"></td><td>(0.166)</td></tr>
## <tr><td style="text-align:left"></td><td>p = 0.302</td></tr>
## <tr><td style="text-align:left"></td><td></td></tr>
## <tr><td style="text-align:left">Constant</td><td>3.104</td></tr>
## <tr><td style="text-align:left"></td><td>(0.205)</td></tr>
## <tr><td style="text-align:left"></td><td>p = 0.000<sup>***</sup></td></tr>
## <tr><td style="text-align:left"></td><td></td></tr>
## <tr><td colspan="2" style="border-bottom: 1px solid black"></td></tr><tr><td style="text-align:left"
## <tr><td style="text-align:left">R<sup>2</sup></td><td>0.251</td></tr>
## <tr><td style="text-align:left">Adjusted R<sup>2</sup></td><td>0.229</td></tr>
## <tr><td style="text-align:left">Residual Std. Error</td><td>0.798 (df = 534)</td></tr>
## <tr><td style="text-align:left">F Statistic</td><td>11.194<sup>***</sup> (df = 16; 534)</td></tr>
## <tr><td colspan="2" style="border-bottom: 1px solid black"></td></tr><tr><td style="text-align:left"
## </table>
```

```
stargazer(mi_death_combined_run$model_adv,
          #type = "text",
          type="html",  out="output/model_combined_death_hte_regression.html", report="vcsp*",
          se = list(mi_death_combined_run$est_adv$robust_se_all),
          dep.var.caption  = "Distressed by COVID-19 Spread in U.S. - HTE",
          dep.var.labels.include = FALSE, model.numbers=FALSE,
          column.labels = c("Both dates"),
          align=TRUE)
```

```
##
## <table style="text-align:center"><tr><td colspan="2" style="border-bottom: 1px solid black"></td></t
## <tr><td></td><td colspan="1" style="border-bottom: 1px solid black"></td></tr>
## <tr><td style="text-align:left"></td><td>Both dates</td></tr>
## <tr><td colspan="2" style="border-bottom: 1px solid black"></td></tr><tr><td style="text-align:left"
## <tr><td style="text-align:left"></td><td>(0.061)</td></tr>
## <tr><td style="text-align:left"></td><td>p = 0.227</td></tr>
## <tr><td style="text-align:left"></td><td></td></tr>
## <tr><td style="text-align:left">gender_female</td><td>0.064</td></tr>
## <tr><td style="text-align:left"></td><td>(0.055)</td></tr>
## <tr><td style="text-align:left"></td><td>p = 0.242</td></tr>
## <tr><td style="text-align:left"></td><td></td></tr>
## <tr><td style="text-align:left">gender_other</td><td>0.553</td></tr>
## <tr><td style="text-align:left"></td><td>(0.106)</td></tr>
## <tr><td style="text-align:left"></td><td>p = 0.00000<sup>***</sup></td></tr>
## <tr><td style="text-align:left"></td><td></td></tr>
## <tr><td style="text-align:left">age_40_60</td><td>0.154</td></tr>
## <tr><td style="text-align:left"></td><td>(0.063)</td></tr>
## <tr><td style="text-align:left"></td><td>p = 0.015<sup>**</sup></td></tr>
## <tr><td style="text-align:left"></td><td></td></tr>
## <tr><td style="text-align:left">age_over_60</td><td>0.011</td></tr>
## <tr><td style="text-align:left"></td><td>(0.188)</td></tr>
## <tr><td style="text-align:left"></td><td>p = 0.954</td></tr>
## <tr><td style="text-align:left"></td><td></td></tr>
## <tr><td style="text-align:left">party_democrat</td><td>0.671</td></tr>
## <tr><td style="text-align:left"></td><td>(0.076)</td></tr>
## <tr><td style="text-align:left"></td><td>p = 0.000<sup>***</sup></td></tr>
## <tr><td style="text-align:left"></td><td></td></tr>
## <tr><td style="text-align:left">party_other</td><td>0.153</td></tr>
## <tr><td style="text-align:left"></td><td>(0.123)</td></tr>
## <tr><td style="text-align:left"></td><td>p = 0.216</td></tr>
## <tr><td style="text-align:left"></td><td></td></tr>
## <tr><td style="text-align:left">not_caucasian</td><td>0.057</td></tr>
## <tr><td style="text-align:left"></td><td>(0.058)</td></tr>
## <tr><td style="text-align:left"></td><td>p = 0.326</td></tr>
## <tr><td style="text-align:left"></td><td></td></tr>
## <tr><td style="text-align:left">college_educated</td><td>-0.062</td></tr>
## <tr><td style="text-align:left"></td><td>(0.054)</td></tr>
## <tr><td style="text-align:left"></td><td>p = 0.253</td></tr>
## <tr><td style="text-align:left"></td><td></td></tr>
## <tr><td style="text-align:left">region_south</td><td>0.052</td></tr>
## <tr><td style="text-align:left"></td><td>(0.072)</td></tr>
## <tr><td style="text-align:left"></td><td>p = 0.472</td></tr>
## <tr><td style="text-align:left"></td><td></td></tr>
## <tr><td style="text-align:left">region_midwest</td><td>-0.065</td></tr>
## <tr><td style="text-align:left"></td><td>(0.087)</td></tr>
## <tr><td style="text-align:left"></td><td>p = 0.454</td></tr>
## <tr><td style="text-align:left"></td><td></td></tr>
## <tr><td style="text-align:left">region_west</td><td>0.046</td></tr>
## <tr><td style="text-align:left"></td><td>(0.086)</td></tr>
## <tr><td style="text-align:left"></td><td>p = 0.593</td></tr>
## <tr><td style="text-align:left"></td><td></td></tr>
## <tr><td style="text-align:left">covid_sick</td><td>-0.108</td></tr>
## <tr><td style="text-align:left"></td><td>(0.061)</td></tr>
## <tr><td style="text-align:left"></td><td>p = 0.080<sup>*</sup></td></tr>
## <tr><td style="text-align:left"></td><td></td></tr>
## <tr><td style="text-align:left">covid_hospitalized</td><td>-0.025</td></tr>
## <tr><td style="text-align:left"></td><td>(0.076)</td></tr>
## <tr><td style="text-align:left"></td><td>p = 0.748</td></tr>
## <tr><td style="text-align:left"></td><td></td></tr>
## <tr><td style="text-align:left">covid_died</td><td>-0.048</td></tr>
## <tr><td style="text-align:left"></td><td>(0.081)</td></tr>
## <tr><td style="text-align:left"></td><td>p = 0.554</td></tr>
## <tr><td style="text-align:left"></td><td></td></tr>
## <tr><td style="text-align:left">treatment_assignment:party_other</td><td>0.247</td></tr>
## <tr><td style="text-align:left"></td><td>(0.130)</td></tr>
## <tr><td style="text-align:left"></td><td>p = 0.059<sup>*</sup></td></tr>
## <tr><td style="text-align:left"></td><td></td></tr>
## <tr><td style="text-align:left">Constant</td><td>2.318</td></tr>
## <tr><td style="text-align:left"></td><td>(0.164)</td></tr>
## <tr><td style="text-align:left"></td><td>p = 0.000<sup>***</sup></td></tr>
## <tr><td style="text-align:left"></td><td></td></tr>
## <tr><td colspan="2" style="border-bottom: 1px solid black"></td></tr><tr><td style="text-align:left"
## <tr><td style="text-align:left">R<sup>2</sup></td><td>0.234</td></tr>
## <tr><td style="text-align:left">Adjusted R<sup>2</sup></td><td>0.211</td></tr>
## <tr><td style="text-align:left">Residual Std. Error</td><td>0.607 (df = 534)</td></tr>
## <tr><td style="text-align:left">F Statistic</td><td>10.180<sup>***</sup> (df = 16; 534)</td></tr>
## <tr><td colspan="2" style="border-bottom: 1px solid black"></td></tr><tr><td style="text-align:left"
## </table>
```

```r
t.test(gender ~ treatment_assignment, data = run2)
```

```
##
##  Welch Two Sample t-test
##
## data:  gender by treatment_assignment
## t = 0.48861, df = 286.52, p-value = 0.6255
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
```

```
##  -0.09520922  0.15808801
## sample estimates:
## mean in group 0 mean in group 1
##        1.643939        1.612500
```

```
t.test(age ~ treatment_assignment, data = run2)
```

```
##
##  Welch Two Sample t-test
##
## data:  age by treatment_assignment
## t = 1.3895, df = 270.08, p-value = 0.1658
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
##  -0.1019390  0.5909542
## sample estimates:
## mean in group 0 mean in group 1
##        3.575758        3.331250
```

```
t.test(age_under_40  ~ treatment_assignment, data = run2)
```

```
##
##  Welch Two Sample t-test
##
## data:  age_under_40 by treatment_assignment
## t = -1.5912, df = 275.56, p-value = 0.1127
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
##  -0.20591972  0.02182881
## sample estimates:
## mean in group 0 mean in group 1
##       0.5454545       0.6375000
```

```
t.test(political_party ~ treatment_assignment, data = run2)
```

```
##
##  Welch Two Sample t-test
##
## data:  political_party by treatment_assignment
## t = -1.8651, df = 281.75, p-value = 0.06321
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
##  -0.346847087  0.009347087
## sample estimates:
## mean in group 0 mean in group 1
##         2.00000         2.16875
```

```
t.test(ethnicity ~ treatment_assignment, data = run2)
```

```
##
##  Welch Two Sample t-test
```

```
##
## data:  ethnicity by treatment_assignment
## t = 0.53453, df = 285.48, p-value = 0.5934
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
##  -0.1442760  0.2518517
## sample estimates:
## mean in group 0 mean in group 1
##        2.878788        2.825000
```

```
t.test(state ~ treatment_assignment, data = run2)
```

```
##
##  Welch Two Sample t-test
##
## data:  state by treatment_assignment
## t = 0.91773, df = 274.56, p-value = 0.3596
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
##  -1.992233  5.471778
## sample estimates:
## mean in group 0 mean in group 1
##        25.47727        23.73750
```

```
t.test(college_educated ~ treatment_assignment, data = run2)
```

```
##
##  Welch Two Sample t-test
##
## data:  college_educated by treatment_assignment
## t = -0.24298, df = 278.83, p-value = 0.8082
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
##  -0.12756046  0.09953016
## sample estimates:
## mean in group 0 mean in group 1
##       0.5984848       0.6125000
```

```
t.test(covid_sick ~ treatment_assignment, data = run2)
```

```
##
##  Welch Two Sample t-test
##
## data:  covid_sick by treatment_assignment
## t = 0.33496, df = 279.15, p-value = 0.7379
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
##  -0.09605997  0.13545391
## sample estimates:
## mean in group 0 mean in group 1
##        1.469697        1.450000
```

```r
t.test(covid_hospitalized ~ treatment_assignment, data = run2)
```

```
##
##  Welch Two Sample t-test
##
## data:  covid_hospitalized by treatment_assignment
## t = 0.51646, df = 283.29, p-value = 0.6059
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
##  -0.07134676  0.12210434
## sample estimates:
## mean in group 0 mean in group 1
##        1.787879        1.762500
```

```r
t.test(covid_died ~ treatment_assignment, data = run2)
```

```
##
##  Welch Two Sample t-test
##
## data:  covid_died by treatment_assignment
## t = 0.37052, df = 283.8, p-value = 0.7113
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
##  -0.06452216  0.09444640
## sample estimates:
## mean in group 0 mean in group 1
##        1.871212        1.856250
```

```r
t.test(party_republican ~ treatment_assignment, data = run2)
```

```
##
##  Welch Two Sample t-test
##
## data:  party_republican by treatment_assignment
## t = 1.4367, df = 265.7, p-value = 0.152
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
##  -0.02644936  0.16925239
## sample estimates:
## mean in group 0 mean in group 1
##       0.2651515       0.1937500
```

```r
t.test(party_democrat ~ treatment_assignment, data = run2)
```

```
##
##  Welch Two Sample t-test
##
## data:  party_democrat by treatment_assignment
## t = 0.18947, df = 279.42, p-value = 0.8499
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
```

```
##  -0.1049179  0.1272664
## sample estimates:
## mean in group 0 mean in group 1
##       0.4924242       0.4812500
```

```
t.test(party_other ~ treatment_assignment, data = run2)
```

```
##
##  Welch Two Sample t-test
##
## data:  party_other by treatment_assignment
## t = -1.5657, df = 286.84, p-value = 0.1185
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
##  -0.18638513  0.02123361
## sample estimates:
## mean in group 0 mean in group 1
##       0.2424242       0.3250000
```