Text Analysis of Correlaid

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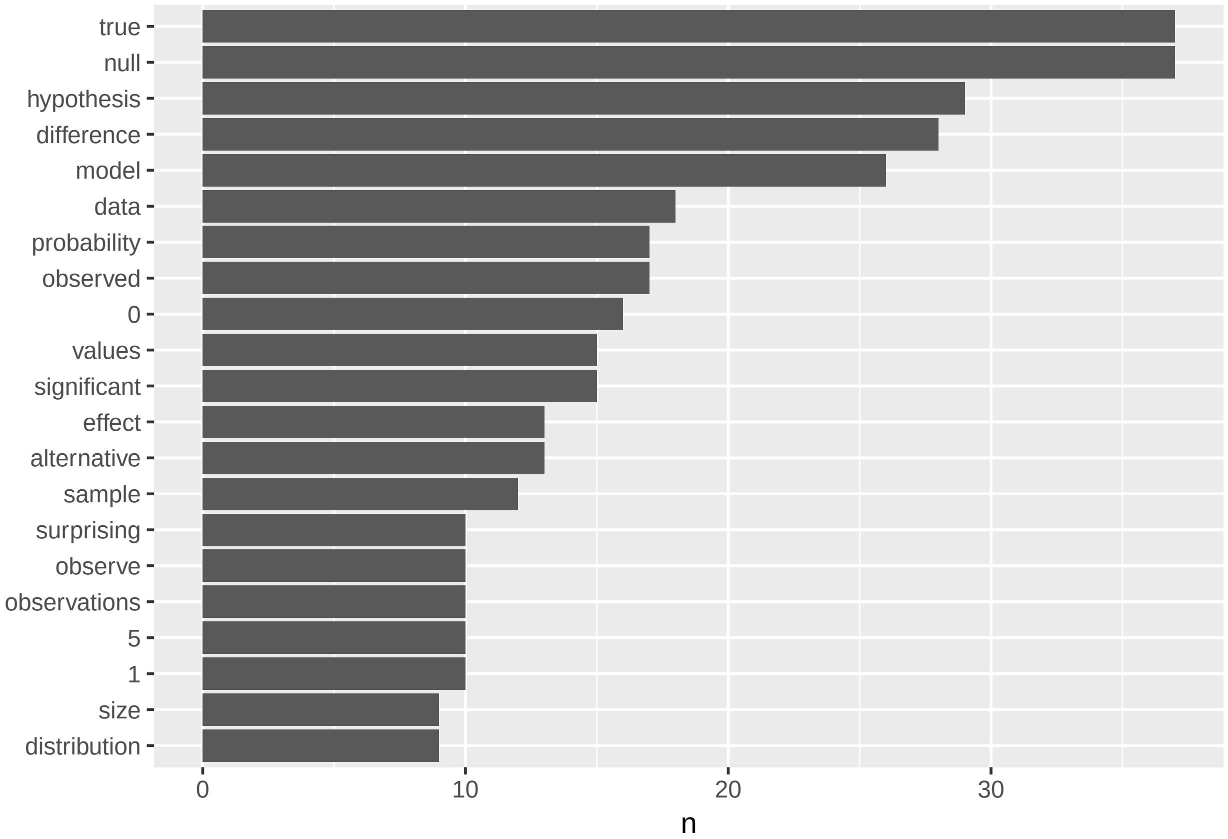
Seperate Analysis on Each Article

P-Value Article

We want to analyze the passage from https://correlaid.org/blog/posts/understand-p-values.

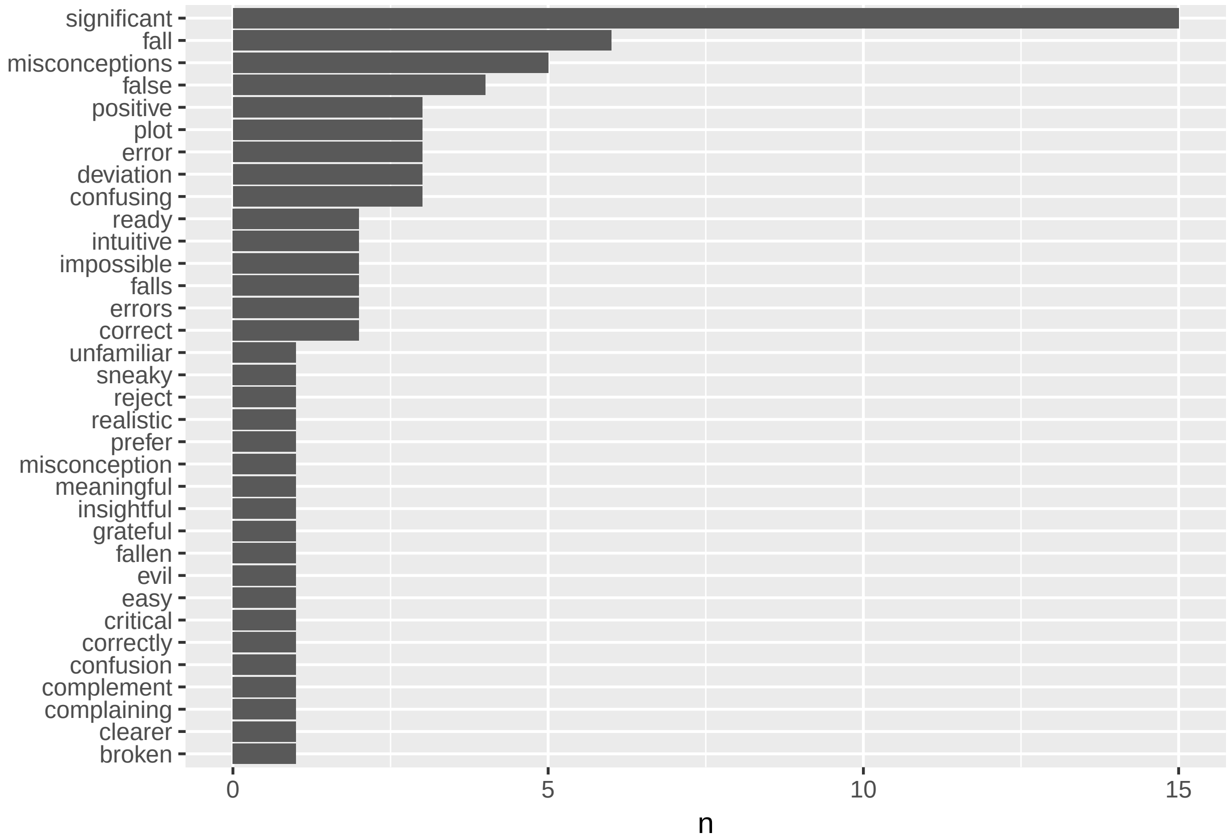
```
##
## Attaching package: 'dplyr'

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

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

## Joining, by = "word"

## # A tibble: 282 x 2
##    word            n
##    <chr>       <int>
##  1 null           37
##  2 true           37
##  3 hypothesis     29
##  4 difference     28
##  5 model          26
##  6 data           18
##  7 observed       17
##  8 probability    17
##  9 0              16
## 10 significant    15
## # ... with 272 more rows

## Selecting by n
```



After eliminating the stop words in the article, we order the words appeared in the passage by frequency and we made a ggplot to show the 20 most frequent words appear in the article.

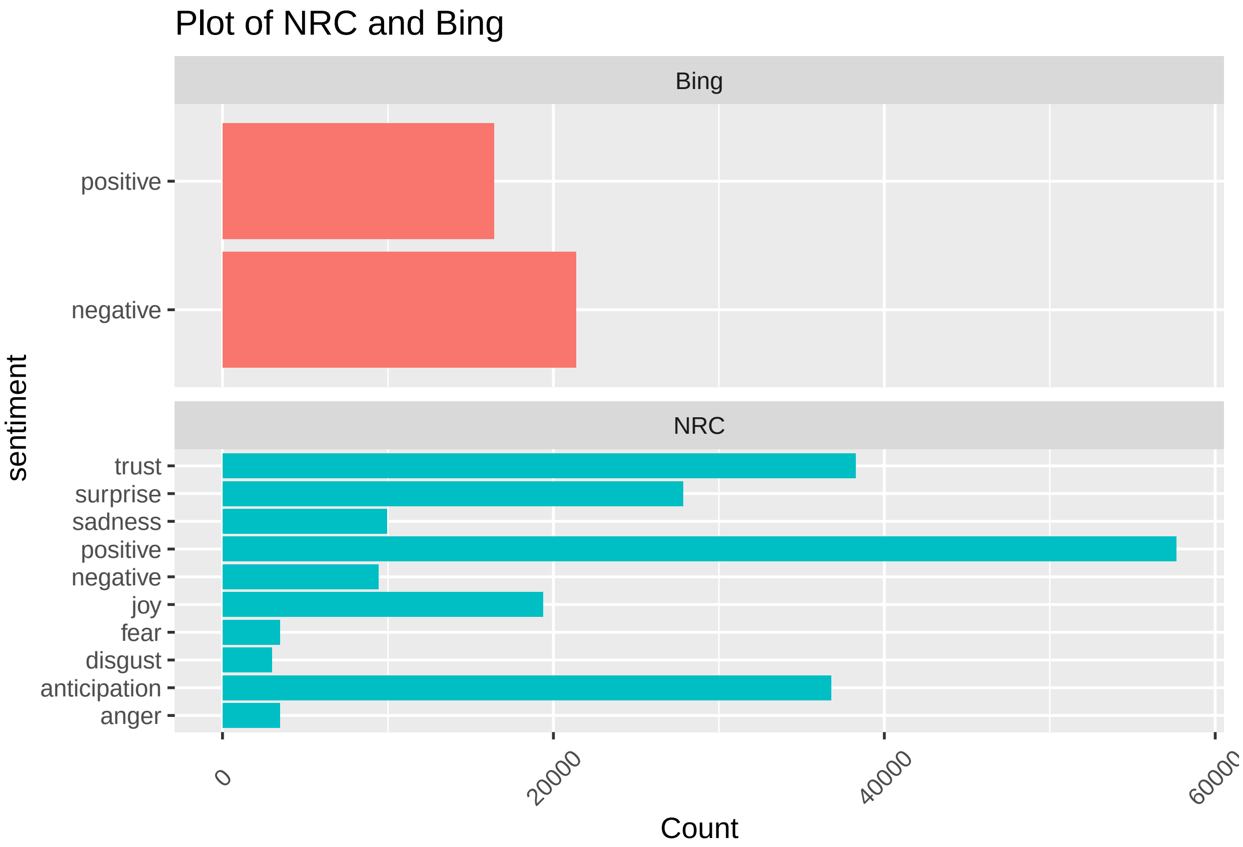
```
## Joining, by = "word"
```

```
## Selecting by n
```

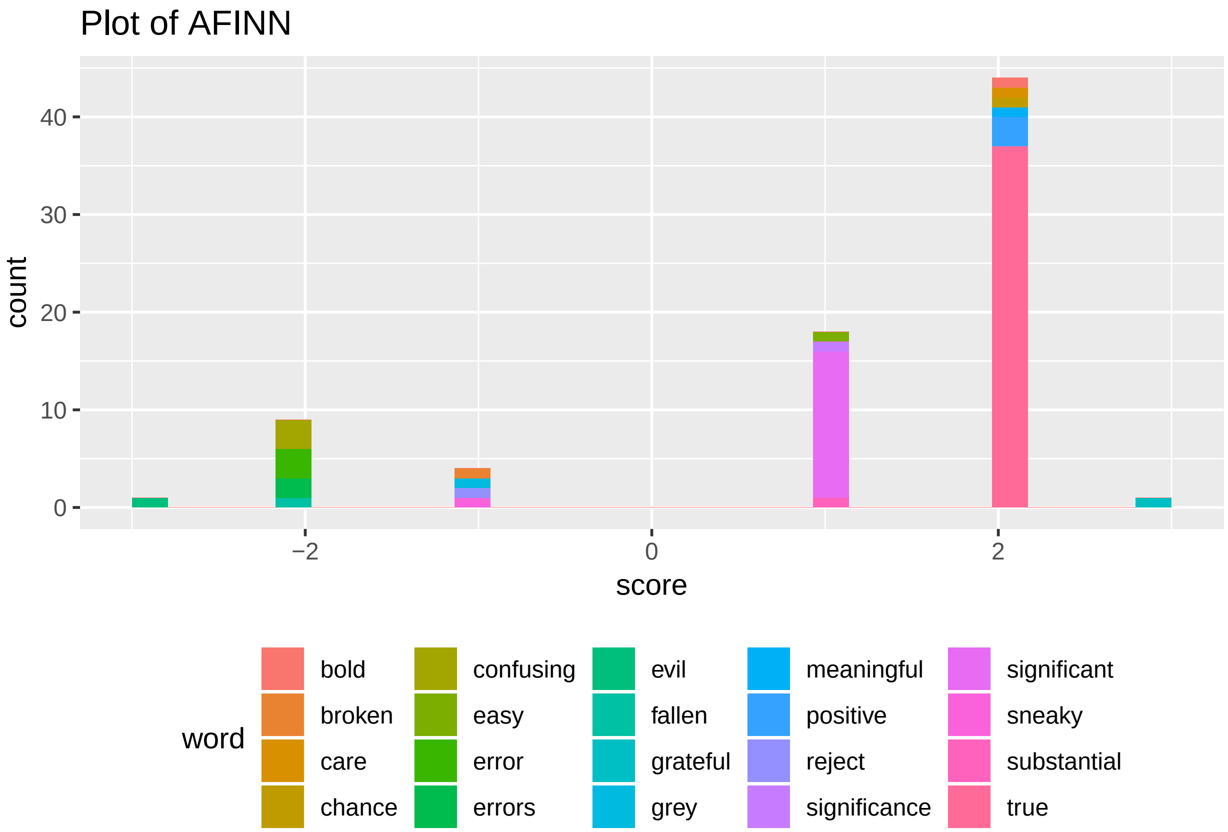


In order to get an odea of the passage's sentiment on P-Value, we applied Bing sentiment package, and made a ggplot of the top 20 sentimental words in the article. The first one "significant" is about 3 times more frequent than the second word in order. That should be due to the term "statistically significant". Then we want to compare the results from the other two packages of sentimenal words: AFINN and NRC.

```
## Joining, by = "word"
## Joining, by = "word"
```

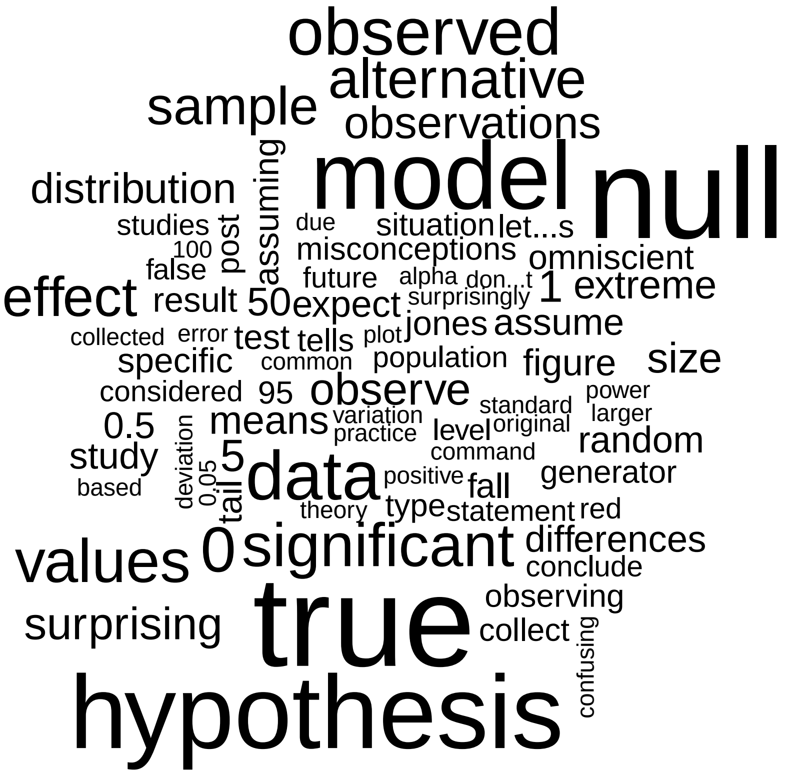


```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```

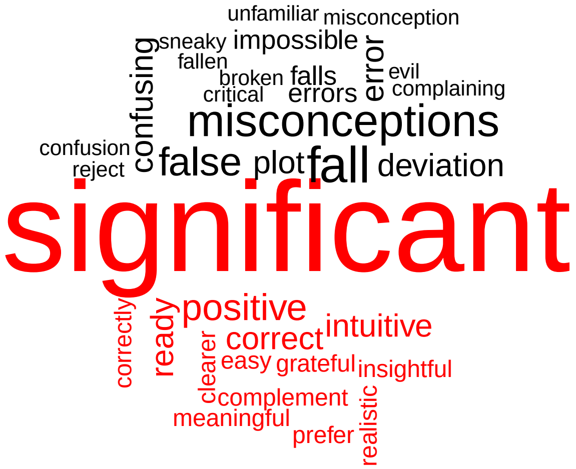


We want to also see the wordcloud.

```
## Loading required package: RColorBrewer
```



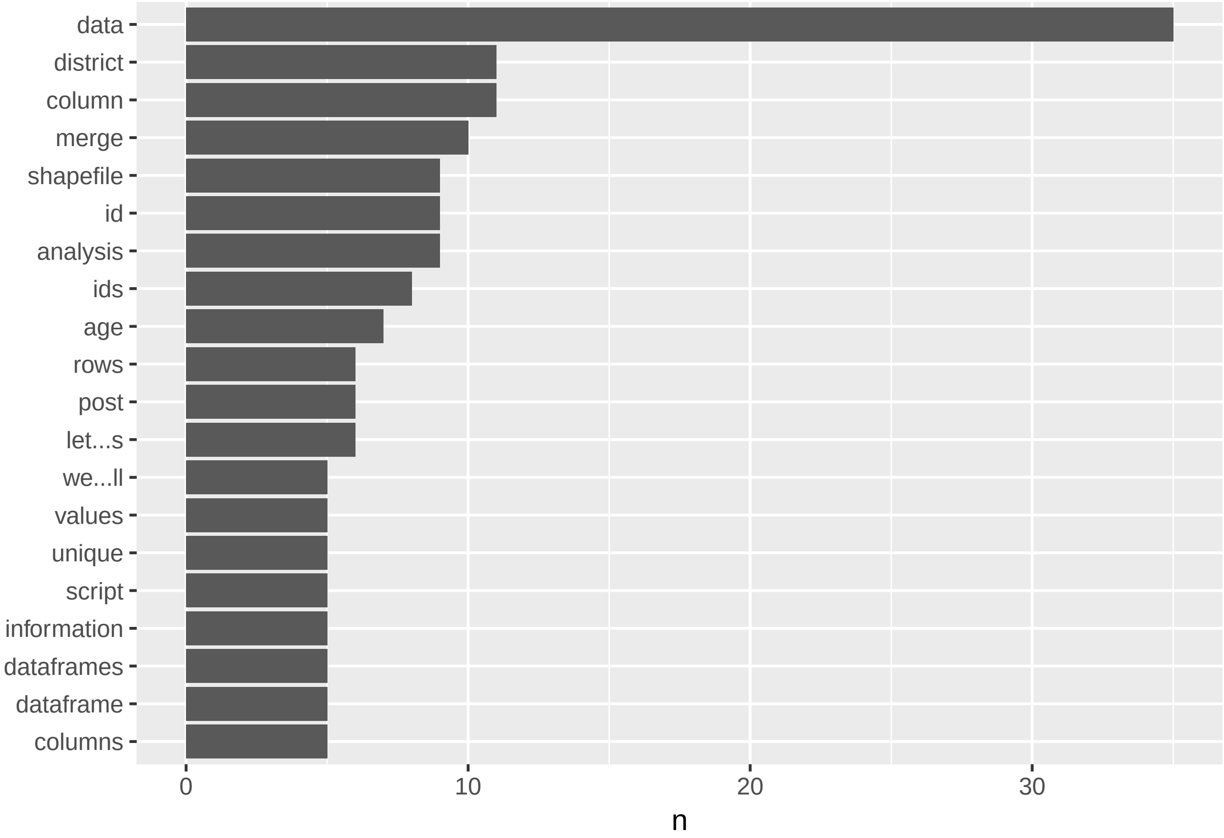
```
##
## Attaching package: 'reshape2'

## The following object is masked from 'package:tidyr':
##
##     smiths

## Joining, by = "word"
```



From the Data to the Story Article

We want to analyze the passage from https://correlaid.org/blog/posts/journocode-workflow.

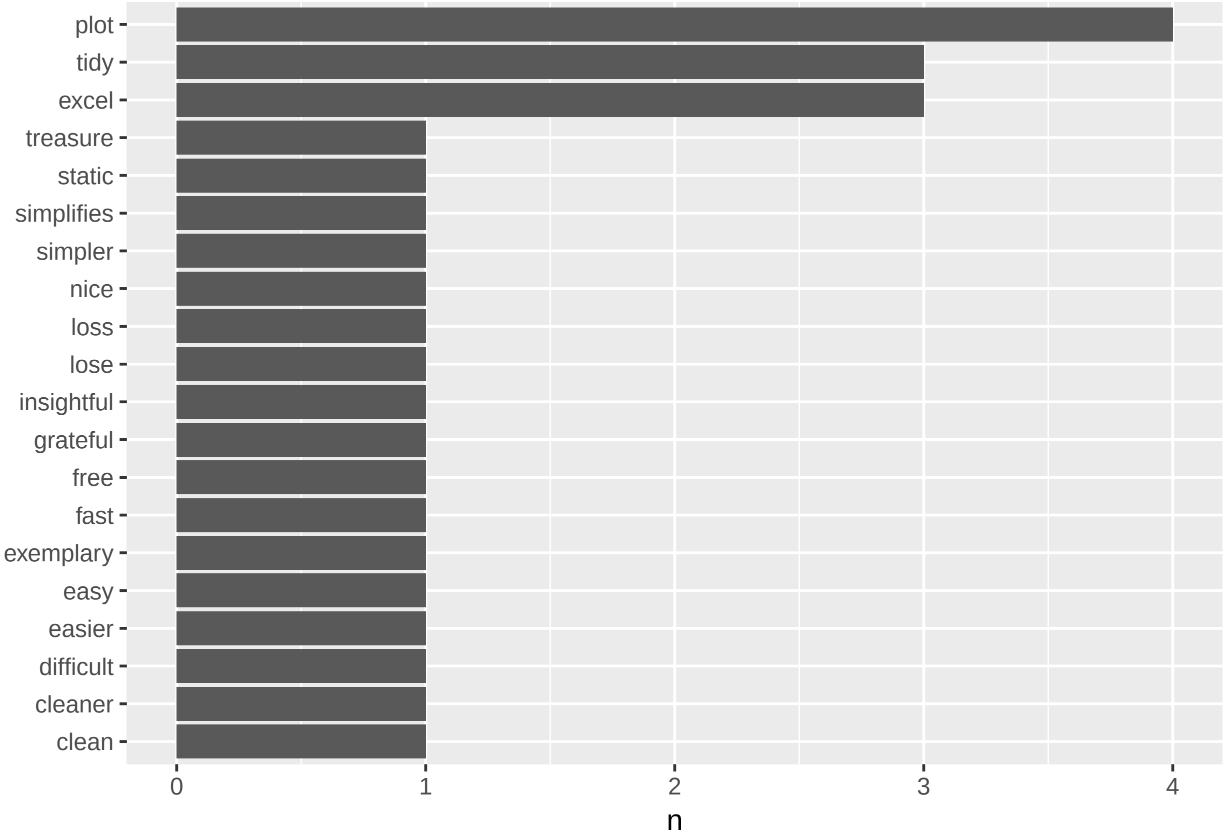
```
## Joining, by = "word"

## # A tibble: 285 x 2
##    word          n
##    <chr>     <int>
##  1 data         35
##  2 column       11
##  3 district     11
##  4 merge        10
##  5 analysis      9
##  6 id            9
##  7 shapefile     9
##  8 ids           8
##  9 age           7
## 10 let’s         6
## # ... with 275 more rows

## Selecting by n
```



After eliminating the stop words in the article, we order the words appeared in the passage by frequency and we made a ggplot to show the 20 most frequent words appear in the article.

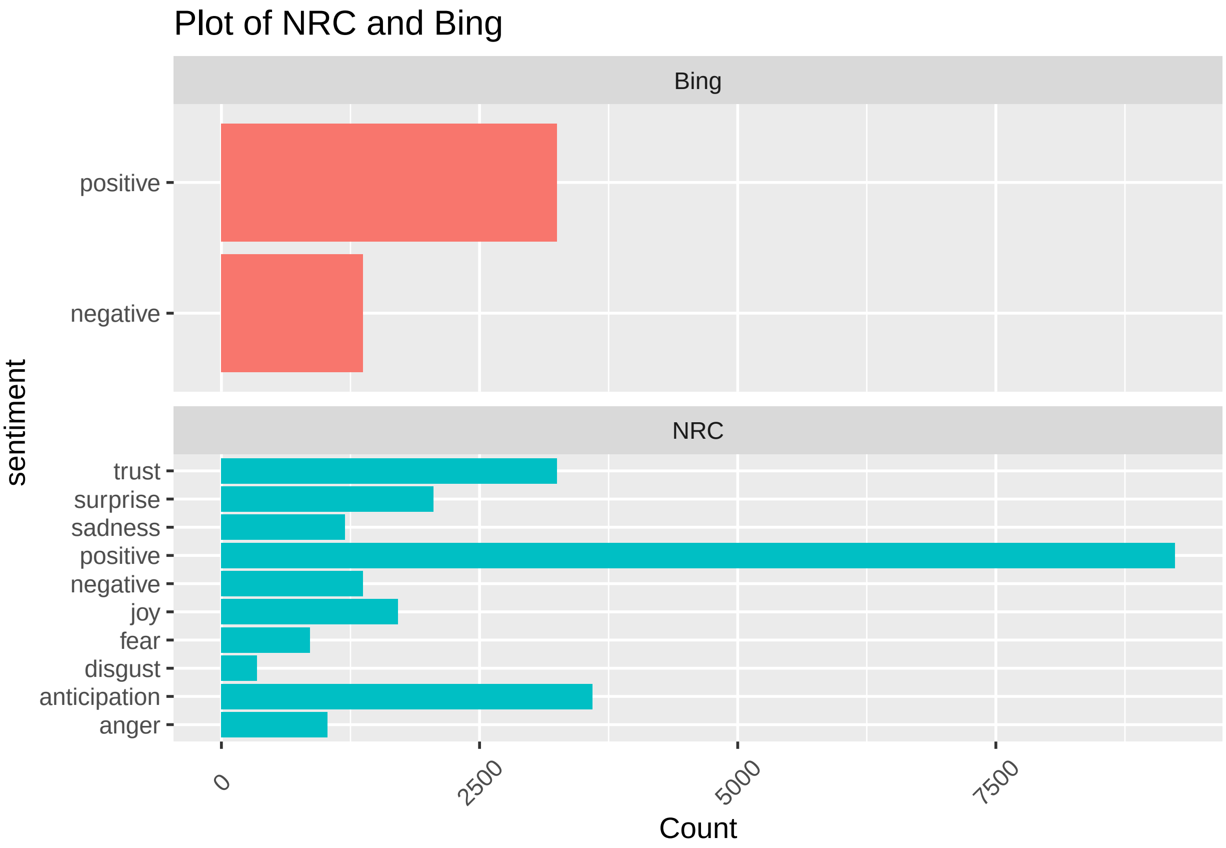
```
## Joining, by = "word"
```

```
## Selecting by n
```

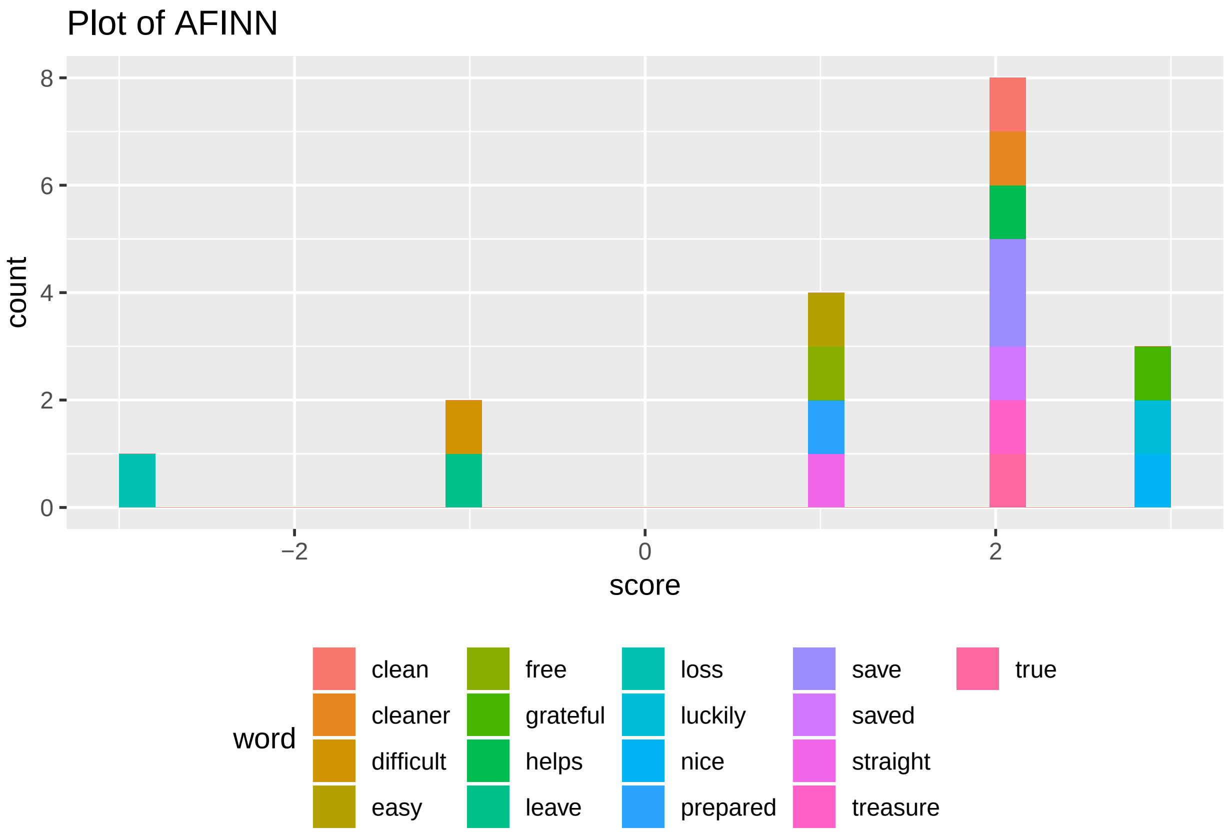


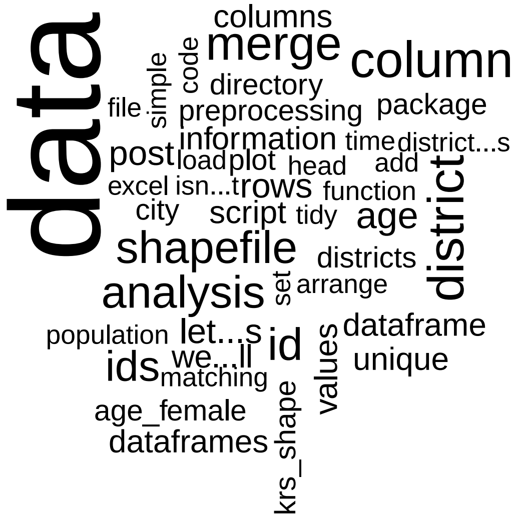
In order to get an odea of the passage's sentiment on this article, we applied Bing sentiment package, and made a ggplot of the top 20 sentimental words in the article. The first three are "plot", "excel" and "tidy", which is reasonable because this is a tutorial of R. Then we want to compare the results from the other two packages of sentimenal words: AFINN and NRC.

```
## Joining, by = "word"
## Joining, by = "word"
```



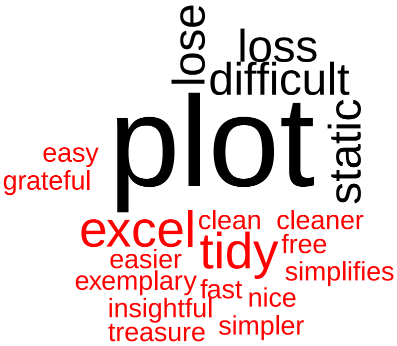
```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```





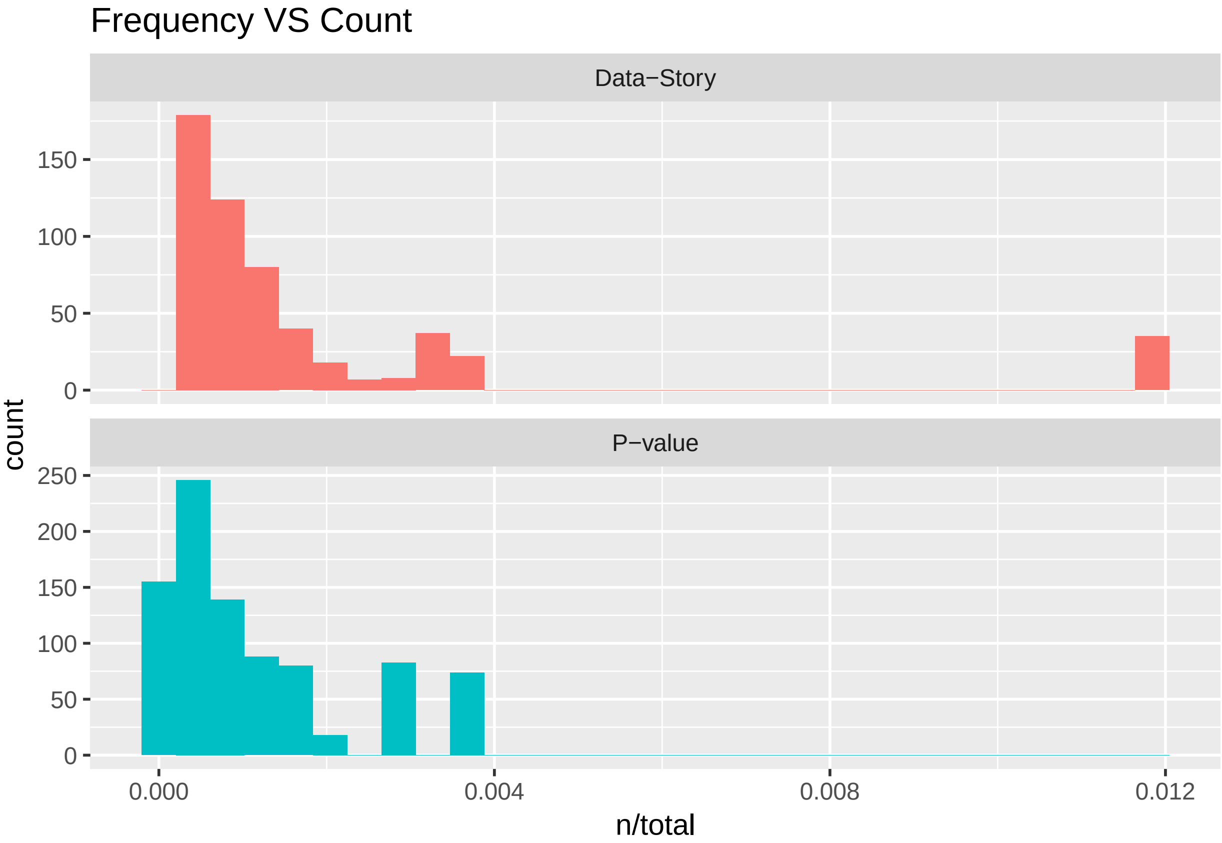
We want to also see the wordcloud.

```
## Joining, by = "word"
```

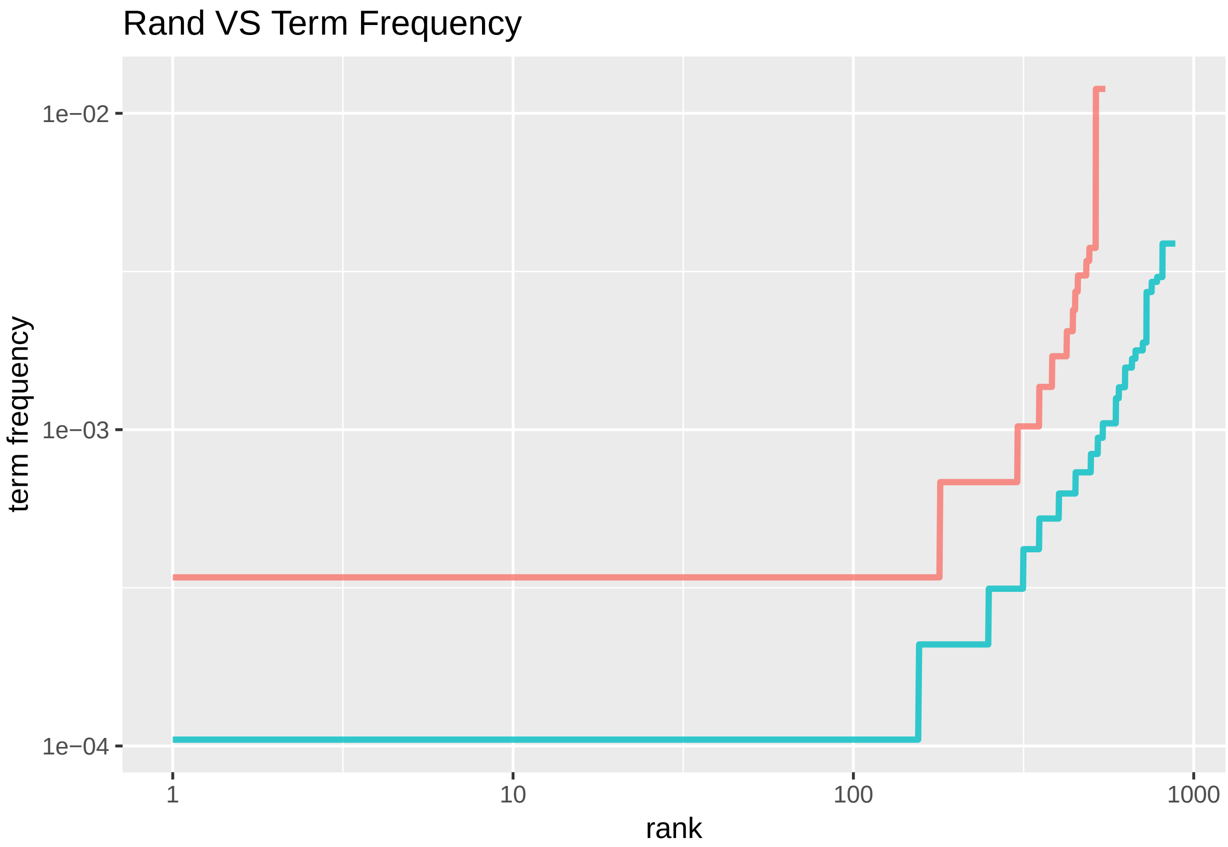


Combined Analysis on Two Articles To find important words for the context by decreasing the weight for commonly used words, we apply bind_tf_idf function for these two article.

```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```



We can see that the tails are not so long and these two article exhibit similar distribution. Their peaks are at sim-



ilar points.
The result is totally opposite to the Zipf's Law, which states that a word appears is inversely proportional to its rank.

Then we apply bind_tf_idf function to find the important words for the content of each document by decreasing the weight for commonly used words and increasing the weight for words that not used very much.

N-grams and Correlations

We want to check the words as bigrams from now on.

Then we apply bind_tf_idf function to find the important bigrams.

```
##                        bigram    article   n          tf        idf
## 1             null hypothesis    P-Value 439 0.003891051 -2.3025851
## 2             null hypothesis    P-Value 439 0.003891051 -2.3025851
## 3             null hypothesis    P-Value 439 0.003891051 -2.3025851
## 4                  text books    P-Value 439 0.003891051  0.6931472
## 5              power analysis    P-Value 439 0.003891051  0.6931472
## 6           analysis software    P-Value 439 0.003891051  0.6931472
## 7             horizontal axis    P-Value 439 0.003891051  0.6931472
## 8            calculated based    P-Value 439 0.003891051  0.6931472
## 9         normal distribution    P-Value 439 0.003891051  0.6931472
## 10                sample size    P-Value 439 0.003891051 -1.0986123
## 11            null hypothesis    P-Value 439 0.003891051 -2.3025851
## 12                 null model    P-Value 439 0.003891051 -2.0149030
## 13            null hypothesis    P-Value 439 0.003891051 -2.3025851
## 14                  post i've    P-Value 439 0.003891051  0.6931472
## 15              i've recently    P-Value 439 0.003891051  0.6931472
## 16          recently realized    P-Value 439 0.003891051  0.6931472
## 17                lot clearer    P-Value 439 0.003891051  0.6931472
## 18                 null model    P-Value 439 0.003891051 -2.0149030
## 19             model assuming    P-Value 439 0.003891051  0.0000000
## 20         standard deviation    P-Value 439 0.003891051 -0.4054651
## 21             test comparing    P-Value 439 0.003891051  0.6931472
## 22                       sd 1    P-Value 439 0.003891051  0.0000000
## 23                effect size    P-Value 439 0.003891051  0.0000000
## 24                 null model    P-Value 439 0.003891051 -2.0149030
## 25              true standard    P-Value 439 0.003891051  0.6931472
## 26         standard deviation    P-Value 439 0.003891051 -0.4054651
## 27                sample size    P-Value 439 0.003891051 -1.0986123
## 28                 null model    P-Value 439 0.003891051 -2.0149030
## 29                 raw scores    P-Value 439 0.003891051  0.6931472
## 30                 null model    P-Value 439 0.003891051 -2.0149030
## 31                sample size    P-Value 439 0.003891051 -1.0986123
## 32             size increases    P-Value 439 0.003891051  0.6931472
## 33               collect 5000    P-Value 439 0.003891051  0.6931472
## 34            50 observations    P-Value 439 0.003891051 -0.9162907
## 35                 null model    P-Value 439 0.003891051 -2.0149030
## 36                 null model    P-Value 439 0.003891051 -2.0149030
## 37                      0 due    P-Value 439 0.003891051  0.6931472
## 38              larger sample    P-Value 439 0.003891051  0.6931472
## 39                sample size    P-Value 439 0.003891051 -1.0986123
## 40              sample closer    P-Value 439 0.003891051  0.6931472
## 41                 0 compared    P-Value 439 0.003891051  0.6931472
## 42                 null model    P-Value 439 0.003891051 -2.0149030
## 43            50 observations    P-Value 439 0.003891051 -0.9162907
## 44                colored red    P-Value 439 0.003891051  0.6931472
## 45              represent 2.5    P-Value 439 0.003891051  0.6931472
## 46                  left tail    P-Value 439 0.003891051  0.6931472
## 47             0 representing    P-Value 439 0.003891051  0.6931472
## 48                alpha level    P-Value 439 0.003891051  0.0000000
## 49              vertical axis    P-Value 439 0.003891051  0.6931472
## 50               curves let’s    P-Value 439 0.003891051  0.6931472
## 51               let’s assume    P-Value 439 0.003891051 -0.4054651
## 52         figure visualizing    P-Value 439 0.003891051  0.6931472
## 53                 null model    P-Value 439 0.003891051 -2.0149030
## 54          observation falls    P-Value 439 0.003891051  0.6931472
## 55                tailed test    P-Value 439 0.003891051  0.6931472
## 56                 null model    P-Value 439 0.003891051 -2.0149030
## 57             collected 5000    P-Value 439 0.003891051  0.6931472
## 58          5000 observations    P-Value 439 0.003891051  0.6931472
## 59               collected 50    P-Value 439 0.003891051  0.6931472
## 60            50 observations    P-Value 439 0.003891051 -0.9162907
## 61             address common    P-Value 439 0.003891051  0.6931472
## 62      common misconceptions    P-Value 439 0.003891051 -0.4054651
## 63     alternative hypothesis    P-Value 439 0.003891051 -0.9162907
## 64          alternative model    P-Value 439 0.003891051 -1.2527630
## 65               let’s assume    P-Value 439 0.003891051 -0.4054651
## 66             knowing entity    P-Value 439 0.003891051  0.0000000
## 67                 paul meehl    P-Value 439 0.003891051  0.6931472
## 68             knowing entity    P-Value 439 0.003891051  0.0000000
## 69          entity omniscient    P-Value 439 0.003891051  0.6931472
## 70           omniscient jones    P-Value 439 0.003891051 -1.0986123
## 71            50 observations    P-Value 439 0.003891051 -0.9162907
## 72    observations omniscient    P-Value 439 0.003891051  0.0000000
## 73           omniscient jones    P-Value 439 0.003891051 -1.0986123
## 74              expected data    P-Value 439 0.003891051  0.6931472
## 75               data pattern    P-Value 439 0.003891051  0.6931472
## 76            null hypothesis    P-Value 439 0.003891051 -2.3025851
## 77                  grey line    P-Value 439 0.003891051  0.6931472
## 78          alternative model    P-Value 439 0.003891051 -1.2527630
## 79             model assuming    P-Value 439 0.003891051  0.0000000
## 80                 0.5 exists    P-Value 439 0.003891051  0.6931472
## 81                 black line    P-Value 439 0.003891051  0.6931472
## 82           omniscient jones    P-Value 439 0.003891051 -1.0986123
## 83            true difference    P-Value 439 0.003891051  0.6931472
## 84               larger let’s    P-Value 439 0.003891051  0.6931472
## 85               let’s assume    P-Value 439 0.003891051 -0.4054651
## 86            50 observations    P-Value 439 0.003891051 -0.9162907
## 87    observations omniscient    P-Value 439 0.003891051  0.0000000
## 88           omniscient jones    P-Value 439 0.003891051 -1.0986123
## 89                jones tells    P-Value 439 0.003891051 -0.4054651
## 90                 null model    P-Value 439 0.003891051 -2.0149030
## 91          alternative model    P-Value 439 0.003891051 -1.2527630
## 92              finally ready    P-Value 439 0.003891051  0.6931472
## 93      common misconceptions    P-Value 439 0.003891051 -0.4054651
## 94         values interpreted    P-Value 439 0.003891051  0.6931472
## 95            null hypothesis    P-Value 439 0.003891051 -2.3025851
## 96                 true let’s    P-Value 439 0.003891051  0.6931472
## 97         significant result    P-Value 439 0.003891051 -1.0986123
## 98            null hypothesis    P-Value 439 0.003891051 -2.3025851
## 99           omniscient jones    P-Value 439 0.003891051 -1.0986123
## 100               jones tells    P-Value 439 0.003891051 -0.4054651
## 101               alpha level    P-Value 439 0.003891051  0.0000000
## 102         alternative model    P-Value 439 0.003891051 -1.2527630
## 103                null model    P-Value 439 0.003891051 -2.0149030
## 104      extremely surprising    P-Value 439 0.003891051  0.6931472
## 105           null hypothesis    P-Value 439 0.003891051 -2.3025851
## 106           null hypothesis    P-Value 439 0.003891051 -2.3025851
## 107           hypothesis true    P-Value 439 0.003891051  0.6931472
## 108    alternative hypothesis    P-Value 439 0.003891051 -0.9162907
## 109           null hypothesis    P-Value 439 0.003891051 -2.3025851
## 110           null hypothesis    P-Value 439 0.003891051 -2.3025851
## 111             false imagine    P-Value 439 0.003891051  0.6931472
## 112             command rnorm    P-Value 439 0.003891051  0.6931472
## 113                      0 sd    P-Value 439 0.003891051  0.6931472
## 114                      sd 1    P-Value 439 0.003891051  0.0000000
## 115                   1 rcopy    P-Value 439 0.003891051  0.6931472
## 116         command generates    P-Value 439 0.003891051  0.6931472
## 117              generates 50    P-Value 439 0.003891051  0.6931472
## 118                 50 random    P-Value 439 0.003891051  0.6931472
## 119       random observations    P-Value 439 0.003891051  0.6931472
## 120        standard deviation    P-Value 439 0.003891051 -0.4054651
## 121                test tells    P-Value 439 0.003891051  0.6931472
## 122      surprisingly extreme    P-Value 439 0.003891051  0.6931472
## 123          extreme assuming    P-Value 439 0.003891051  0.6931472
## 124           null hypothesis    P-Value 439 0.003891051 -2.3025851
## 125                 bold move    P-Value 439 0.003891051  0.6931472
## 126      observing surprising    P-Value 439 0.003891051  0.6931472
## 127           surprising data    P-Value 439 0.003891051  0.6931472
## 128             data assuming    P-Value 439 0.003891051  0.6931472
## 129           null hypothesis    P-Value 439 0.003891051 -2.3025851
## 130            conclude based    P-Value 439 0.003891051  0.6931472
## 131           extreme outcome    P-Value 439 0.003891051  0.6931472
## 132     considered surprising    P-Value 439 0.003891051 -0.6931472
## 133           null hypothesis    P-Value 439 0.003891051 -2.3025851
## 134    alternative hypothesis    P-Value 439 0.003891051 -0.9162907
## 135              evil hackers    P-Value 439 0.003891051  0.6931472
## 136            hackers taking    P-Value 439 0.003891051  0.6931472
## 137               chance note    P-Value 439 0.003891051  0.6931472
## 138           null hypothesis    P-Value 439 0.003891051 -2.3025851
## 139          random variation    P-Value 439 0.003891051  0.6931472
## 140           observe extreme    P-Value 439 0.003891051  0.6931472
## 141              extreme data    P-Value 439 0.003891051  0.0000000
## 142             basically 100    P-Value 439 0.003891051  0.6931472
## 143           null hypothesis    P-Value 439 0.003891051 -2.3025851
## 144              extreme data    P-Value 439 0.003891051  0.0000000
## 145               95 remember    P-Value 439 0.003891051  0.6931472
## 146              hypothesis 3    P-Value 439 0.003891051  0.6931472
## 147                null model    P-Value 439 0.003891051 -2.0149030
## 148               sample size    P-Value 439 0.003891051 -1.0986123
## 149     considered surprising    P-Value 439 0.003891051 -0.6931472
## 150               sample size    P-Value 439 0.003891051 -1.0986123
## 151     considered surprising    P-Value 439 0.003891051 -0.6931472
## 152            surprising due    P-Value 439 0.003891051  0.6931472
## 153         substantial level    P-Value 439 0.003891051  0.6931472
## 154                 data note    P-Value 439 0.003891051  0.6931472
## 155           null hypothesis    P-Value 439 0.003891051 -2.3025851
## 156             observed data    P-Value 439 0.003891051  0.6931472
## 157     considered surprising    P-Value 439 0.003891051 -0.6931472
## 158              verbal label    P-Value 439 0.003891051  0.6931472
## 159         label significant    P-Value 439 0.003891051  0.6931472
## 160        significant effect    P-Value 439 0.003891051  0.6931472
## 161         surprising effect    P-Value 439 0.003891051  0.6931472
## 162                null model    P-Value 439 0.003891051 -2.0149030
## 163        automatically true    P-Value 439 0.003891051  0.6931472
## 164          interpret effect    P-Value 439 0.003891051  0.6931472
## 165              effect sizes    P-Value 439 0.003891051  0.6931472
## 166          hypothesis tests    P-Value 439 0.003891051  0.6931472
## 167           hypothesis test    P-Value 439 0.003891051  0.6931472
## 168          equivalence test    P-Value 439 0.003891051  0.6931472
## 169       observed difference    P-Value 439 0.003891051  0.0000000
## 170       observed difference    P-Value 439 0.003891051  0.0000000
## 171       surprisingly closer    P-Value 439 0.003891051  0.6931472
## 172       significant finding    P-Value 439 0.003891051  0.6931472
## 173                    type 1    P-Value 439 0.003891051 -0.6931472
## 174                   1 error    P-Value 439 0.003891051 -0.4054651
## 175            false positive    P-Value 439 0.003891051 -0.4054651
## 176                  5 assume    P-Value 439 0.003891051  0.6931472
## 177                collect 20    P-Value 439 0.003891051  0.6931472
## 178           20 observations    P-Value 439 0.003891051  0.6931472
## 179          omniscient jones    P-Value 439 0.003891051 -1.0986123
## 180               jones tells    P-Value 439 0.003891051 -0.4054651
## 181           null hypothesis    P-Value 439 0.003891051 -2.3025851
## 182        significant result    P-Value 439 0.003891051 -1.0986123
## 183            false positive    P-Value 439 0.003891051 -0.4054651
## 184       significant results    P-Value 439 0.003891051  0.6931472
## 185                    type 1    P-Value 439 0.003891051 -0.6931472
## 186                  1 errors    P-Value 439 0.003891051  0.6931472
## 187                    type 1    P-Value 439 0.003891051 -0.6931472
## 188                   1 error    P-Value 439 0.003891051 -0.4054651
## 189                error rate    P-Value 439 0.003891051  0.6931472
## 190             rate controls    P-Value 439 0.003891051  0.6931472
## 191                  red tail    P-Value 439 0.003891051  0.6931472
## 192                    type 1    P-Value 439 0.003891051 -0.6931472
## 193                   1 error    P-Value 439 0.003891051 -0.4054651
## 194        significant result    P-Value 439 0.003891051 -1.0986123
## 195             5 probability    P-Value 439 0.003891051  0.6931472
## 196            false positive    P-Value 439 0.003891051 -0.4054651
## 197              collect data    P-Value 439 0.003891051  0.6931472
## 198                     run 5    P-Value 439 0.003891051  0.6931472
## 199        significant result    P-Value 439 0.003891051 -1.0986123
## 200           replicate based    P-Value 439 0.003891051  0.6931472
## 201            future studies    P-Value 439 0.003891051 -0.4054651
## 202    additional assumptions    P-Value 439 0.003891051  0.6931472
## 203           assumptions e.g    P-Value 439 0.003891051  0.6931472
## 204        alternative effect    P-Value 439 0.003891051  0.6931472
## 205               effect size    P-Value 439 0.003891051  0.0000000
## 206            original study    P-Value 439 0.003891051  0.0000000
## 207            future studies    P-Value 439 0.003891051 -0.4054651
## 208        specific situation    P-Value 439 0.003891051 -0.9162907
## 209            future studies    P-Value 439 0.003891051 -0.4054651
## 210        specific situation    P-Value 439 0.003891051 -0.9162907
## 211                null model    P-Value 439 0.003891051 -2.0149030
## 212         alternative model    P-Value 439 0.003891051 -1.2527630
## 213          150 observations    P-Value 439 0.003891051  0.6931472
## 214          difference falls    P-Value 439 0.003891051  0.6931472
## 215        significance level    P-Value 439 0.003891051  0.6931472
## 216        specific situation    P-Value 439 0.003891051 -0.9162907
## 217               95 probable    P-Value 439 0.003891051  0.6931472
## 218        significant result    P-Value 439 0.003891051 -1.0986123
## 219         replication study    P-Value 439 0.003891051  0.6931472
## 220            study assuming    P-Value 439 0.003891051  0.6931472
## 221               true effect    P-Value 439 0.003891051  0.6931472
## 222         alternative model    P-Value 439 0.003891051 -1.2527630
## 223         alternative model    P-Value 439 0.003891051 -1.2527630
## 224                   true 95    P-Value 439 0.003891051  0.6931472
## 225                      95 1    P-Value 439 0.003891051  0.6931472
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## 279  0.003808501
## 280  0.003808501
## 281  0.003808501
## 282  0.000000000
## 283  0.003808501
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## 286  0.003808501
## 287  0.003808501
## 288  0.003808501
## 289  0.003808501
## 290  0.003808501
## 291 -0.002227830
## 292 -0.005034564
## 293  0.003808501
## 294  0.003808501
## 295  0.000000000
## 296  0.003808501
## 297  0.003808501
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## 319 -0.002227830
## 320 -0.005034564
## 321  0.000000000
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## 341  0.003808501
## 342  0.003808501
## 343  0.000000000
## 344  0.003808501
## 345  0.003808501
## 346  0.003808501
## 347  0.003808501
## 348  0.003808501
## 349  0.003808501
## 350  0.003808501
## 351 -0.005034564
## 352  0.003808501
## 353  0.003808501
## 354  0.003808501
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## 360  0.003808501
## 361  0.003808501
## 362  0.003808501
## 363  0.003808501
## 364  0.000000000
## 365  0.003808501
## 366  0.003808501
## 367  0.003808501
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## 377  0.003808501
## 378  0.000000000
## 379  0.003808501
## 380  0.003808501
## 381  0.003808501
## 382 -0.002227830
## 383  0.000000000
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## 392  0.003808501
## 393  0.003808501
## 394 -0.005034564
## 395 -0.005034564
## 396  0.000000000
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## 426  0.003808501
## 427  0.003808501
## 428  0.003808501
## 429  0.000000000
## 430  0.003808501
## 431  0.003808501
## 432  0.003808501
## 433  0.003808501
## 434  0.003808501
## 435  0.000000000
## 436  0.000000000
## 437  0.000000000
## 438  0.000000000
## 439  0.000000000
```

Using bigrams to do sentiments analysis. If we do seperate analysis on both article about “not” words.

```
## # A tibble: 1 x 4
##   word2 score     n contribution
##   <chr> <int> <int>        <int>
## 1 true      2     3            6
```

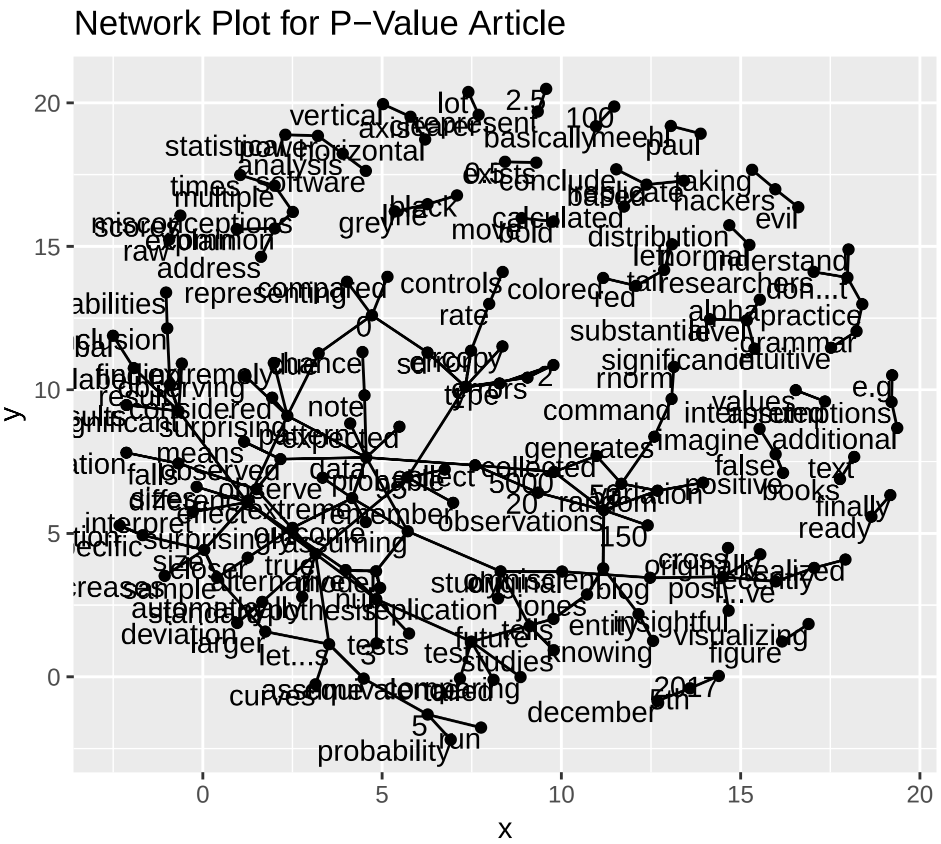
In this P-Value article, only one word is follwed by “not”.

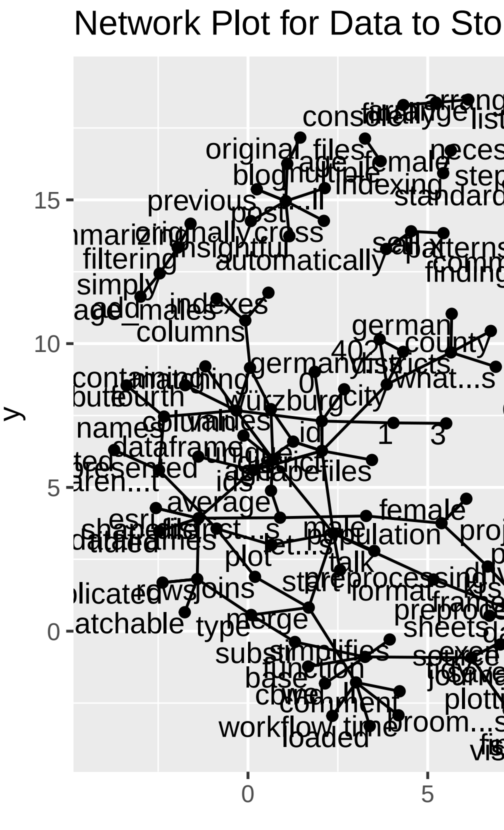
```
## # A tibble: 0 x 4
## # ... with 4 variables: word2 <chr>, score <int>, n <int>,
## #   contribution <int>
```

And in this Data to Story article, on word is followed by “not”.

Network of Bigrams

```
##
## Attaching package: 'igraph'

## The following object is masked from 'package:tidyr':
##
##     crossing

## The following objects are masked from 'package:dplyr':
##
##     as_data_frame, groups, union

## The following objects are masked from 'package:stats':
##
##     decompose, spectrum

## The following object is masked from 'package:base':
##
##     union
```

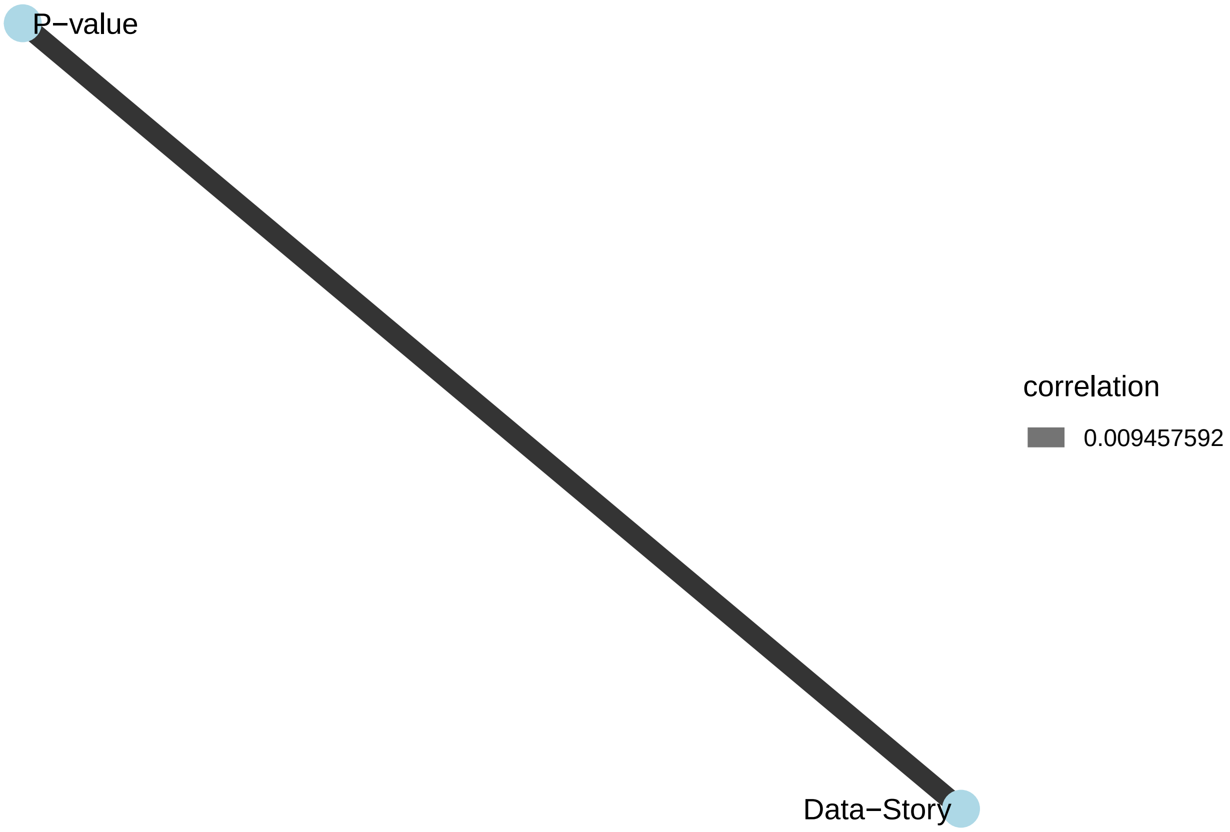

Network Plot for P−Value Article


Network Plot for Data to Sto

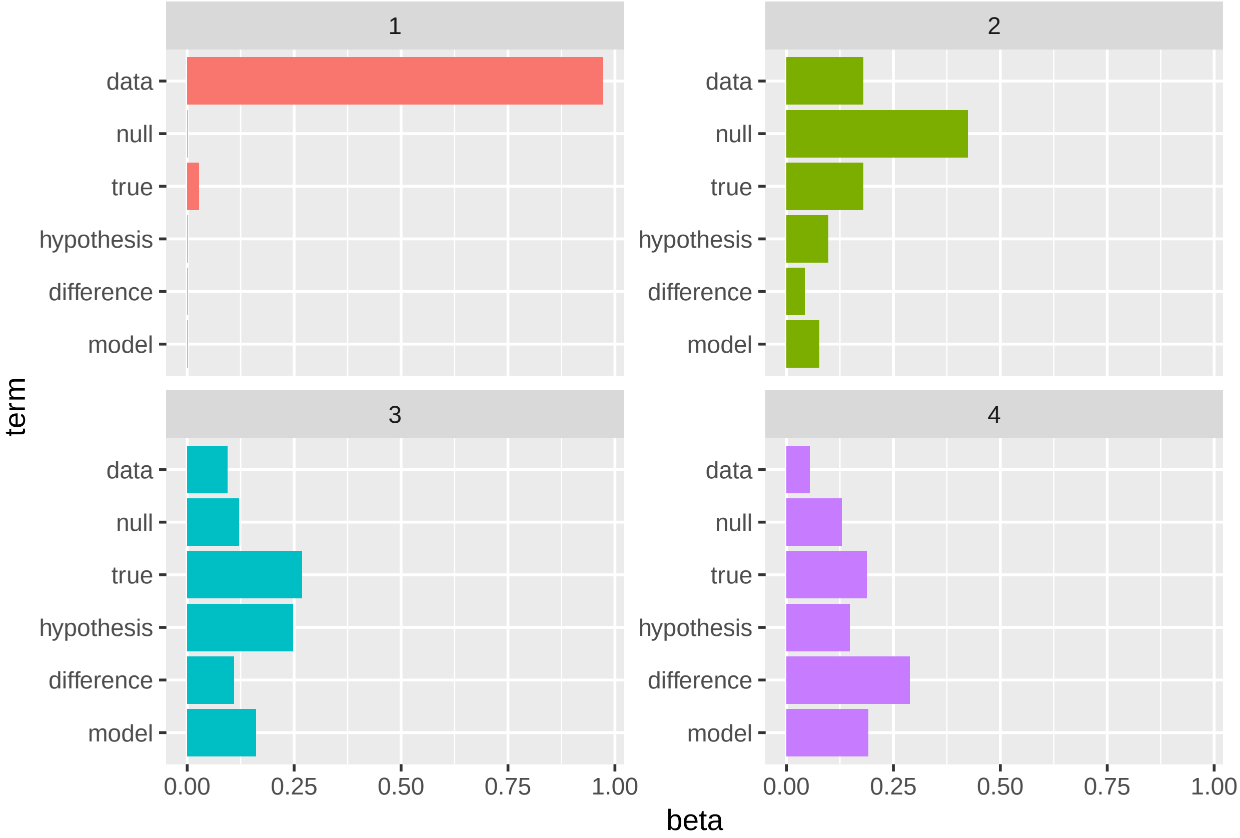
```
## # A tibble: 103 x 4
## # Groups:   word [?]
##    word               n article sentiment
##    <chr>          <int> <chr>   <chr>
##  1 critical           1 P-value negative
##  2 clearer            1 P-value positive
##  3 prefer             1 P-value positive
##  4 easy               1 P-value positive
##  5 reject             1 P-value negative
##  6 evil               1 P-value negative
##  7 misconception      1 P-value negative
##  8 sneaky             1 P-value negative
##  9 broken             1 P-value negative
## 10 correctly          1 P-value positive
## # ... with 93 more rows
```

```
## # A tibble: 1,433 x 6
## # Groups:   word [524]
##    word            n article          tf   idf   tf_idf
##    <chr>       <int> <chr>         <dbl> <dbl>    <dbl>
##  1 tutorial        1 Data-Story 0.000341 0.693 0.000237
##  2 steps           1 Data-Story 0.000341 0.693 0.000237
##  3 driven          1 Data-Story 0.000341 0.693 0.000237
##  4 morgenpost      1 Data-Story 0.000341 0.693 0.000237
##  5 exemplary       1 Data-Story 0.000341 0.693 0.000237
##  6 journalism      1 Data-Story 0.000341 0.693 0.000237
##  7 workflow        1 Data-Story 0.000341 0.693 0.000237
##  8 bbsr            1 Data-Story 0.000341 0.693 0.000237
##  9 commented      1 Data-Story 0.000341 0.693 0.000237
## 10 organized      1 Data-Story 0.000341 0.693 0.000237
## # ... with 1,423 more rows
```

```
## # A tibble: 2 x 3
##   item1      item2      correlation
##   <chr>      <chr>            <dbl>
## 1 Data-Story P-value        0.00946
## 2 P-value    Data-Story     0.00946
```



```
## # A tibble: 211 x 4
##    word      n article word_total
##    <chr> <int> <chr>        <int>
##  1 data     18 P-value         53
##  2 data     18 P-value         53
##  3 data     18 P-value         53
##  4 data     18 P-value         53
##  5 data     18 P-value         53
##  6 data     18 P-value         53
##  7 data     18 P-value         53
##  8 data     18 P-value         53
##  9 data     18 P-value         53
## 10 data     18 P-value         53
## # ... with 201 more rows
```



We can see that we have the same common words amongst all of the topics in the LDA.

Conclusion

In conclusion, we can see that these two articles have a high correlation, and they both don't have apparent emotional tendency because they are academic articles.