

5243project1

```
# install packages and load
```

```
packages.used=c("tm", "numofwordcloud", "RColorBrewer", "dplyr", "tidytext")
```

```
# check packages that need to be installed.
```

```
packages.needed=setdiff(packages.used,  
                        intersect(installed.packages()[,1],  
                                packages.used))
```

```
# install additional packages
```

```
if(length(packages.needed)>0){  
  install.packages(packages.needed, dependencies = TRUE,  
                  repos='http://cran.us.r-project.org')  
}
```

```
## Warning: package 'numofwordcloud' is not available for this version of R
```

```
##
```

```
## A version of this package for your version of R might be available elsewhere,
```

```
## see the ideas at
```

```
## https://cran.r-project.org/doc/manuals/r-patched/R-admin.html#Installing-packages
```

```
library("sentimentr")
```

```
library("stringr")
```

```
library("gplots")
```

```
##
```

```
## Attaching package: 'gplots'
```

```
## The following object is masked from 'package:stats':
```

```
##
```

```
## lowess
```

```
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("syuzhet")

##
## Attaching package: 'syuzhet'

## The following object is masked from 'package:sentimentr':
##
##   get_sentences

library("factoextra")

## Loading required package: ggplot2

## Welcome! Want to learn more? See two factoextra-related books at https://goo.gl/ve3WBa

library("scales")

##
## Attaching package: 'scales'

## The following object is masked from 'package:syuzhet':
##
##   rescale

library("RColorBrewer")
library("readtext")
library("ggplot2")
library("MASS")

##
## Attaching package: 'MASS'

## The following object is masked from 'package:dplyr':
##
##   select

library("dplyr")
library("tidyverse")

## -- Attaching packages ----- tidyverse 1.3.1 --

## v tibble  3.1.6      v purrr  0.3.4
## v tidyr   1.1.4      v forcats 0.5.1
## v readr   2.1.1

## -- Conflicts ----- tidyverse_conflicts() --
## x readr::col_factor() masks scales::col_factor()
## x purrr::discard()    masks scales::discard()
## x dplyr::filter()     masks stats::filter()
## x dplyr::lag()        masks stats::lag()
## x MASS::select()      masks dplyr::select()

```

```
library("fmsb")
library("tidytext")
library("tm")
```

```
## Loading required package: NLP
```

```
##
## Attaching package: 'NLP'
```

```
## The following object is masked from 'package:ggplot2':
##
##      annotate
```

```
library("ggplot2")
library("tidyverse")
```

This notebook was prepared with the following environmental settings.

Introduction

Under some condition, students major in math, physics, chemistry or anything that related to math would like to say that they are more rational and empirical because they focus on the behind logic of the story. However, some people who majored in art, communications or media would more likely express them as idealism or more rely on emotions. This is a starter that why I'm interested in rationalism, empiricism and idealism. Do rationalism, empiricism and idealism really different with each other?

```
# import dataset
philosophy_data <- read.csv("~/Desktop/5243 Applied Data Science/project1/philosophy_data.csv")
```

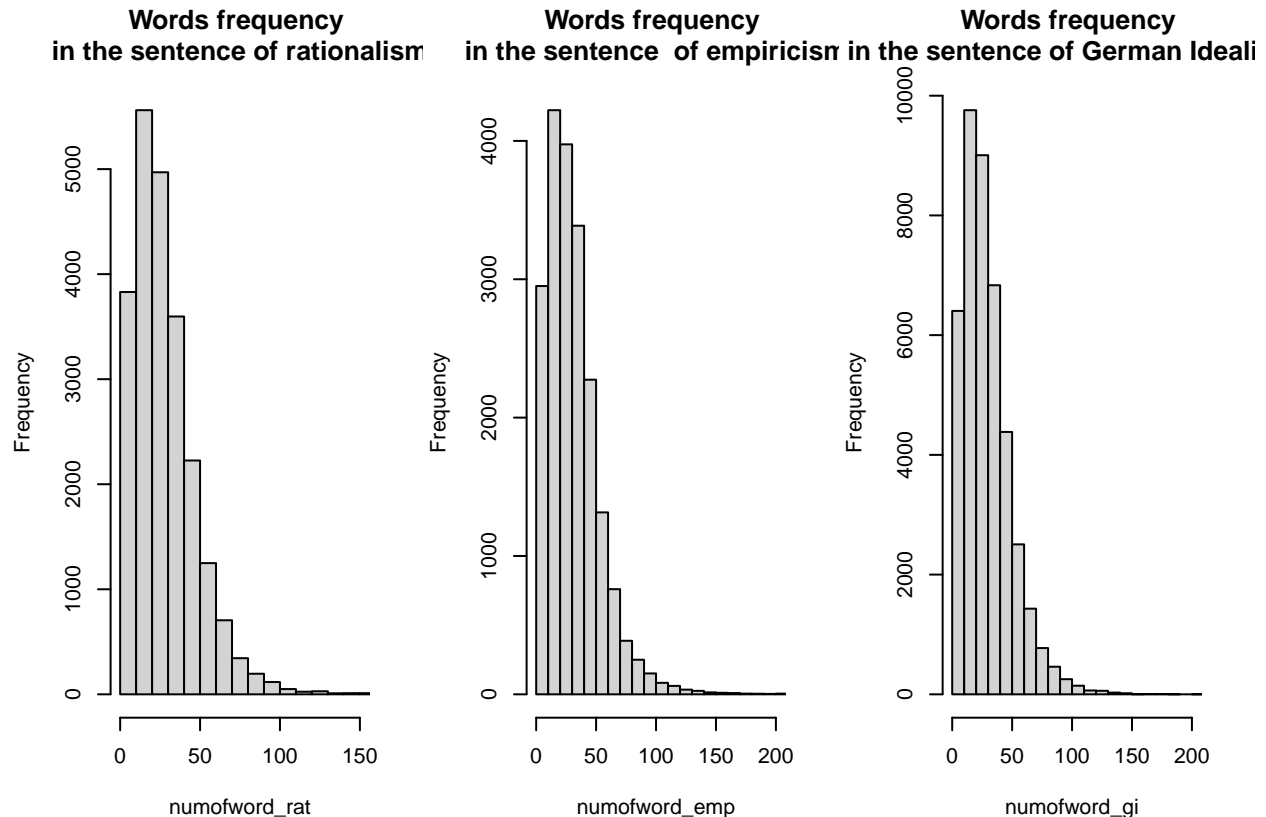
```
#filter out the schools that i need
rat=philosophy_data[philosophy_data$school=='rationalism',]
emp=philosophy_data[philosophy_data$school=='empiricism',]
gi=philosophy_data[philosophy_data$school=='german_idealism',]
```

Explore the differences

First of all, I'm trying to find out whether there are any differences of the length of the sentence? I'm curious about whether the length of rationalism and empiricism would shorter in general than idealism. So I apply the histogram to explore the number of words in one sentence of each 3 schools and found out that there are no much differences on words containing in one sentences. They share similar distributions which represent the number of words in each 3 schools are almost the same. There are no one specific school express more shorter or precise in one sentence.

```
library("stringr") # Load stringr package
numofword_rat<-str_count(rat$sentence_str,pattern=' ')
numofword_emp<-str_count(emp$sentence_str,pattern=' ')
numofword_gi<-str_count(gi$sentence_str,pattern=' ')
# put the histogram into a 2*2 form
par(mfrow=c(1,3))
```

```
# draw the histogram of 3 schools' word number frequency
hist(numofword_rat,breaks=30,main="Words frequency \n in the sentence of rationalism ",xlim=c(0,150))
hist(numofword_emp,breaks=30,main="Words frequency \n in the sentence of empiricism ",xlim=c(0,200))
hist(numofword_gi,breaks=30,main="Words frequency \n in the sentence of German Idealism ",xlim=c(0,200))
```



After observing there are no much differences on containing number of words in one sentence, we continue our sentiment analysis on specific words in the sentence. Therefore I apply the radar chart to show the average emotion shows in the sentences. From the chart, we see that idealism express way more trust than rationalism and empiricism. Overall, the emotion of rationalism and empiricism conveys similar emotion. Rationalism conveys more joy, anticipation and fear. Except those 3 emotions, the rest of emotions are almost the same. Starting from here, we could see the difference of idealism from the other two. And further exploring the word emotion by ordering each emotions, we observe that the rank of each emotion are the same. For all schools, the all express the lowest emotion of negatives like disgust, anger and sadness. All 3 schools express positives more than negatives like joy and trust. Therefore, I would like to say that all 3 schools convey a sense of positive and optimistic.

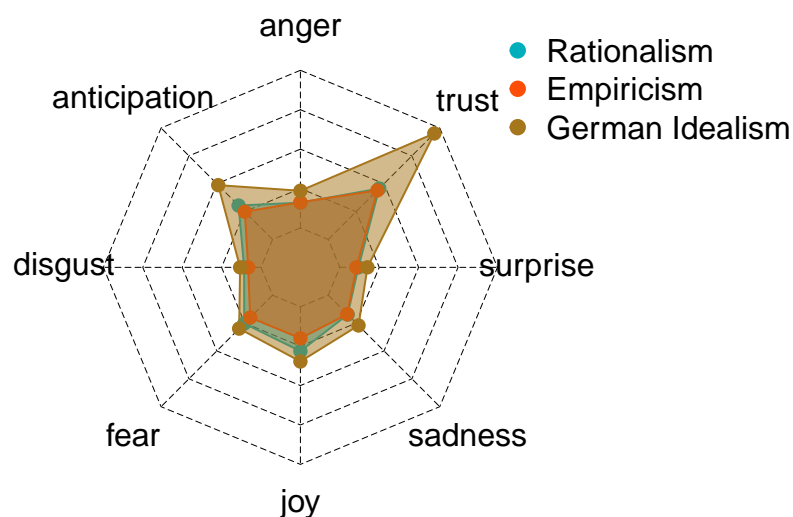
```
library(syuzhet)
#emotional analysis
emo_rat<-get_nrc_sentiment(rat$sentence_str)
emo_emp<-get_nrc_sentiment(emp$sentence_str)
emo_gi<-get_nrc_sentiment(gi$sentence_str)
emo_rat<-as.data.frame(diag(1/(numofword_rat+0.01))%*%as.matrix(emo_rat))
emo_emp<-as.data.frame(diag(1/(numofword_emp+0.01))%*%as.matrix(emo_emp))
emo_gi<-as.data.frame(diag(1/(numofword_gi+0.01))%*%as.matrix(emo_gi))
sum_rat<-apply(emo_rat,2,sum)/length(rat[,1])
sum_emp<-apply(emo_emp,2,sum)/length(emp[,1])
sum_gi<-apply(emo_gi,2,sum)/length(gi[,1])
#per_cap<-apply(emo_cap,2,sum)/length(cap[,1])
```

```
#per_com<-apply(emo_com,2,sum)/length(com[,1])
```

```
res<-data.frame(rbind(rep(0.08,10),rep(0,10),sum_rat,sum_emp,sum_gi),
  row.names=c('Max','Min','Rationalism','Empiricism','German Idealism'))
```

```
library("fmsb")
library(RColorBrewer)
library(radarchart)
radarchart(res[,1:8],axistype=0,pcol=c("#00AFBB","#FC4E07","#A6761D"),
  pfc col=scales::alpha(c("#00AFBB","#FC4E07","#A6761D"),0.5),plty=1,
  cglty=5,cglcol="black",cglwd =0.5,
  title='Radar Chart of sentiments in schools of Rationalism,Empiricism \n and German Idealism',
  legend(x="topright",legend=c('Rationalism','Empiricism','German Idealism'),bty="n",
  pch=20,col=c("#00AFBB","#FC4E07","#A6761D"),text.col="black",cex=1,
  pt.cex=1.5)
```

Radar Chart of sentiments in schools of Rationalism,Empiricism and German Idealism

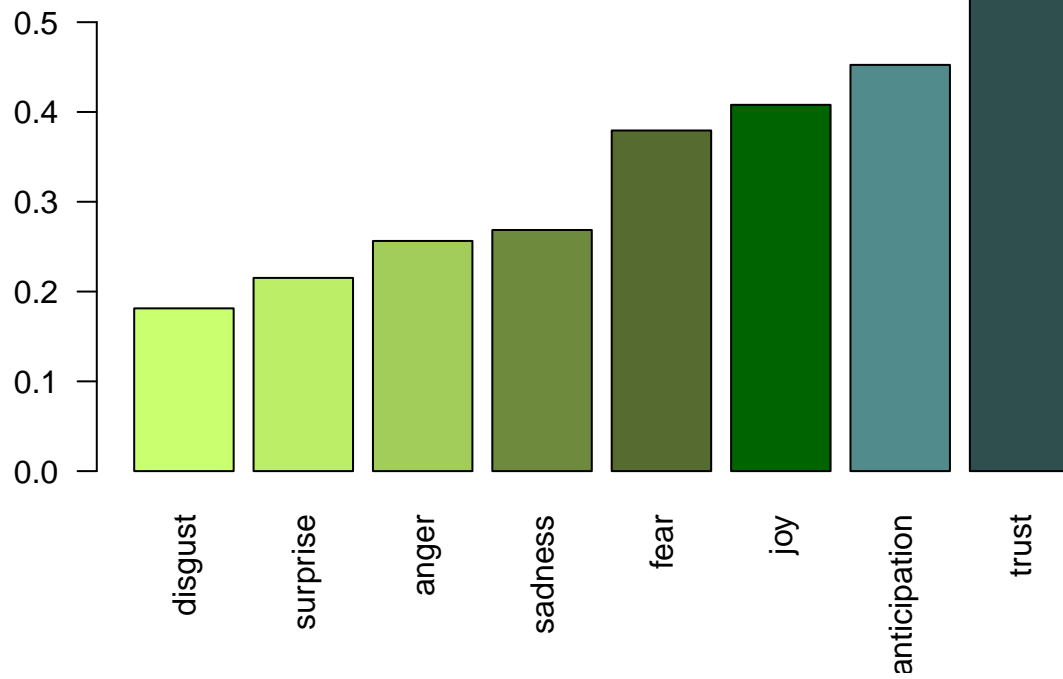


```
res[3:4,9:10]
```

```
##           negative   positive
## Rationalism 0.02945504 0.05899061
## Empiricism  0.03154178 0.06043965
```

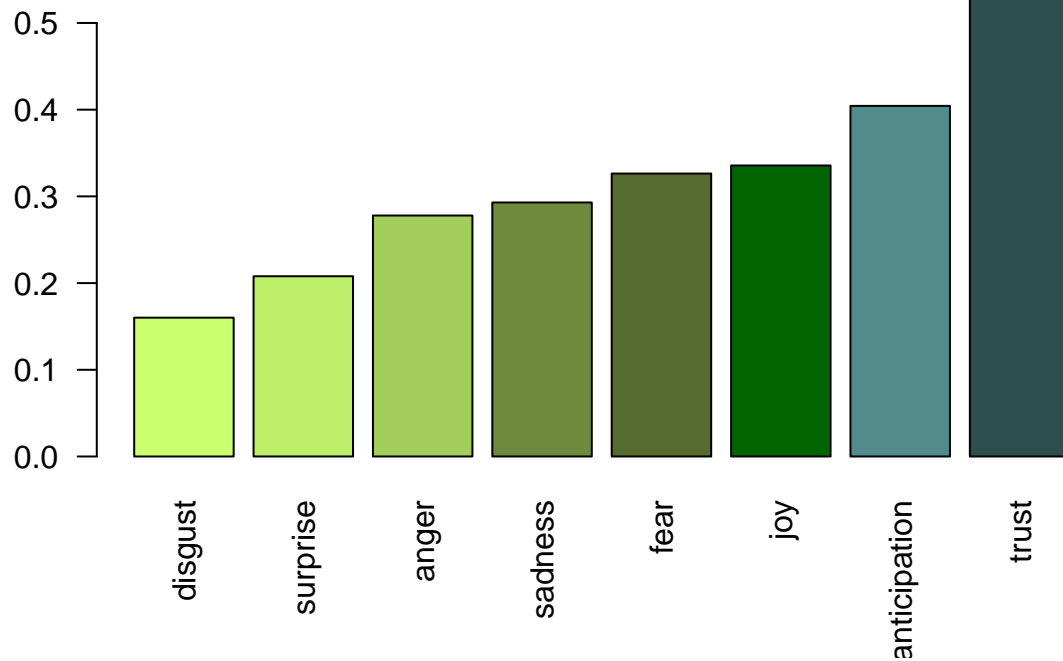
```
means_rat=colMeans(emo_rat[,1:8]>0.005)
means_emp=colMeans(emo_emp[,1:8]>0.005)
means_gi=colMeans(emo_gi[,1:8]>0.005)
col.use=c("darkolivegreen3", "darkslategray4",
  "darkolivegreen1", "darkolivegreen",
  "darkgreen", "darkolivegreen4",
  "darkolivegreen2", "darkslategray")
barplot(means_rat[order(means_rat)],las=2, col=col.use[order(means_rat)],main="Rationalism sentences")
```

Rationalism sentences

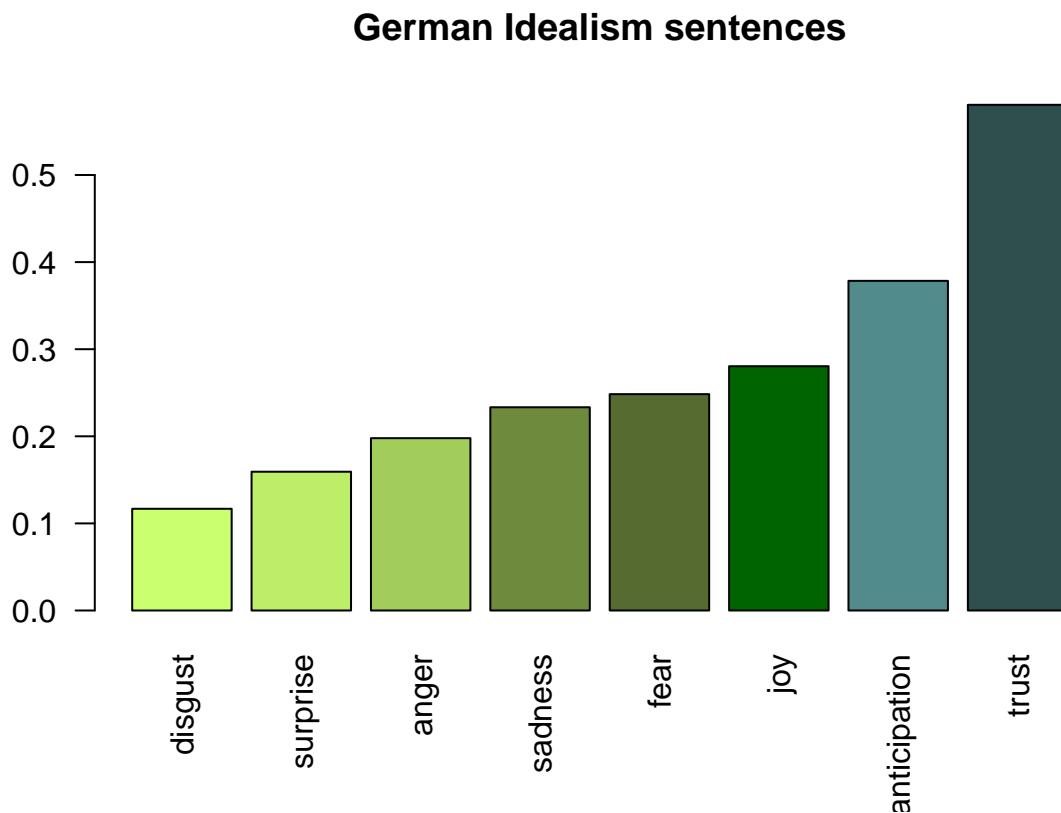


```
barplot(means_emp[order(means_emp)],las=2, col=col.use[order(means_emp)],main="Empiricism sentences")
```

Empiricism sentences



```
barplot(means_gi[order(means_gi)],las=2, col=col.use[order(means_gi)],main="German Idealism sentences")
```



```

sentence_cluster<-function(sentence,emotion){
  sents<-variable.names(emotion)[1:8]
  emos<-variable.names(emotion)[9:10]
  anyemo<-apply(emotion>=1e-6,1,any)
  emotion<-emotion[anyemo,]
  sentence<-sentence[anyemo]
  sentiment<-cbind(sents[apply(emotion[,1:8],1,which.max)],apply(emotion[,1:8],1,max))
  emotion<-cbind(emos[apply(emotion[,9:10],1,which.max)],apply(emotion[,9:10],1,max))
  return(cbind(sentence,sentiment,emotion))
}

sent_rat<-data.frame(sentence_cluster(rat$sentence_str,emo_rat))
sent_emp<-data.frame(sentence_cluster(emp$sentence_str,emo_emp))
sent_gi<-data.frame(sentence_cluster(gi$sentence_str,emo_gi))
names(sent_rat)<-c('sentence','sentiment','score1','emotion','score2')
names(sent_emp)<-c('sentence','sentiment','score1','emotion','score2')
names(sent_gi)<-c('sentence','sentiment','score1','emotion','score2')

```

```

#barplot
sent1<-data.frame(as.character(levels(factor(sent_rat$sentiment))),
  summary(factor(sent_rat$sentiment),row.names=NULL))
names(sent1)<-c('sentiment','count')
sent2<-data.frame(as.character(levels(factor(sent_emp$sentiment))),
  summary(factor(sent_emp$sentiment),row.names=NULL))
names(sent2)<-c('sentiment','count')
sent3<-data.frame(as.character(levels(factor(sent_gi$sentiment))),

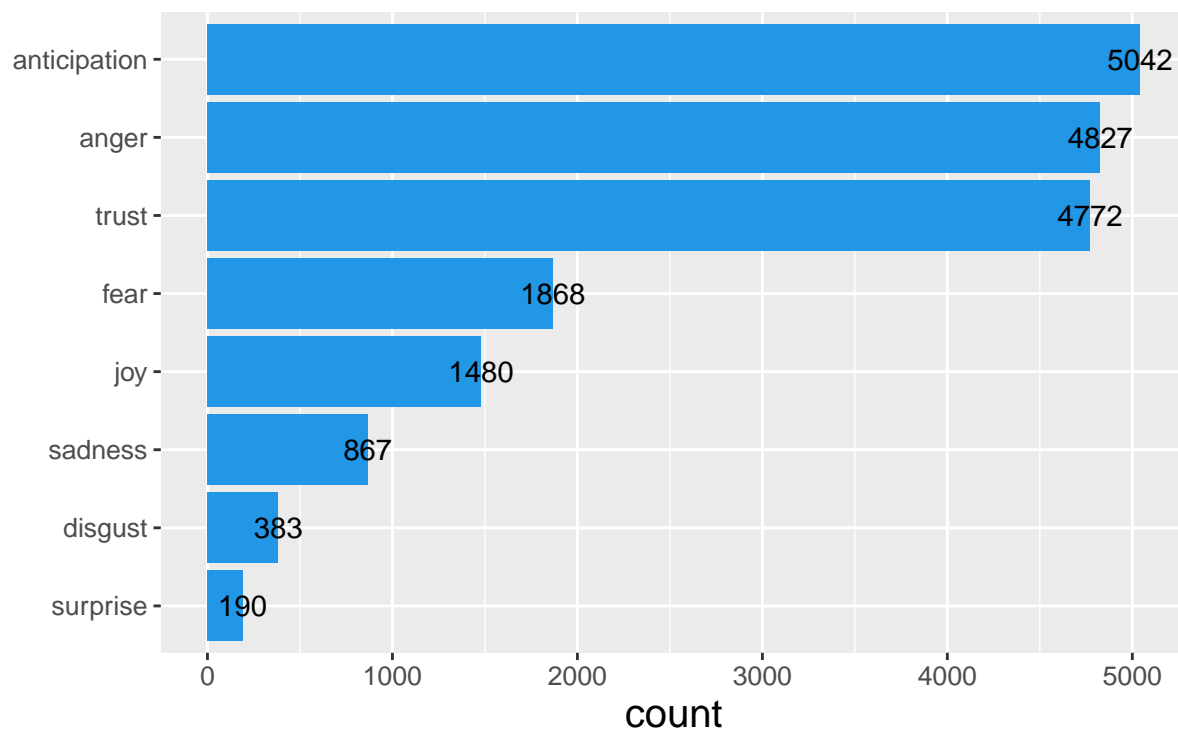
```

```

summary(factor(sent_gi$sentiment),row.names=NULL))
names(sent3)<-c('sentiment','count')
sent1%>%
  mutate(name=fct_reorder(sentiment,count))%>%
  ggplot(aes(x=reorder(sentiment,count),y=count))+
  geom_bar(stat="identity",col=0,fill=4)+
  theme(axis.text.y=element_text(size=10),title=element_text(size=15),text=element_text(size=12))+
  labs(title="Rationalism: Number of sentences \n in different sentiments", x="")+
  geom_text(mapping=aes(label=count))+
  coord_flip()

```

Rationalism: Number of sentences in different sentiments

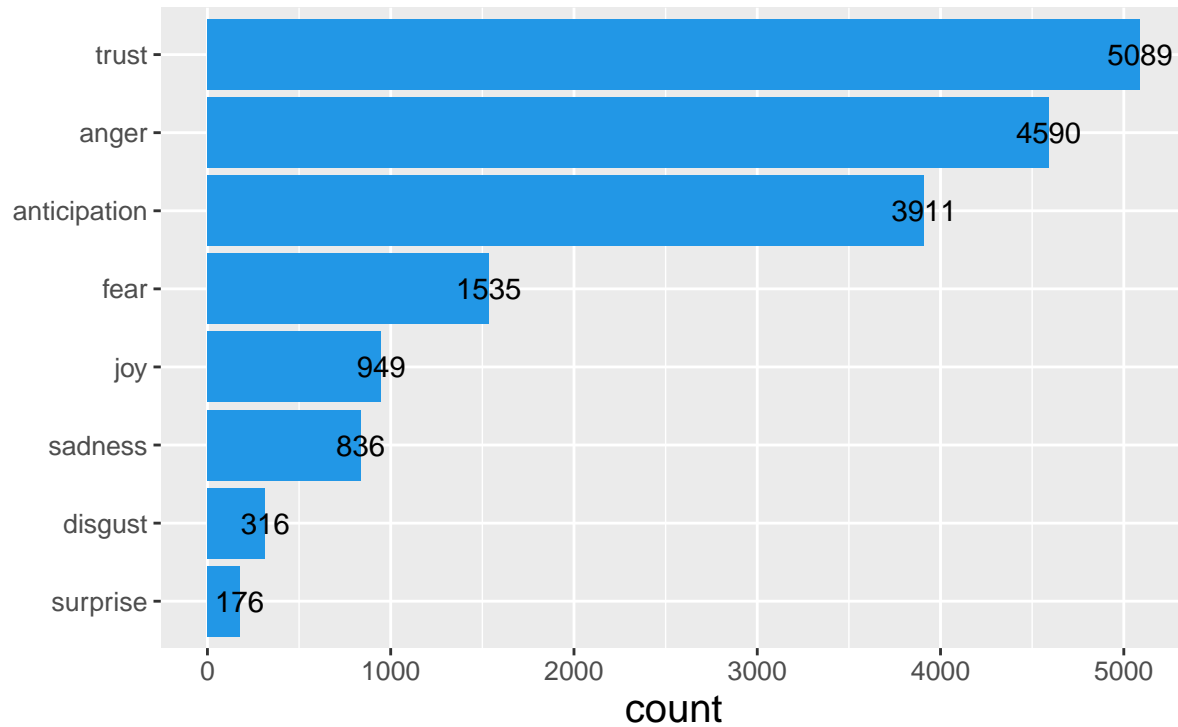


```

sent2%>%
  mutate(name=fct_reorder(sentiment,count))%>%
  ggplot(aes(x=reorder(sentiment,count),y=count))+
  geom_bar(stat="identity",col=0,fill=4)+
  theme(axis.text.y=element_text(size=10),title=element_text(size=15),text=element_text(size=12))+
  labs(title="Empiricism: Number of sentences \n in different sentiments", x="")+
  geom_text(mapping=aes(label=count))+
  coord_flip()

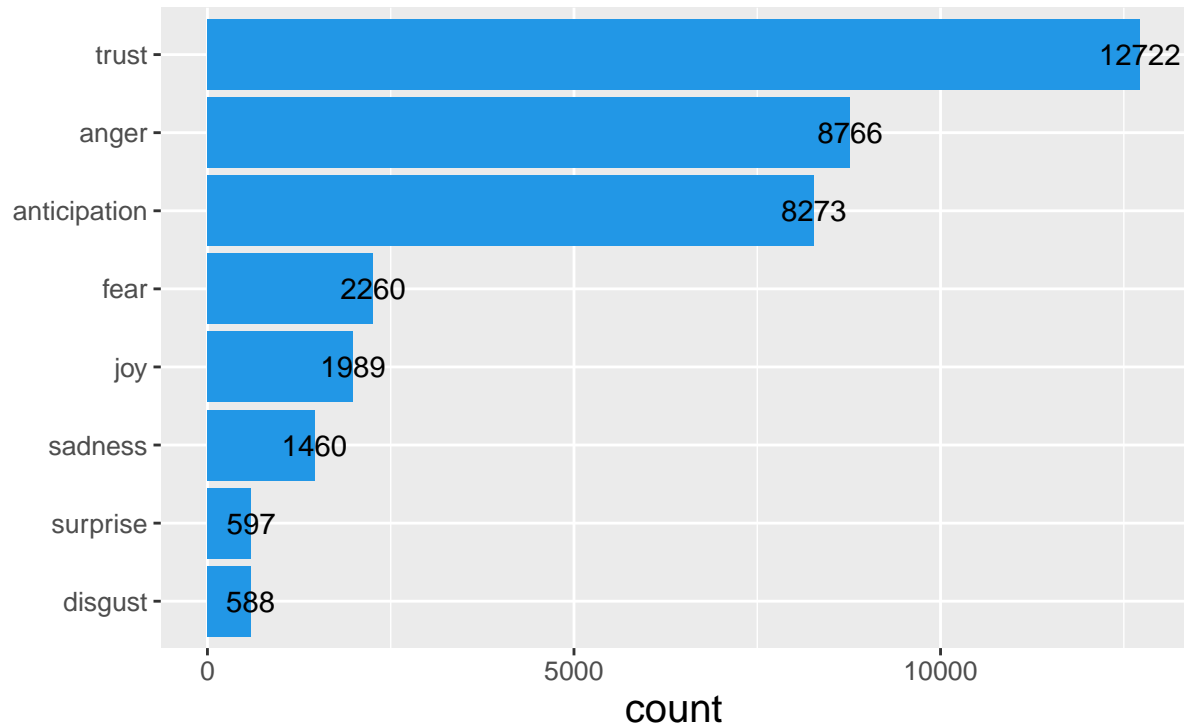
```


Empiricism: Number of sentences in different sentiments



```
sent3%>%
  mutate(name=fct_reorder(sentiment,count))%>%
  ggplot(aes(x=reorder(sentiment,count),y=count))+
    geom_bar(stat="identity",col=0,fill=4)+
    theme(axis.text.y=element_text(size=10),title=element_text(size=15),text=element_text(size=12))+
    labs(title="German Idealism: Number of sentences \n in different sentiments", x="")+
    geom_text(mapping=aes(label=count))+
    coord_flip()
```

German Idealism: Number of sentences in different sentiments



After figuring out there are indeed some emotions specific words different in each schools, next step for me that I want to explore is that what specific words in one sentence shows up the most quantity of times. There are actually 2 ways to draw a word cloud but here I just imply one way that is just calculating the word count. And the word cloud is based on the word count. Finally we found out that for rationalism the most words that they use is god, will, things,nature, body which kind of different from what I defined rationalism. And we could see that the most frequent word empiricism are ideas, mind, may,can.Finally for idealism, the most word that idealism use is concept,reason and can.

```
#text processing
sts_rat<-Corpus(VectorSource(rat$sentence_str))
sts_emp<-Corpus(VectorSource(emp$sentence_str))
sts_gi<-Corpus(VectorSource(gi$sentence_str))
# clear white space, convert to lower case
#Rationalism
sts_rat<-tm_map(sts_rat, stripWhitespace)
sts_rat<-tm_map(sts_rat, content_transformer(tolower))
sts_rat<-tm_map(sts_rat, removeWords, stopwords("english"))
sts_rat<-tm_map(sts_rat, removeWords, character(0))
sts_rat<-tm_map(sts_rat, removePunctuation)
#Empiricism
sts_emp<-tm_map(sts_emp, stripWhitespace)
sts_emp<-tm_map(sts_emp, content_transformer(tolower))
sts_emp<-tm_map(sts_emp, removeWords, stopwords("english"))
sts_emp<-tm_map(sts_emp, removeWords, character(0))
sts_emp<-tm_map(sts_emp, removePunctuation)
#German Idealism
sts_gi<-tm_map(sts_gi, stripWhitespace)
sts_gi=tm_map(sts_gi, content_transformer(tolower))
```

```

sts_gi<-tm_map(sts_gi, removeWords, stopwords("english"))
sts_gi<-tm_map(sts_gi, removeWords, character(0))
sts_gi<-tm_map(sts_gi, removePunctuation)
# Then we compute the [Document-Term Matrix (DTM)]
tdm_rat<-TermDocumentMatrix(sts_rat)
tdm_emp<-TermDocumentMatrix(sts_emp)
tdm_gi<-TermDocumentMatrix(sts_gi)

# Turn the Term Document Matrix into a tidy tibble and get the Overall Counts over the Whole Corpus
tdm_rat_tidy<-tidy(tdm_rat)
tdm_emp_tidy<-tidy(tdm_emp)
tdm_gi_tidy<-tidy(tdm_gi)
tdm_rat_overall<-summarise(group_by(tdm_rat_tidy,term),sum(count))
tdm_emp_overall<-summarise(group_by(tdm_emp_tidy,term),sum(count))
tdm_gi_overall<-summarise(group_by(tdm_gi_tidy,term),sum(count))

library("wordcloud")

##
## Attaching package: 'wordcloud'

## The following object is masked from 'package:gplots':
##
##      textplot

#wordcloud
wordcloud(tdm_rat_overall$term, tdm_rat_overall$`sum(count)`,
          scale=c(5,0.5),
          max.words=100,
          min.freq=1,
          random.order=FALSE,
          rot.per=0.3,
          use.r.layout=T,
          random.color=FALSE,
          colors=brewer.pal(9,"Reds"))

## Warning in wordcloud(tdm_rat_overall$term, tdm_rat_overall$`sum(count)` , :
## knowledge could not be fit on page. It will not be plotted.

## Warning in wordcloud(tdm_rat_overall$term, tdm_rat_overall$`sum(count)` , : great
## could not be fit on page. It will not be plotted.

## Warning in wordcloud(tdm_rat_overall$term, tdm_rat_overall$`sum(count)` , :
## objects could not be fit on page. It will not be plotted.

## Warning in wordcloud(tdm_rat_overall$term, tdm_rat_overall$`sum(count)` , :
## matter could not be fit on page. It will not be plotted.

## Warning in wordcloud(tdm_rat_overall$term, tdm_rat_overall$`sum(count)` , : much
## could not be fit on page. It will not be plotted.

```

```

## Warning in wordcloud(tdm_rat_overall$term, tdm_rat_overall$'sum(count)', :
## pleasure could not be fit on page. It will not be plotted.

## Warning in wordcloud(tdm_rat_overall$term, tdm_rat_overall$'sum(count)', :
## object could not be fit on page. It will not be plotted.

## Warning in wordcloud(tdm_rat_overall$term, tdm_rat_overall$'sum(count)', :
## according could not be fit on page. It will not be plotted.

## Warning in wordcloud(tdm_rat_overall$term, tdm_rat_overall$'sum(count)', : upon
## could not be fit on page. It will not be plotted.

## Warning in wordcloud(tdm_rat_overall$term, tdm_rat_overall$'sum(count)', : parts
## could not be fit on page. It will not be plotted.

## Warning in wordcloud(tdm_rat_overall$term, tdm_rat_overall$'sum(count)', : part
## could not be fit on page. It will not be plotted.

## Warning in wordcloud(tdm_rat_overall$term, tdm_rat_overall$'sum(count)', :
## another could not be fit on page. It will not be plotted.

## Warning in wordcloud(tdm_rat_overall$term, tdm_rat_overall$'sum(count)', :
## natural could not be fit on page. It will not be plotted.

## Warning in wordcloud(tdm_rat_overall$term, tdm_rat_overall$'sum(count)', :
## causes could not be fit on page. It will not be plotted.

## Warning in wordcloud(tdm_rat_overall$term, tdm_rat_overall$'sum(count)', :
## general could not be fit on page. It will not be plotted.

## Warning in wordcloud(tdm_rat_overall$term, tdm_rat_overall$'sum(count)', : think
## could not be fit on page. It will not be plotted.

## Warning in wordcloud(tdm_rat_overall$term, tdm_rat_overall$'sum(count)', : pain
## could not be fit on page. It will not be plotted.

## Warning in wordcloud(tdm_rat_overall$term, tdm_rat_overall$'sum(count)', : given
## could not be fit on page. It will not be plotted.

## Warning in wordcloud(tdm_rat_overall$term, tdm_rat_overall$'sum(count)', :
## although could not be fit on page. It will not be plotted.

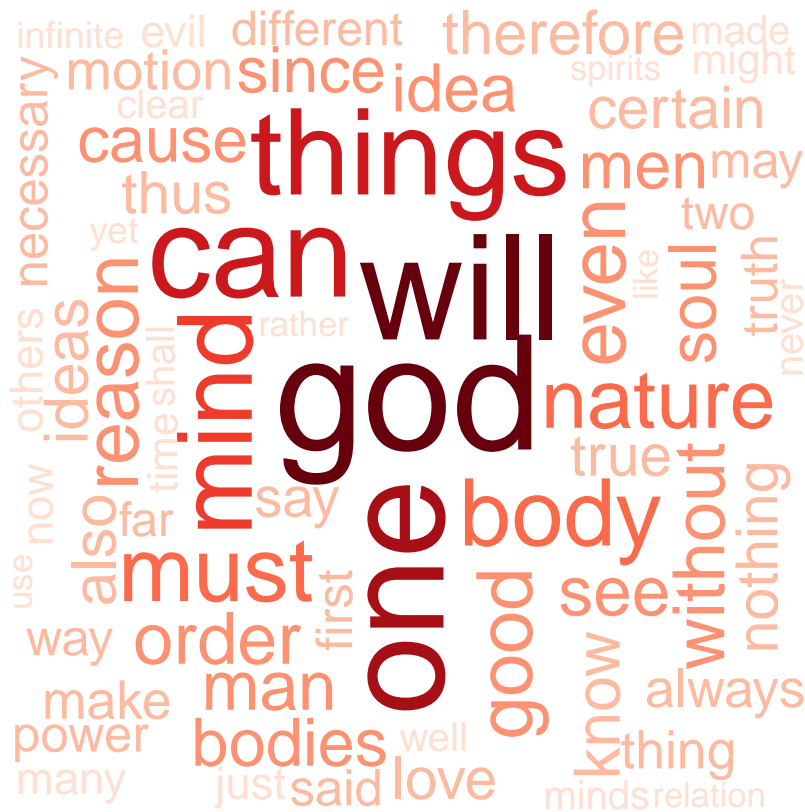
## Warning in wordcloud(tdm_rat_overall$term, tdm_rat_overall$'sum(count)', :
## senses could not be fit on page. It will not be plotted.

## Warning in wordcloud(tdm_rat_overall$term, tdm_rat_overall$'sum(count)', :
## something could not be fit on page. It will not be plotted.

## Warning in wordcloud(tdm_rat_overall$term, tdm_rat_overall$'sum(count)', :
## believe could not be fit on page. It will not be plotted.

```

```
## Warning in wordcloud(tdm_rat_overall$term, tdm_rat_overall$'sum(count)', :  
## clearly could not be fit on page. It will not be plotted.  
  
## Warning in wordcloud(tdm_rat_overall$term, tdm_rat_overall$'sum(count)', : human  
## could not be fit on page. It will not be plotted.  
  
## Warning in wordcloud(tdm_rat_overall$term, tdm_rat_overall$'sum(count)', :  
## people could not be fit on page. It will not be plotted.  
  
## Warning in wordcloud(tdm_rat_overall$term, tdm_rat_overall$'sum(count)', :  
## existence could not be fit on page. It will not be plotted.  
  
## Warning in wordcloud(tdm_rat_overall$term, tdm_rat_overall$'sum(count)', :  
## passions could not be fit on page. It will not be plotted.  
  
## Warning in wordcloud(tdm_rat_overall$term, tdm_rat_overall$'sum(count)', :  
## imagination could not be fit on page. It will not be plotted.  
  
## Warning in wordcloud(tdm_rat_overall$term, tdm_rat_overall$'sum(count)', :  
## particular could not be fit on page. It will not be plotted.  
  
## Warning in wordcloud(tdm_rat_overall$term, tdm_rat_overall$'sum(count)', : brain  
## could not be fit on page. It will not be plotted.  
  
## Warning in wordcloud(tdm_rat_overall$term, tdm_rat_overall$'sum(count)', : often  
## could not be fit on page. It will not be plotted.  
  
## Warning in wordcloud(tdm_rat_overall$term, tdm_rat_overall$'sum(count)', :  
## whether could not be fit on page. It will not be plotted.  
  
## Warning in wordcloud(tdm_rat_overall$term, tdm_rat_overall$'sum(count)', :  
## greater could not be fit on page. It will not be plotted.  
  
## Warning in wordcloud(tdm_rat_overall$term, tdm_rat_overall$'sum(count)', :  
## capable could not be fit on page. It will not be plotted.
```



```
wordcloud(tdm_emp_overall$term, tdm_emp_overall$`sum(count)`,
          scale=c(5,0.5),
          max.words=100,
          min.freq=1,
          random.order=FALSE,
          rot.per=0.3,
          use.r.layout=T,
          random.color=FALSE,
          colors=brewer.pal(9,"Blues"))
```

```
## Warning in wordcloud(tdm_emp_overall$term, tdm_emp_overall$`sum(count)`, : know
## could not be fit on page. It will not be plotted.
```

```
## Warning in wordcloud(tdm_emp_overall$term, tdm_emp_overall$`sum(count)`, : since
## could not be fit on page. It will not be plotted.
```

```
## Warning in wordcloud(tdm_emp_overall$term, tdm_emp_overall$`sum(count)`, :
## simple could not be fit on page. It will not be plotted.
```

```
## Warning in wordcloud(tdm_emp_overall$term, tdm_emp_overall$`sum(count)`, : say
## could not be fit on page. It will not be plotted.
```

```
## Warning in wordcloud(tdm_emp_overall$term, tdm_emp_overall$`sum(count)`, :  
## natural could not be fit on page. It will not be plotted.
```

```
## Warning in wordcloud(tdm_emp_overall$term, tdm_emp_overall$`sum(count)` , :
## principles could not be fit on page. It will not be plotted.
```

```

## Warning in wordcloud(tdm_emp_overall$term, tdm_emp_overall$'sum(count)', :
## thought could not be fit on page. It will not be plotted.

## Warning in wordcloud(tdm_emp_overall$term, tdm_emp_overall$'sum(count)', :
## common could not be fit on page. It will not be plotted.

## Warning in wordcloud(tdm_emp_overall$term, tdm_emp_overall$'sum(count)', : good
## could not be fit on page. It will not be plotted.

## Warning in wordcloud(tdm_emp_overall$term, tdm_emp_overall$'sum(count)', : names
## could not be fit on page. It will not be plotted.

## Warning in wordcloud(tdm_emp_overall$term, tdm_emp_overall$'sum(count)', : sense
## could not be fit on page. It will not be plotted.

## Warning in wordcloud(tdm_emp_overall$term, tdm_emp_overall$'sum(count)', : even
## could not be fit on page. It will not be plotted.

## Warning in wordcloud(tdm_emp_overall$term, tdm_emp_overall$'sum(count)', :
## several could not be fit on page. It will not be plotted.

## Warning in wordcloud(tdm_emp_overall$term, tdm_emp_overall$'sum(count)', :
## always could not be fit on page. It will not be plotted.

## Warning in wordcloud(tdm_emp_overall$term, tdm_emp_overall$'sum(count)', : thus
## could not be fit on page. It will not be plotted.

## Warning in wordcloud(tdm_emp_overall$term, tdm_emp_overall$'sum(count)', : many
## could not be fit on page. It will not be plotted.

## Warning in wordcloud(tdm_emp_overall$term, tdm_emp_overall$'sum(count)', :
## concerning could not be fit on page. It will not be plotted.

## Warning in wordcloud(tdm_emp_overall$term, tdm_emp_overall$'sum(count)', : truth
## could not be fit on page. It will not be plotted.

## Warning in wordcloud(tdm_emp_overall$term, tdm_emp_overall$'sum(count)', :
## consider could not be fit on page. It will not be plotted.

## Warning in wordcloud(tdm_emp_overall$term, tdm_emp_overall$'sum(count)', :
## manner could not be fit on page. It will not be plotted.

## Warning in wordcloud(tdm_emp_overall$term, tdm_emp_overall$'sum(count)', :
## pleasure could not be fit on page. It will not be plotted.

## Warning in wordcloud(tdm_emp_overall$term, tdm_emp_overall$'sum(count)', : take
## could not be fit on page. It will not be plotted.

## Warning in wordcloud(tdm_emp_overall$term, tdm_emp_overall$'sum(count)', : true
## could not be fit on page. It will not be plotted.

```

ideas can change the world

without will one man may idea mind thought knowledge general things well man either way object two make therefore parts give thing particular also body yet never words po regard made reason time right think use little her general things well man either way object two make therefore parts give thing particular also body yet never words po

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## Warning in wordcloud(tdm_gi_overall$term, tdm_gi_overall$'sum(count)', scale =
## c(5, : understanding could not be fit on page. It will not be plotted.

## Warning in wordcloud(tdm_gi_overall$term, tdm_gi_overall$'sum(count)', scale =
## c(5, : possible could not be fit on page. It will not be plotted.

## Warning in wordcloud(tdm_gi_overall$term, tdm_gi_overall$'sum(count)', scale =
## c(5, : cognition could not be fit on page. It will not be plotted.
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## Warning in wordcloud(tdm_gi_overall$term, tdm_gi_overall$'sum(count)', scale =
## c(5, : subject could not be fit on page. It will not be plotted.

## Warning in wordcloud(tdm_gi_overall$term, tdm_gi_overall$'sum(count)', scale =
## c(5, : principle could not be fit on page. It will not be plotted.

## Warning in wordcloud(tdm_gi_overall$term, tdm_gi_overall$'sum(count)', scale =
## c(5, : things could not be fit on page. It will not be plotted.

## Warning in wordcloud(tdm_gi_overall$term, tdm_gi_overall$'sum(count)', scale =
## c(5, : concepts could not be fit on page. It will not be plotted.

## Warning in wordcloud(tdm_gi_overall$term, tdm_gi_overall$'sum(count)', scale =
## c(5, : immediate could not be fit on page. It will not be plotted.

## Warning in wordcloud(tdm_gi_overall$term, tdm_gi_overall$'sum(count)', scale =
## c(5, : experience could not be fit on page. It will not be plotted.

## Warning in wordcloud(tdm_gi_overall$term, tdm_gi_overall$'sum(count)', scale =
## c(5, : external could not be fit on page. It will not be plotted.

## Warning in wordcloud(tdm_gi_overall$term, tdm_gi_overall$'sum(count)', scale =
## c(5, : rather could not be fit on page. It will not be plotted.

## Warning in wordcloud(tdm_gi_overall$term, tdm_gi_overall$'sum(count)', scale =
## c(5, : ground could not be fit on page. It will not be plotted.

## Warning in wordcloud(tdm_gi_overall$term, tdm_gi_overall$'sum(count)', scale =
## c(5, : still could not be fit on page. It will not be plotted.

## Warning in wordcloud(tdm_gi_overall$term, tdm_gi_overall$'sum(count)', scale =
## c(5, : another could not be fit on page. It will not be plotted.

## Warning in wordcloud(tdm_gi_overall$term, tdm_gi_overall$'sum(count)', scale =
## c(5, : determined could not be fit on page. It will not be plotted.

## Warning in wordcloud(tdm_gi_overall$term, tdm_gi_overall$'sum(count)', scale =
## c(5, : determinateness could not be fit on page. It will not be plotted.

## Warning in wordcloud(tdm_gi_overall$term, tdm_gi_overall$'sum(count)', scale =
## c(5, : hence could not be fit on page. It will not be plotted.

## Warning in wordcloud(tdm_gi_overall$term, tdm_gi_overall$'sum(count)', scale =
## c(5, : matter could not be fit on page. It will not be plotted.

## Warning in wordcloud(tdm_gi_overall$term, tdm_gi_overall$'sum(count)', scale =
## c(5, : case could not be fit on page. It will not be plotted.

## Warning in wordcloud(tdm_gi_overall$term, tdm_gi_overall$'sum(count)', scale =
## c(5, : essence could not be fit on page. It will not be plotted.

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## Warning in wordcloud(tdm_gi_overall$term, tdm_gi_overall$'sum(count)', scale =
## c(5, : posited could not be fit on page. It will not be plotted.

## Warning in wordcloud(tdm_gi_overall$term, tdm_gi_overall$'sum(count)', scale =
## c(5, : spirit could not be fit on page. It will not be plotted.

## Warning in wordcloud(tdm_gi_overall$term, tdm_gi_overall$'sum(count)', scale =
## c(5, : state could not be fit on page. It will not be plotted.

## Warning in wordcloud(tdm_gi_overall$term, tdm_gi_overall$'sum(count)', scale =
## c(5, : moral could not be fit on page. It will not be plotted.

## Warning in wordcloud(tdm_gi_overall$term, tdm_gi_overall$'sum(count)', scale =
## c(5, : reflection could not be fit on page. It will not be plotted.

## Warning in wordcloud(tdm_gi_overall$term, tdm_gi_overall$'sum(count)', scale =
## c(5, : particular could not be fit on page. It will not be plotted.

## Warning in wordcloud(tdm_gi_overall$term, tdm_gi_overall$'sum(count)', scale =
## c(5, : determinations could not be fit on page. It will not be plotted.

## Warning in wordcloud(tdm_gi_overall$term, tdm_gi_overall$'sum(count)', scale =
## c(5, : priori could not be fit on page. It will not be plotted.

## Warning in wordcloud(tdm_gi_overall$term, tdm_gi_overall$'sum(count)', scale =
## c(5, : mere could not be fit on page. It will not be plotted.

## Warning in wordcloud(tdm_gi_overall$term, tdm_gi_overall$'sum(count)', scale =
## c(5, : objects could not be fit on page. It will not be plotted.

## Warning in wordcloud(tdm_gi_overall$term, tdm_gi_overall$'sum(count)', scale =
## c(5, : truth could not be fit on page. It will not be plotted.

## Warning in wordcloud(tdm_gi_overall$term, tdm_gi_overall$'sum(count)', scale =
## c(5, : reality could not be fit on page. It will not be plotted.

## Warning in wordcloud(tdm_gi_overall$term, tdm_gi_overall$'sum(count)', scale =
## c(5, : empirical could not be fit on page. It will not be plotted.

## Warning in wordcloud(tdm_gi_overall$term, tdm_gi_overall$'sum(count)', scale =
## c(5, : idea could not be fit on page. It will not be plotted.

## Warning in wordcloud(tdm_gi_overall$term, tdm_gi_overall$'sum(count)', scale =
## c(5, : judgement could not be fit on page. It will not be plotted.

## Warning in wordcloud(tdm_gi_overall$term, tdm_gi_overall$'sum(count)', scale =
## c(5, : objective could not be fit on page. It will not be plotted.

## Warning in wordcloud(tdm_gi_overall$term, tdm_gi_overall$'sum(count)', scale =
## c(5, : sense could not be fit on page. It will not be plotted.

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## Warning in wordcloud(tdm_gi_overall$term, tdm_gi_overall$'sum(count)', scale =
## c(5, : whole could not be fit on page. It will not be plotted.

## Warning in wordcloud(tdm_gi_overall$term, tdm_gi_overall$'sum(count)', scale =
## c(5, : simple could not be fit on page. It will not be plotted.

## Warning in wordcloud(tdm_gi_overall$term, tdm_gi_overall$'sum(count)', scale =
## c(5, : negative could not be fit on page. It will not be plotted.

## Warning in wordcloud(tdm_gi_overall$term, tdm_gi_overall$'sum(count)', scale =
## c(5, : human could not be fit on page. It will not be plotted.

## Warning in wordcloud(tdm_gi_overall$term, tdm_gi_overall$'sum(count)', scale =
## c(5, : order could not be fit on page. It will not be plotted.

## Warning in wordcloud(tdm_gi_overall$term, tdm_gi_overall$'sum(count)', scale =
## c(5, : natural could not be fit on page. It will not be plotted.

## Warning in wordcloud(tdm_gi_overall$term, tdm_gi_overall$'sum(count)', scale =
## c(5, : possibility could not be fit on page. It will not be plotted.

## Warning in wordcloud(tdm_gi_overall$term, tdm_gi_overall$'sum(count)', scale =
## c(5, : right could not be fit on page. It will not be plotted.

## Warning in wordcloud(tdm_gi_overall$term, tdm_gi_overall$'sum(count)', scale =
## c(5, : laws could not be fit on page. It will not be plotted.

## Warning in wordcloud(tdm_gi_overall$term, tdm_gi_overall$'sum(count)', scale =
## c(5, : individual could not be fit on page. It will not be plotted.

## Warning in wordcloud(tdm_gi_overall$term, tdm_gi_overall$'sum(count)', scale =
## c(5, : good could not be fit on page. It will not be plotted.
```



In conclusion, we could conclude that when we use sentimental analysis at the first time, we didn't say much differences among all 3 schools based on the words number in one sentence. Although indeed observe idealism has some differences on emotion by

plotting spider chart because it express more trust than the other 2 schools. Further, by drawing word cloud we observe that 3 schools the most frequent words use are different. After the whole analyzing, I found that there are slightly differences between rationalism and empiricism. But idealism have bigger differences because it conveys more trust in the sentences among the all. But there are one similarity share among all school is that they all express the sense of positive and optimistic in their sentences and words.