Sentiment Analysis

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Comparing Trump's State of the Union Address with Nixon's.

```
library(knitr)
library(tidytext)
```

```
## Warning: package 'tidytext' was built under R version 3.4.4
```

```
library(dplyr)
```

```
##
## 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
```

```
library(stringr)
library(readtext)
library(wordcloud)
```

```
## Warning: package 'wordcloud' was built under R version 3.4.4
```

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

```
library(ggplot2)
library(reshape2)

get_sentiments("bing")
```

```
## # A tibble: 6,788 x 2
##    word        sentiment
##    <chr>       <chr>
##  1 2-faced     negative
##  2 2-faces     negative
##  3 a+          positive
##  4 abnormal    negative
##  5 abolish     negative
##  6 abominable  negative
##  7 abominably  negative
##  8 abominate   negative
##  9 abomination negative
## 10 abort       negative
## # ... with 6,778 more rows
```

```
nrc_joy <- get_sentiments("nrc") %>%
  filter(sentiment == "joy")
```

```
nrc_anger <- get_sentiments("nrc") %>%
  filter(sentiment == "anger")

nrc_anticipation <- get_sentiments("nrc") %>%
  filter(sentiment == "anticipation")
```

Trump

Now we look into Trump's State of the Union Address.

```
trump <- readtext("trump first state of the union.txt")
trump <- trump %>% unnest_tokens(word,text)

count(trump)
```

```
## # A tibble: 1 x 1
##       n
##   <int>
## 1  5251
```

```
trump_anger <- trump %>%
  inner_join(nrc_anger) %>%
  count(word, sort = TRUE)
```

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

```
trump_anger
```

```
## # A tibble: 64 x 2
##    word             n
##    <chr>        <int>
##  1 deserve          5
##  2 gang             4
##  3 terrible         4
##  4 defense          3
##  5 dictatorship     3
##  6 fighting         3
##  7 aftermath        2
##  8 aggression       2
##  9 bad              2
## 10 broken           2
## # ... with 54 more rows
```

Here, we see some words that are clearly associated with anger, such as aggression and disgrace, but we also see some words that might have been taken out of context and may not actually be used in an angry context like deserve and powerful.

```
trump_anticipation <- trump %>%
  inner_join(nrc_anticipation) %>%
  count(word, sort = TRUE)
```

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

```
trump_anticipation
```

```
## # A tibble: 82 x 2
##    word        n
##    <chr>   <int>
##  1 time        9
##  2 finally     8
##  3 proud       6
##  4 deserve     5
##  5 long        5
##  6 god         4
##  7 plan        4
##  8 young       4
##  9 child       3
## 10 defense     3
## # ... with 72 more rows
```

There are not only more anticipation words, but there are also some anticipation words used more frequently, such as time and plan. This implies that Trump's agenda is filled with

```
trump_joy <- trump %>%
  inner_join(nrc_joy) %>%
  count(word, sort = TRUE)
```

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

```
trump_joy
```

```
## # A tibble: 76 x 2
##    word           n
##    <chr>      <int>
##  1 finally        8
##  2 love           7
##  3 safe           7
##  4 freedom        6
##  5 proud          6
##  6 god            4
##  7 young          4
##  8 achieve        3
##  9 child          3
## 10 confidence     3
## # ... with 66 more rows
```

Despite what the media has said about Trump so far during his presidency, his state of the union address was has more words associated with joy than words associated with anger. However, there are plenty of words here that may have been taken out of context, such as finally, create, and yearning.

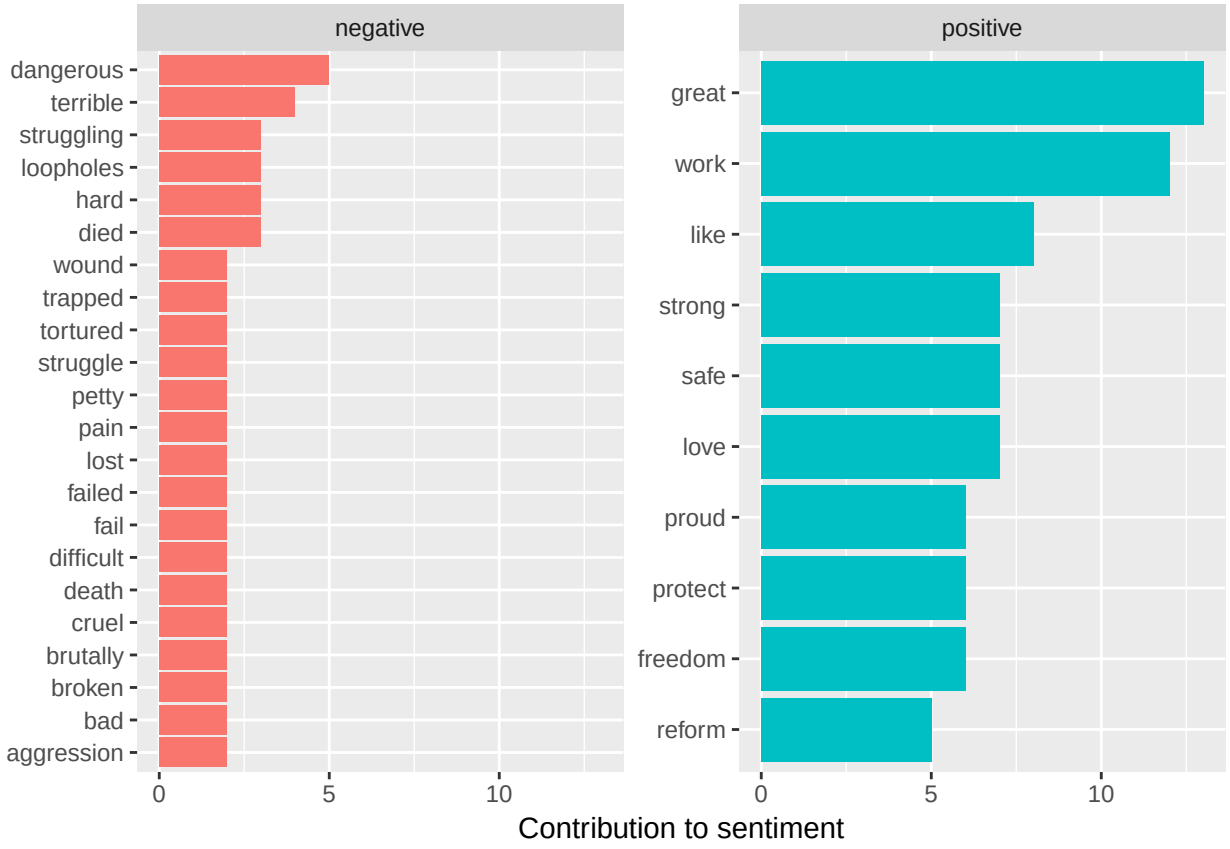
```
trump_bing <- trump %>%
  inner_join(get_sentiments("bing")) %>%
  count(word, sentiment, sort = TRUE) %>%
  ungroup()
```

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

```
trump_bing %>%
  group_by(sentiment) %>%
  top_n(10) %>%
```

```
  ungroup() %>%
  mutate(word = reorder(word, n)) %>%
  ggplot(aes(word, n, fill = sentiment)) +
  geom_col(show.legend = FALSE) +
  facet_wrap(~sentiment, scales = "free_y") +
  labs(y = "Contribution to sentiment",
       x = NULL) +
  coord_flip()
```

```
## Selecting by n
```

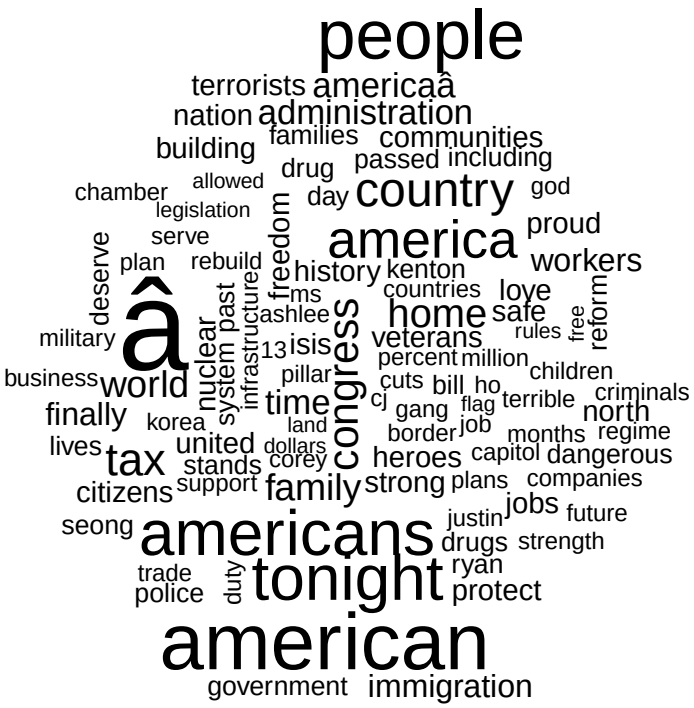


Here, we see that there are many more negative words than positive, but the most frequently used positive word, great, is used more than the most frequently used negative word, which is dangerous. This implies that Trump sees the current condition of the US in a bad light and is not very optimistic about the US' potential future. Like in the previous sentiment analyses, some words may have been taken out of context like reform.

Wordcloud for Trump's State of the Union Address

```
trump %>%
  anti_join(stop_words) %>%
  count(word) %>%
  with(wordcloud(word, n, max.words = 100))
```

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



Wordcloud comparing positive and negative words in Trump's State of the Union Address

```
trump %>%
  inner_join(get_sentiments("bing")) %>%
  count(word, sentiment, sort = TRUE) %>%
  acast(word ~ sentiment, value.var = "n", fill = 0) %>%
  comparison.cloud(colors = c("gray20", "gray80"),
                   max.words = 100)
```

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

```
## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): prosperity could not be fit on page. It will not be plotted.
```

```
## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): supported could not be fit on page. It will not be plotted.
```

```
## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): disgrace could not be fit on page. It will not be plotted.
```

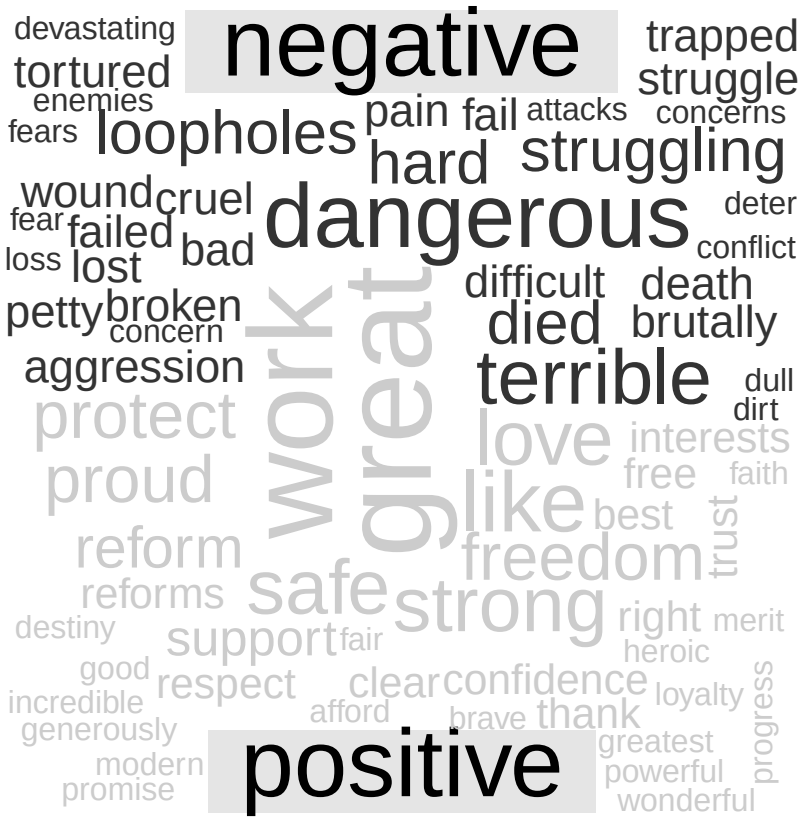
```
## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): epidemic could not be fit on page. It will not be plotted.
```

```
## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): extinguish could not be fit on page. It will not be plotted.
```

```
## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): foolishly could not be fit on page. It will not be plotted.

## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): grieving could not be fit on page. It will not be plotted.

## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): harm could not be fit on page. It will not be plotted.

## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): illegal could not be fit on page. It will not be plotted.

## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): injustice could not be fit on page. It will not be plotted.

## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): menace could not be fit on page. It will not be plotted.

## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): mistakes could not be fit on page. It will not be plotted.

## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): needy could not be fit on page. It will not be plotted.

## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): poor could not be fit on page. It will not be plotted.

## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): poverty could not be fit on page. It will not be plotted.

## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): problem could not be fit on page. It will not be plotted.

## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): randomly could not be fit on page. It will not be plotted.

## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): rogue could not be fit on page. It will not be plotted.

## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): sacrificed could not be fit on page. It will not be plotted.

## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): savage could not be fit on page. It will not be plotted.

## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): shameful could not be fit on page. It will not be plotted.

## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): stagnation could not be fit on page. It will not be plotted.

## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): steal could not be fit on page. It will not be plotted.

## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): threats could not be fit on page. It will not be plotted.

## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): unfortunately could not be fit on page. It will not be plotted.

## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): vulnerable could not be fit on page. It will not be plotted.
```

```
## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): weakness could not be fit on page. It will not be plotted.
```

```
## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): weep could not be fit on page. It will not be plotted.
```



Nixon

Nixon's State of the Union Address

```
nixon <- readtext("nixon first state of the union.txt")
nixon <- nixon %>% unnest_tokens(word,text)

count(nixon)
```

```
## # A tibble: 1 x 1
##       n
##   <int>
## 1  4326
```

```
nixon_anger <- nixon %>%
  inner_join(nrc_anger) %>%
  count(word, sort = TRUE)
```

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

```
nixon_anger
```

```
## # A tibble: 28 x 2
##    word            n
##    <chr>       <int>
##  1 crime           7
##  2 blame           4
##  3 bad             3
##  4 challenge       3
##  5 defense         3
##  6 money           3
##  7 fight           2
##  8 involvement     2
##  9 moral           2
## 10 argue           1
## # ... with 18 more rows
```

Simlar to Trump's state of the union address, there are not too many of Nixon's words associated with anger. Moreover, Nixon had way less words associated with anger than Trump in his State of the Union, which infers that Nixon had a more favorable outlook and attitude toward the US as well as leading the US to become a better nation.

```
nixon_anticipation <- nixon %>%
  inner_join(nrc_anticipation) %>%
  count(word, sort = TRUE)
```

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

```
nixon_anticipation
```

```
## # A tibble: 58 x 2
##    word            n
##    <chr>       <int>
##  1 time           17
##  2 peace          16
##  3 progress        6
##  4 defense         3
##  5 hope            3
##  6 money           3
##  7 opportunity     3
##  8 plan            3
##  9 vision          3
## 10 abundance       2
## # ... with 48 more rows
```

Like in Trump's address, Nixon's address has the word 'time' as the most frequently used word related to anticipation, but Nixon uses it even more than Trump, seventeen times to be exact, compared to nine times by Trump.

```
nixon_joy <- nixon %>%
  inner_join(nrc_joy) %>%
  count(word, sort = TRUE)
```

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

```
nixon_joy
```

```
## # A tibble: 57 x 2
##    word          n
##    <chr>     <int>
```

```
##  1 peace        16
##  2 clean         9
##  3 progress      6
##  4 freedom       4
##  5 fulfill       4
##  6 hope          3
##  7 money         3
##  8 abundance     2
##  9 achieve       2
## 10 income        2
## # ... with 47 more rows
```

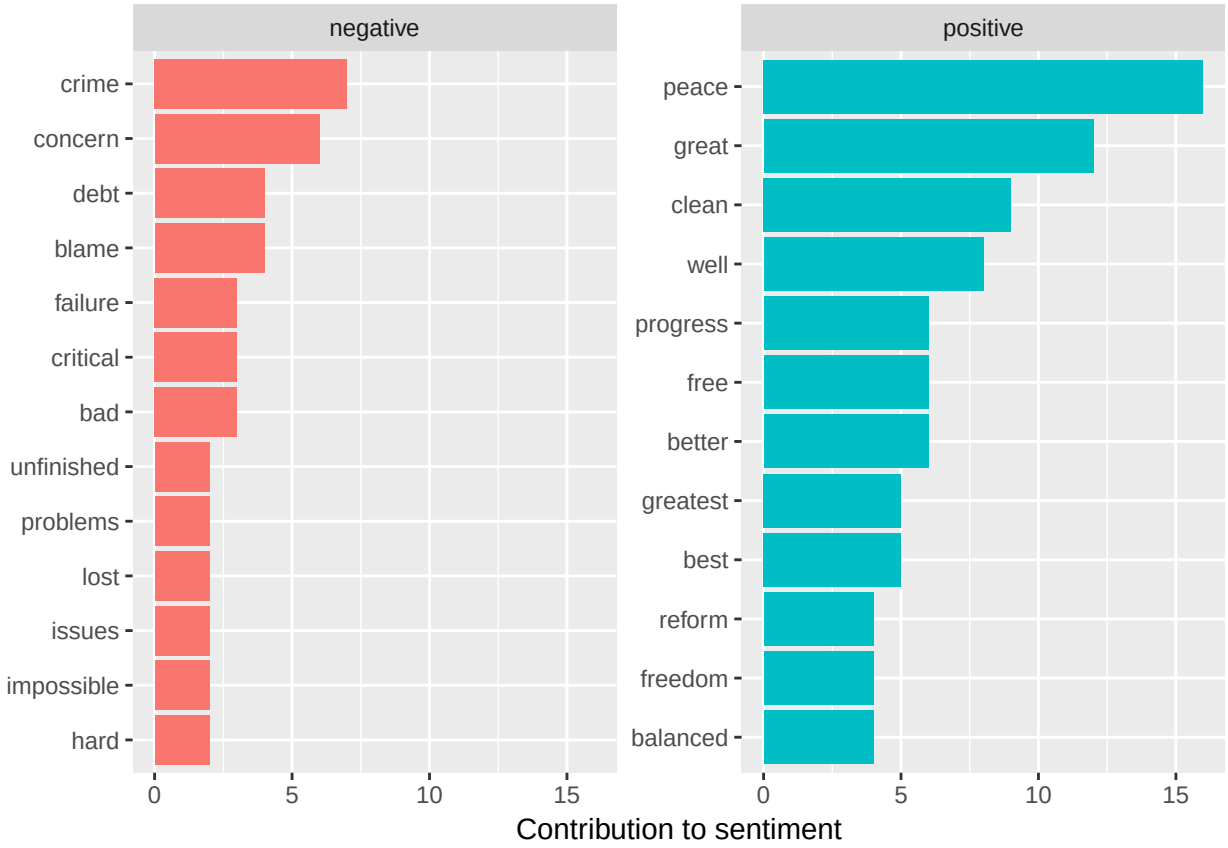
Although Trump may have used more words relating to joy, Nixon's most frequent joy word, namely peace, is used sixteen times in his speech, as opposed to Trump's most frequent word, finally, which is used eight times and may not have necessarily been used in such a positive context. Moreover, there are less words associated with joy that are used only once in Nixon's speech than in Trump's speech, further implying that Nixon approached leading the US in a more optimistic way.

```
nixon_bing <- nixon %>%
  inner_join(get_sentiments("bing")) %>%
  count(word, sentiment, sort = TRUE) %>%
  ungroup()
```

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

```
nixon_bing %>%
  group_by(sentiment) %>%
  top_n(10) %>%
  ungroup() %>%
  mutate(word = reorder(word, n)) %>%
  ggplot(aes(word, n, fill = sentiment)) +
  geom_col(show.legend = FALSE) +
  facet_wrap(~sentiment, scales = "free_y") +
  labs(y = "Contribution to sentiment",
       x = NULL) +
  coord_flip()
```

```
## Selecting by n
```



Unlike in Trump's State of the Union Address, where there were clearly more negative words used, Nixon's State of the Union Address has a relatively equal balance between positive and negative words. Therefore, we can infer that Nixon's agenda approached resolving the nation's issues with a more optimistic outlook, as opposed to Trump, who seems to really focus on the negative side of the nation's condition and has a little more pessimistic view on resolving the problems.

Wordcloud for Nixon's State of the Union Address

```
nixon %>%
  anti_join(stop_words) %>%
  count(word) %>%
  with(wordcloud(word, n, max.words = 100))
```

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

```
## Warning in wordcloud(word, n, max.words = 100): america could not be fit on
## page. It will not be plotted.
```

```
## Warning in wordcloud(word, n, max.words = 100): people could not be fit on
## page. It will not be plotted.
```

```
## Warning in wordcloud(word, n, max.words = 100): world could not be fit on
## page. It will not be plotted.
```

```
## Warning in wordcloud(word, n, max.words = 100): programs could not be fit
## on page. It will not be plotted.
```

```
## Warning in wordcloud(word, n, max.words = 100): congress could not be fit
```

```
## on page. It will not be plotted.
```

Wordcloud comparing positive and negative words in Nixon's State of the Union Address

```
nixon %>%
  inner_join(get_sentiments("bing")) %>%
  count(word, sentiment, sort = TRUE) %>%
  acast(word ~ sentiment, value.var = "n", fill = 0) %>%
  comparison.cloud(colors = c("gray20", "gray80"),
                   max.words = 100)
```

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

```
## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): lawlessness could not be fit on page. It will not be plotted.
```

```
## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): limitations could not be fit on page. It will not be plotted.
```

```
## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): obsolete could not be fit on page. It will not be plotted.
```

```
## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): polluter could not be fit on page. It will not be plotted.
```

```
## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
```

```
## 100): problem could not be fit on page. It will not be plotted.

## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): rejecting could not be fit on page. It will not be plotted.

## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): retreat could not be fit on page. It will not be plotted.

## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): strict could not be fit on page. It will not be plotted.

## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): suffered could not be fit on page. It will not be plotted.

## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): surrender could not be fit on page. It will not be plotted.

## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): tragic could not be fit on page. It will not be plotted.

## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): unable could not be fit on page. It will not be plotted.

## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): unbearable could not be fit on page. It will not be plotted.

## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): underestimate could not be fit on page. It will not be plotted.

## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): unrest could not be fit on page. It will not be plotted.

## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): violent could not be fit on page. It will not be plotted.

## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): warning could not be fit on page. It will not be plotted.

## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): weak could not be fit on page. It will not be plotted.

## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): weaken could not be fit on page. It will not be plotted.

## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): weakness could not be fit on page. It will not be plotted.

## Warning in comparison.cloud(., colors = c("gray20", "gray80"), max.words =
## 100): worst could not be fit on page. It will not be plotted.
```


negative
spite
lacked
object
grim
murder
stark
gross
inability
conspicuous
contaminate
carelessness
decayed
congestion
costly
dangerous
destiny
enhance
fresh
profound
right
wisdom
courage
freedom
success
balanced
richer
lengthy
waste
issue
garbage
poor
dilapidated
burden
delay
confrontation
doubt
problems
impossible
contradiction
unfinished
hard
critical
catastrophic
noise
disaster
denied
damage
broken
scarce
fall
urgent
lost
issues
failure
work
spiritual
celebrate
dignity
important
abundance
genius
reforms
support
reform
greatest
better
free
clean
great
well
best
peace
progress
breaks
bad
blame
crime
concern
debt
positive