Supplementary Material

Contents

1 Interactive visualizations

Interactive visualizations showing the distribution of race and gender in different countries/regions are available at https://icaviz.netlify.app/.

2 Number of publications for each journal

See Figure 1.

3 Women proportion among authors of different racial groups

See Figure 2 and Figure 3.

4 Citation Analysis

4.1 Read data
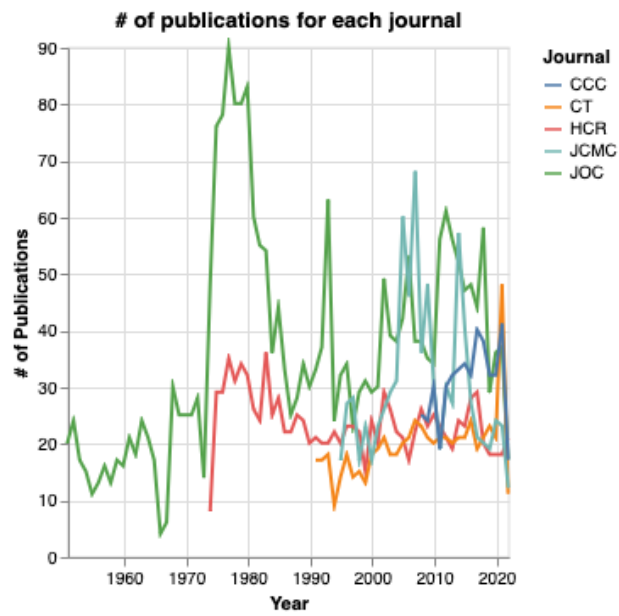
The first step is to read data:

Figure 1: Number of publications for each journal by year

Figure 2: Women proportion

2

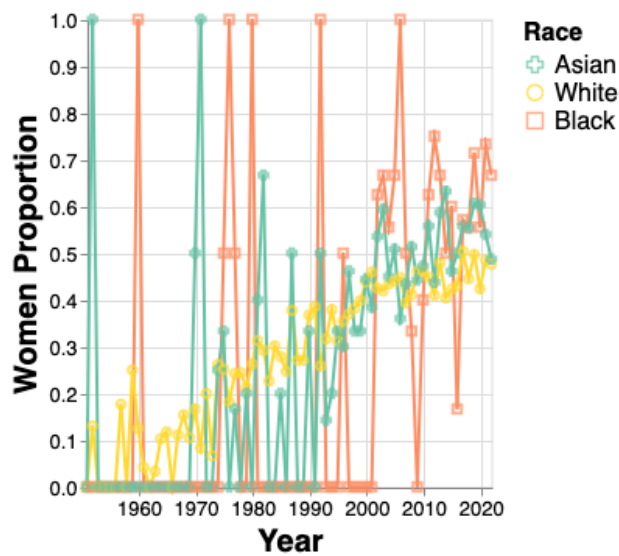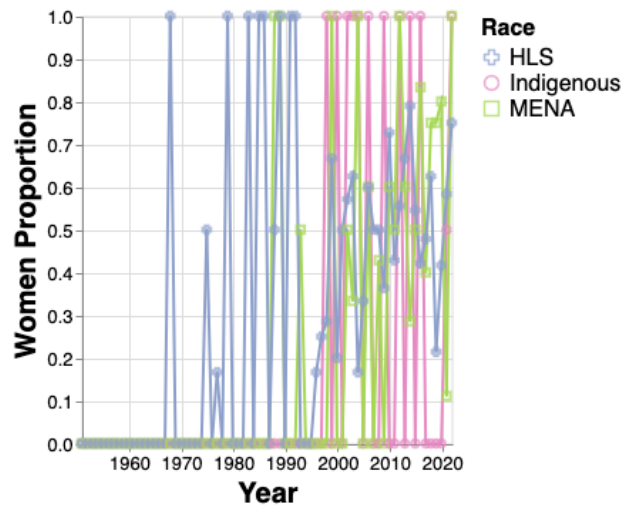Figure 3: Women proportion

```
df <- read.csv("../data/processed/papers_to_study_expanded.csv")
df$Year.Distance.from.2022 = abs(df$year - 2022)

# do the log10 transformation on citation counts
df$gscholar_citation_log10 <- log10(df$gscholar_citation + 0.1)
var_cols <- c(1, 16:17, 20:33, 35:36)
data <- df[, var_cols]
```

4.2 Deal with univariate outliers

```
hist(data$gscholar_citation_log10)
```

Histogram of data$gscholar_citation_log10
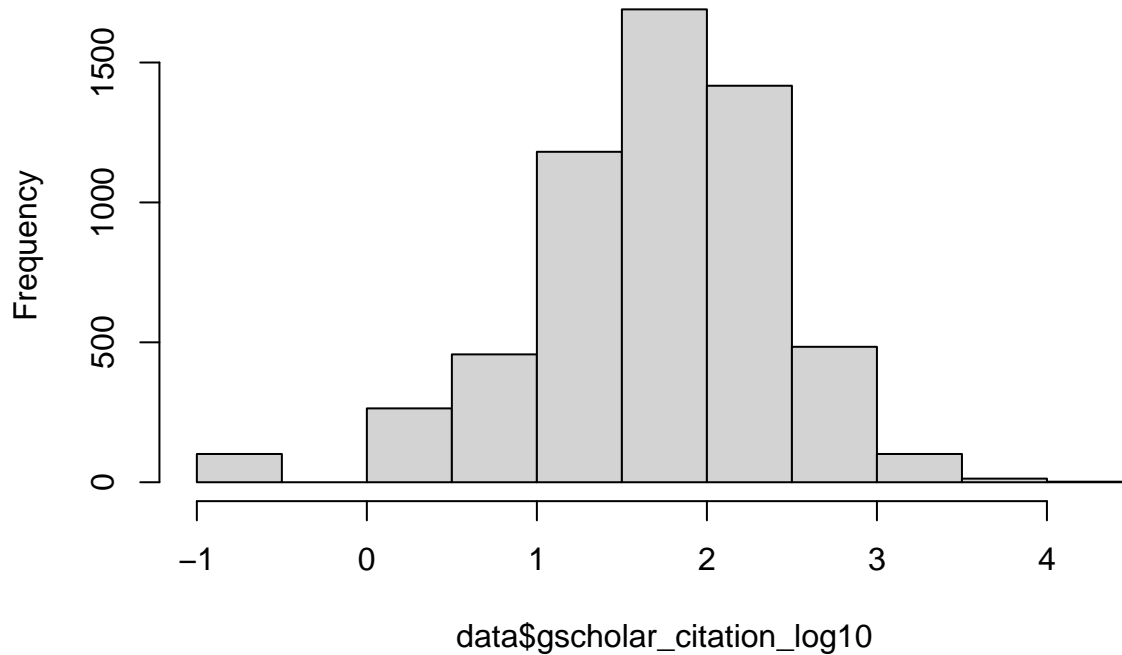

```r
data$gscholar_citation_log10_stdized <- scale(
  data$gscholar_citation_log10,
  center = T,
  scale = T
)
data$outlier0 <- ifelse(data$gscholar_citation_log10_stdized > 3.3 |
                          data$gscholar_citation_log10_stdized < -3.3,
                        1, 0
)
table(data$outlier0)
```

```
##
##    0    1
## 5607  103
```

As can be seen, there are 103 outliers.

4.3   Build model

```r
# '10.1111/j.1460-2466.1977.tb02133.x', '10.1111/j.1460-2466.1952.tb00171.x' These two papers have no g
datanew <- subset(data, outlier0 == 0)
datanew$outlier0 <- NULL
datanew$gscholar_citation_log10_stdized <- NULL
```

```r
model <- lm(gscholar_citation_log10~., datanew)
```

4.4 Dianostics

```r
## Normality
ols_plot_resid_qq(model)
```

Normal Q–Q Plot
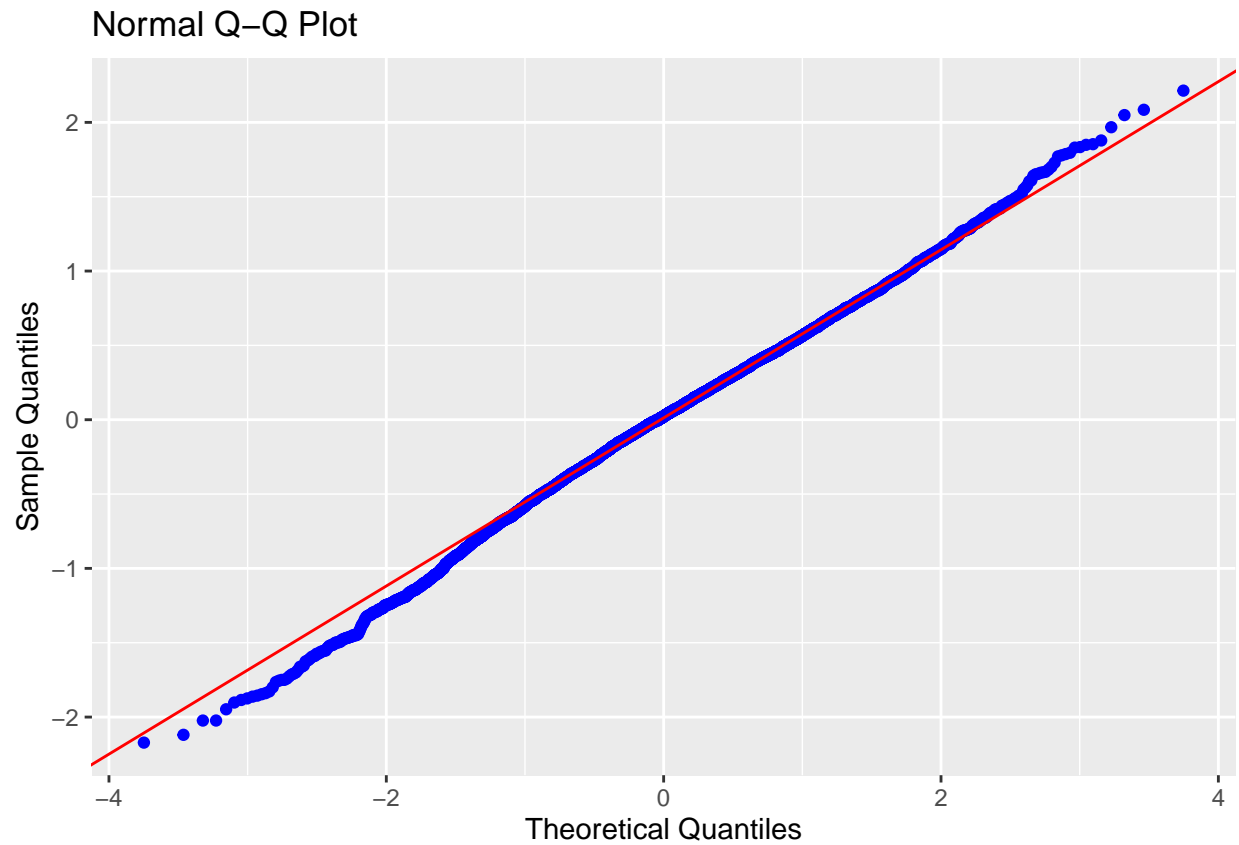

```r
#Correlation between observed residuals and expected residuals under normality.
ols_test_correlation(model)
```

```
## [1] 0.9986378
```

```r
ols_plot_resid_hist(model)
```

Residual Histogram
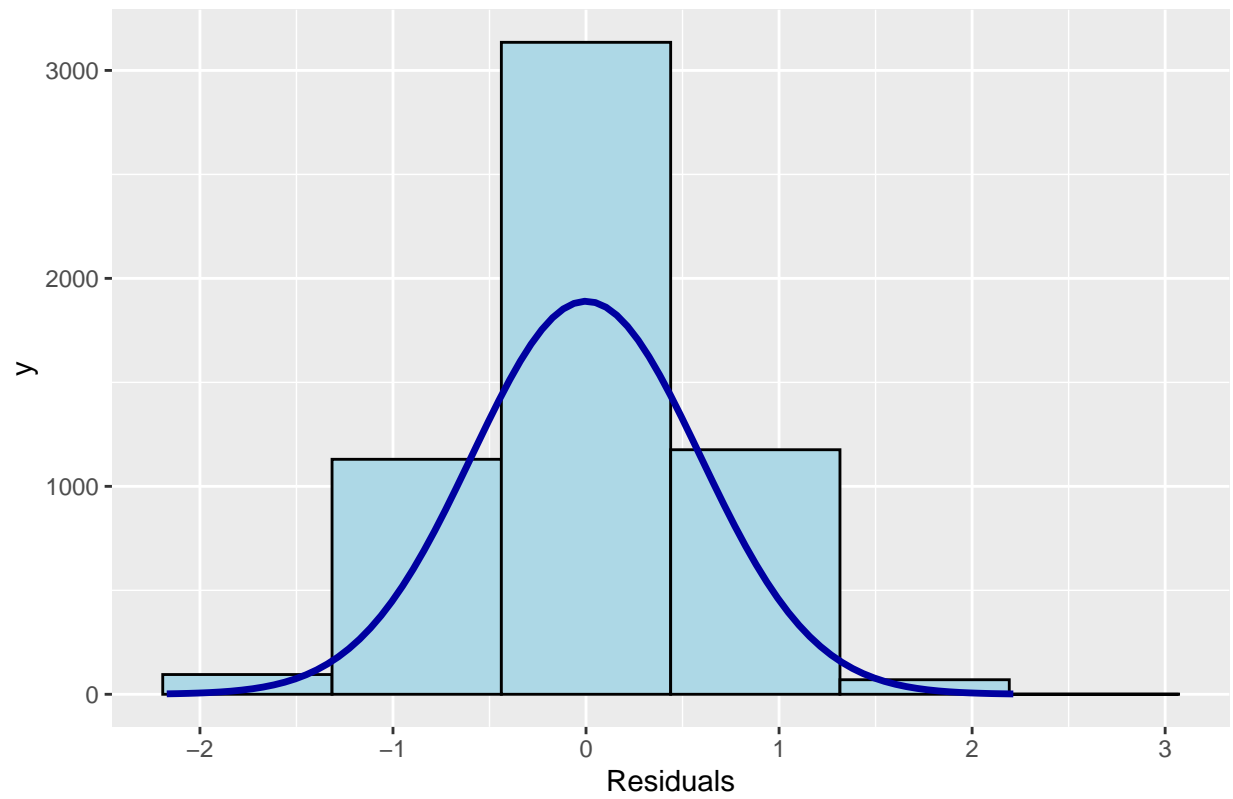

```r
## linearity & homoscedasticity
ols_plot_resid_fit(model)
```

Residual vs Fitted Values
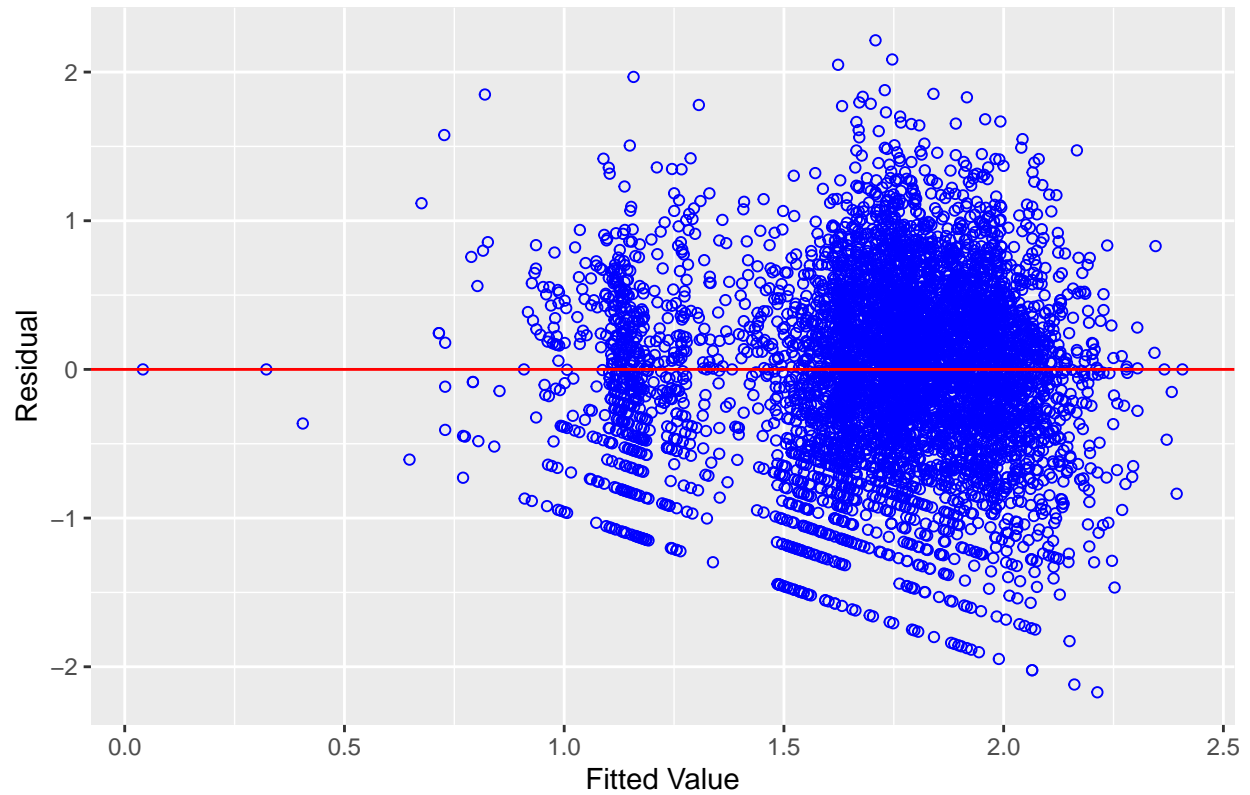

```
## collinearity diagnostics
# ols_coll_diag(model)
vif(model)
```

```
##                                 GVIF Df GVIF^(1/(2*Df))
## journal                     1.803106  4        1.076472
## cross_country               6.619440  1        2.572827
## cross_type                  1.180897  1        1.086691
## num_race                   12.682847  1        3.561298
## num_country                 4.963491  1        2.227889
## cross_gender_and_race       4.109228  1        2.027123
## cross_gender_and_country    4.438181  1        2.106699
## cross_country_and_race      5.693560  1        2.386118
## cross_gender_race_and_country 6.218367 1       2.493665
## numberOfAuthors             2.314327  1        1.521291
## first_author_gender        11.030926  2        1.822439
## first_author_race          88.563799  5        1.565762
## first_author_country       27.159605 64        1.026130
## first_author_afftype        1.203357  1        1.096976
## with_us_authors             8.687016  1        2.947374
## cross_race_details        941.384763  6        1.769351
## cross_gender_details       24.331605  3        1.702270
## Year.Distance.from.2022     1.849162  1        1.359839
```

4.5 Run Model

```
summary(model)
```

```
##
## Call:
## lm(formula = gscholar_citation_log10 ~ ., data = datanew)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -2.17181 -0.36909  0.02204  0.39369  2.21343
##
## Coefficients:
##                                                  Estimate Std. Error t value
## (Intercept)                                     1.7575010  0.4326112   4.063
## journalCommunication, Culture and Critique     -0.6191977  0.0385673 -16.055
## journalHuman Communication Research             0.1922003  0.0315584   6.090
## journalJournal of Communication                 0.0748179  0.0290478   2.576
## journalJournal of Computer-Mediated Communication 0.2535682 0.0328364  7.722
## cross_countryTrue                               0.1661404  0.0669349   2.482
## cross_typeTrue                                  0.0593013  0.0413427   1.434
## num_race                                       -0.1527943  0.0682835  -2.238
## num_country                                     0.0645221  0.0419850   1.537
## cross_gender_and_raceTrue                      -0.1094405  0.0543681  -2.013
## cross_gender_and_countryTrue                   -0.2550186  0.0692284  -3.684
## cross_country_and_raceTrue                     -0.0986971  0.0956964  -1.031
## cross_gender_race_and_countryTrue               0.0209796  0.1212366   0.173
## numberOfAuthors                                 0.0019381  0.0085842   0.226
## first_author_genderM                            0.0483471  0.0300441   1.609
## first_author_genderN                           -0.0823867  0.3489748  -0.236
## first_author_raceBlack                         -0.1022738  0.1313243  -0.779
## first_author_raceHispanic                       0.0432094  0.0810781   0.533
## first_author_raceIndigenous                    -0.2074777  0.3017309  -0.688
## first_author_raceMiddle Eastern                -0.1638593  0.1279014  -1.281
## first_author_raceWhite                          0.0088196  0.0465751   0.189
## first_author_countryAR                         -0.1670665  0.5992099  -0.279
## first_author_countryAT                          0.0541806  0.4419681   0.123
## first_author_countryAU                          0.0344297  0.4299884   0.080
## first_author_countryBE                          0.0782253  0.4385574   0.178
## first_author_countryBR                         -0.0897198  0.4746324  -0.189
## first_author_countryBS                         -0.3078873  0.7317539  -0.421
## first_author_countryBY                         -0.1763622  0.7317590  -0.241
## first_author_countryCA                          0.1519215  0.4268059   0.356
## first_author_countryCH                          0.2272420  0.4404915   0.516
## first_author_countryCL                          0.2191174  0.4574807   0.479
## first_author_countryCN                         -0.0089431  0.4311088  -0.021
## first_author_countryCO                          0.1698293  0.5186720   0.327
## first_author_countryCR                          0.7622836  0.7371177   1.034
## first_author_countryCZ                          0.9509944  0.4895678   1.943
## first_author_countryDE                          0.2570244  0.4270822   0.602
## first_author_countryDK                          0.2083847  0.4440428   0.469
## first_author_countryEE                         -0.0331776  0.7322282  -0.045
## first_author_countryEG                          0.3530255  0.5491112   0.643
```

```
## first_author_countryES                       0.2036157  0.4436131   0.459
## first_author_countryFI                      -0.1162013  0.4437614  -0.262
## first_author_countryFR                      -0.2781594  0.4440562  -0.626
## first_author_countryGB                       0.1902383  0.4256283   0.447
## first_author_countryGH                       0.1365045  0.5986721   0.228
## first_author_countryGR                       0.0537018  0.5459413   0.098
## first_author_countryHK                      -0.5647224  0.5181047  -1.090
## first_author_countryHR                       0.2661562  0.7328335   0.363
## first_author_countryHU                      -0.0685841  0.5192323  -0.132
## first_author_countryIE                      -0.1709405  0.5460988  -0.313
## first_author_countryIL                       0.0217967  0.4265232   0.051
## first_author_countryIN                      -0.0969677  0.4737428  -0.205
## first_author_countryIR                       0.6667213  0.7336795   0.909
## first_author_countryIT                       0.0239192  0.4436468   0.054
## first_author_countryJP                       0.0630023  0.4377805   0.144
## first_author_countryKE                       0.7413407  0.7367288   1.006
## first_author_countryKH                       0.3940539  0.7317559   0.539
## first_author_countryKR                       0.2380853  0.4348270   0.548
## first_author_countryLB                       0.3573528  0.4728221   0.756
## first_author_countryLK                      -0.0849982  0.7325615  -0.116
## first_author_countryMA                      -0.2157315  0.7327270  -0.294
## first_author_countryMO                       0.0278520  0.7322781   0.038
## first_author_countryMX                       0.1267372  0.5036210   0.252
## first_author_countryMZ                      -0.6006328  0.7327921  -0.820
## first_author_countryNG                       0.2897573  0.7317651   0.396
## first_author_countryNL                       0.1637743  0.4264875   0.384
## first_author_countryNO                       0.1862891  0.4545124   0.410
## first_author_countryNZ                       0.2226745  0.4505984   0.494
## first_author_countryPH                       0.3074057  0.4284483   0.717
## first_author_countryPL                       0.1515184  0.4884319   0.310
## first_author_countryPT                      -0.2684248  0.6030294  -0.445
## first_author_countryQA                       0.3412421  0.4905214   0.696
## first_author_countryRU                      -0.3264408  0.5474785  -0.596
## first_author_countrySE                       0.1308407  0.4381343   0.299
## first_author_countrySG                       0.0233332  0.4335970   0.054
## first_author_countrySI                      -0.1105005  0.4882286  -0.226
## first_author_countrySK                       0.1043069  0.7357632   0.142
## first_author_countryTH                       0.3389994  0.6016546   0.563
## first_author_countryTJ                      -0.7856905  0.4729496  -1.661
## first_author_countryTR                       0.1684039  0.5198392   0.324
## first_author_countryTW                      -0.1226529  0.4536421  -0.270
## first_author_countryUG                      -1.3624534  0.7375944  -1.847
## first_author_countryUK                       0.0028515  0.4472601   0.006
## first_author_countryUS                       0.1661144  0.4268645   0.389
## first_author_countryVN                       1.0079261  0.7327678   1.376
## first_author_countryZA                      -0.3171598  0.5463729  -0.580
## first_author_afftypeNon Education           -0.3818704  0.0389782  -9.797
## with_us_authorsTrue                          0.0362180  0.0576519   0.628
## cross_race_detailsBlack only                -0.0436183  0.1622478  -0.269
## cross_race_detailscross race                 0.2000852  0.0906408   2.207
## cross_race_detailsHispanic only             -0.1002020  0.1122239  -0.893
## cross_race_detailsIndigenous only           -0.2969760  0.5198808  -0.571
## cross_race_detailsMiddle Eastern only        0.2420354  0.1711496   1.414
## cross_race_detailsWhite only                 0.0250952  0.0582313   0.431
```

```
## cross_gender_detailsF only                               -0.0963608  0.0339207  -2.841
## cross_gender_detailsM only                               -0.1588912  0.0298945  -5.315
## cross_gender_detailsN only                                0.0839789  0.4176286   0.201
## Year.Distance.from.2022                                  -0.0054423  0.0006475  -8.405
##                                                          Pr(>|t|)
## (Intercept)                                              4.92e-05 ***
## journalCommunication, Culture and Critique                < 2e-16 ***
## journalHuman Communication Research                      1.20e-09 ***
## journalJournal of Communication                          0.010030 *
## journalJournal of Computer-Mediated Communication        1.35e-14 ***
## cross_countryTrue                                        0.013090 *
## cross_typeTrue                                           0.151520
## num_race                                                 0.025284 *
## num_country                                              0.124402
## cross_gender_and_raceTrue                                0.044168 *
## cross_gender_and_countryTrue                             0.000232 ***
## cross_country_and_raceTrue                               0.302419
## cross_gender_race_and_countryTrue                        0.862621
## numberOfAuthors                                          0.821383
## first_author_genderM                                     0.107630
## first_author_genderN                                     0.813378
## first_author_raceBlack                                   0.436138
## first_author_raceHispanic                                0.594100
## first_author_raceIndigenous                              0.491718
## first_author_raceMiddle Eastern                          0.200199
## first_author_raceWhite                                   0.849815
## first_author_countryAR                                   0.780400
## first_author_countryAT                                   0.902437
## first_author_countryAU                                   0.936183
## first_author_countryBE                                   0.858439
## first_author_countryBR                                   0.850076
## first_author_countryBS                                   0.673952
## first_author_countryBY                                   0.809555
## first_author_countryCA                                   0.721892
## first_author_countryCH                                   0.605957
## first_author_countryCL                                   0.631982
## first_author_countryCN                                   0.983450
## first_author_countryCO                                   0.743354
## first_author_countryCR                                   0.301116
## first_author_countryCZ                                   0.052125 .
## first_author_countryDE                                   0.547322
## first_author_countryDK                                   0.638881
## first_author_countryEE                                   0.963861
## first_author_countryEG                                   0.520314
## first_author_countryES                                   0.646257
## first_author_countryFI                                   0.793443
## first_author_countryFR                                   0.531075
## first_author_countryGB                                   0.654922
## first_author_countryGH                                   0.819645
## first_author_countryGR                                   0.921646
## first_author_countryHK                                   0.275771
## first_author_countryHR                                   0.716479
## first_author_countryHU                                   0.894920
## first_author_countryIE                                   0.754276
```

```
## first_author_countryIL                        0.959245
## first_author_countryIN                        0.837826
## first_author_countryIR                        0.363529
## first_author_countryIT                        0.957005
## first_author_countryJP                        0.885574
## first_author_countryKE                        0.314335
## first_author_countryKH                        0.590250
## first_author_countryKR                        0.584030
## first_author_countryLB                        0.449809
## first_author_countryLK                        0.907634
## first_author_countryMA                        0.768446
## first_author_countryMO                        0.969661
## first_author_countryMX                        0.801319
## first_author_countryMZ                        0.412451
## first_author_countryNG                        0.692142
## first_author_countryNL                        0.700988
## first_author_countryNO                        0.681920
## first_author_countryNZ                        0.621202
## first_author_countryPH                        0.473105
## first_author_countryPL                        0.756410
## first_author_countryPT                        0.656245
## first_author_countryQA                        0.486663
## first_author_countryRU                        0.551025
## first_author_countrySE                        0.765232
## first_author_countrySG                        0.957086
## first_author_countrySI                        0.820954
## first_author_countrySK                        0.887269
## first_author_countryTH                        0.573155
## first_author_countryTJ                        0.096719 .
## first_author_countryTR                        0.745985
## first_author_countryTW                        0.786883
## first_author_countryUG                        0.064778 .
## first_author_countryUK                        0.994913
## first_author_countryUS                        0.697180
## first_author_countryVN                        0.169031
## first_author_countryZA                        0.561613
## first_author_afftypeNon Education             < 2e-16 ***
## with_us_authorsTrue                           0.529887
## cross_race_detailsBlack only                  0.788065
## cross_race_detailscross race                  0.027324 *
## cross_race_detailsHispanic only               0.371963
## cross_race_detailsIndigenous only             0.567861
## cross_race_detailsMiddle Eastern only         0.157367
## cross_race_detailsWhite only                  0.666517
## cross_gender_detailsF only                    0.004517 **
## cross_gender_detailsM only                    1.11e-07 ***
## cross_gender_detailsN only                    0.840639
## Year.Distance.from.2022                       < 2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.5969 on 5510 degrees of freedom
## Multiple R-squared:  0.1726,	Adjusted R-squared:  0.1582
## F-statistic: 11.97 on 96 and 5510 DF,  p-value: < 2.2e-16
```