Text Mining

```
library(textmineR)

## Warning: package 'textmineR' was built under R version 3.4.4

## Loading required package: Matrix

## textmineR v3.0 is coming with major changes that WILL break things!
##    Please see https://github.com/TommyJones/textmineR/tree/3.0 for the
##    development version. Expected release is October or November of 2018.
##    Please submit questions or requests to
https://github.com/TommyJones/textmineR/issues

library(tidyverse)

## Warning: package 'tidyverse' was built under R version 3.4.4

## -- Attaching packages ---------------------------------------------------
------------------- tidyverse 1.2.1 --

## v ggplot2 3.0.0     v purrr   0.2.5
## v tibble  1.4.2     v dplyr   0.7.6
## v tidyr   0.8.1     v stringr 1.3.1
## v readr   1.1.1     v forcats 0.3.0

## Warning: package 'ggplot2' was built under R version 3.4.4

## Warning: package 'tibble' was built under R version 3.4.4

## Warning: package 'tidyr' was built under R version 3.4.4

## Warning: package 'readr' was built under R version 3.4.4

## Warning: package 'purrr' was built under R version 3.4.4

## Warning: package 'dplyr' was built under R version 3.4.4

## Warning: package 'stringr' was built under R version 3.4.4

## Warning: package 'forcats' was built under R version 3.4.4

## -- Conflicts ------------------------------------------------------------
------------- tidyverse_conflicts() --
## x tidyr::expand() masks Matrix::expand()
## x dplyr::filter() masks stats::filter()
## x dplyr::lag()    masks stats::lag()

library(factoextra)

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

```
## Welcome! Related Books: `Practical Guide To Cluster Analysis in R` at
https://goo.gl/13EFCZ

library(cluster)
library(NbClust)
library(fpc)

## Warning: package 'fpc' was built under R version 3.4.4

library(wordcloud)

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

## Loading required package: RColorBrewer

library(dendroextras)

## Warning: package 'dendroextras' was built under R version 3.4.4

##
## Attaching package: 'dendroextras'

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

library(dendextend)

## Warning: package 'dendextend' was built under R version 3.4.4

##
## ---------------------
## Welcome to dendextend version 1.8.0
## Type citation('dendextend') for how to cite the package.
##
## Type browseVignettes(package = 'dendextend') for the package vignette.
## The github page is: https://github.com/talgalili/dendextend/
##
## Suggestions and bug-reports can be submitted at:
https://github.com/talgalili/dendextend/issues
## Or contact: <tal.galili@gmail.com>
##
##  To suppress this message use:
suppressPackageStartupMessages(library(dendextend))
## ---------------------

##
## Attaching package: 'dendextend'

## The following object is masked from 'package:dendroextras':
##
##     labels<-
```

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

library(mclust)

## Warning: package 'mclust' was built under R version 3.4.4

## Package 'mclust' version 5.4.1
## Type 'citation("mclust")' for citing this R package in publications.

##
## Attaching package: 'mclust'

## The following object is masked from 'package:purrr':
##
##     map

library(dbscan)

## Warning: package 'dbscan' was built under R version 3.4.4

##
## Attaching package: 'dbscan'

## The following object is masked from 'package:fpc':
##
##     dbscan

library(dplyr)
library(e1071)

## Warning: package 'e1071' was built under R version 3.4.4

library(seriation)

## Warning: package 'seriation' was built under R version 3.4.4

library(arules)

## Warning: package 'arules' was built under R version 3.4.4

##
## Attaching package: 'arules'

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

## The following objects are masked from 'package:base':
##
##     abbreviate, write
```

```
library(ggplot2)
library(RColorBrewer)
library(tm)
```

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

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

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

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

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

```
##
## Attaching package: 'tm'
```

```
## The following object is masked from 'package:arules':
##
##     inspect
```

```
library(DT)
```

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

```
library(arulesViz)
```

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

```
## Loading required package: grid
```

```
library(arulesCBA)
```

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

```
## Loading required package: discretization
```

```
library(dplyr)
bible<-
read.csv("https://raw.githubusercontent.com/vigneshjmurali/Statistical-
Predictive-Modelling/master/Datasets/bible_asv.csv")
dim(bible)
```

```
## [1] 31103     8
```

```
bible_var=aggregate(Testaments~Books,data=bible,FUN = unique,collapse="" )
bible_var$Testaments=as.factor(ifelse(bible_var$Testaments==bible_var$Testame
nts[1],1,2))
```

```
levels(bible$Sections)
```

```
## [1] "Apostles" "Gospels"  "History"  "Law"      "Paul"     "Prophets"
## [7] "Wisdom"
```

```
bible_books=aggregate(Sections~Books, data=bible, FUN = unique, collapse="")
bible_books$Sections<-
ordered(bible_books$Sections,levels=c('Apostles','Gospels','History','Law','P
aul','Prophets','Wisdom'))
```

```
bible_chap=aggregate(Testaments~Chapters,data=bible,FUN=unique, collapse="")
bible_chap$Testaments=as.factor(ifelse(bible_chap$Testaments==bible_chap$Test
aments[1],1,2))
bible_chas=aggregate(Sections~Chapters,data=bible,FUN=unique,collapse="")
bible_chas$Sections<-
ordered(bible_chas$Sections,levels=c('Apostles','Gospels','History','Law','Pa
ul','Prophets','Wisdom'))
```

```
bible_ver=bible[,c('Testaments','Verses')]
bible_ver$Testaments=as.factor(ifelse(bible_ver$Testaments==bible_ver$Testame
nts[1],1,2))
bible_verse=bible[,c('Sections','Verses')]
bible_verse$Sections<-
ordered(bible_verse$Sections,levels=c('Apostles','Gospels','History','Law','P
aul','Prophets','Wisdom'))
```

```
bible_test=aggregate(Testaments~text,data=bible,FUN=unique,collapse="")
bible_test$Testaments=as.factor(ifelse(bible_test$Testaments==bible_test$Test
aments[1],1,2))
```

```
bible_sect=aggregate(Sections~text,data=bible,FUN=unique,collapse="")
```

All the texts from the verses are collapsed into a common book which makes it easier to perform the analysis.

```
attach(bible)
text.Book=c()
for (i in 1:66){
  text.Book[i]=paste(text[Books==as.character(unique(Books)[i])],collapse="")
}
```

```
text.Chapters=c()
for (i in 1:1189){

text.Chapters[i]=paste(text[Chapters==as.character(unique(Chapters)[i])],coll
apse = "")
}
```

```
bible_col=data.frame(Books=unique(Books),text=text.Book)
bible_chapters=data.frame(Chapters=unique(Chapters),text=text.Chapters)
bible_verses=bible
dim(bible_col);dim(bible_chapters);dim(bible_verses)
```

```
## [1] 66  2
```

```
## [1] 1189    2

## [1] 31103     8
```

In order to get better results, we should convert all the characters into lower cases, remove the punctuations, numbers and whitespace.

```
my_stopwords1 = c("a", "about", "above", "across", "after", "afterwards",
"again", "against", "all", "almost", "alone", "along", "already",
"also","although","always","am","among", "amongst", "amoungst", "amount",
"an", "and", "another", "any","anyhow","anyone","anything","anyway",
"anywhere", "are", "around", "as", "at", "back","be","became",
"because","become","becomes", "becoming", "been", "before", "beforehand",
"behind", "being", "below", "beside", "besides", "between", "beyond", "bill",
"both", "bottom","but", "by", "call", "can", "cannot", "cant", "co", "con",
"could", "couldnt", "cry", "de", "describe", "detail", "do", "done", "down",
"due", "during", "each", "eg", "eight", "either", "eleven","else",
"elsewhere", "empty", "enough", "etc", "even", "ever", "every", "everyone",
"everything", "everywhere", "except", "few", "fifteen", "fify", "fill",
"find", "fire", "first", "five", "for", "former", "formerly", "forty",
"found", "four", "from", "front", "full", "further", "get", "give", "go",
"had", "has", "hasnt", "have", "he", "hence", "her", "here", "hereafter",
"hereby", "herein", "hereupon", "hers", "herself", "him", "himself", "his",
"how", "however", "hundred", "ie", "if", "in", "inc", "indeed", "interest",
"into", "is", "it", "its", "itself", "keep", "last", "latter", "latterly",
"least", "less", "ltd", "made", "many", "may", "me", "meanwhile", "might",
"mill", "mine", "more", "moreover", "most", "mostly", "move", "much", "must",
"my", "myself", "name", "namely", "neither", "never", "nevertheless", "next",
"nine", "no", "nobody", "none", "noone", "nor", "not", "nothing", "now",
"nowhere", "of", "off", "often", "on", "once", "one", "only", "onto", "or",
"other", "others", "otherwise", "our", "ours", "ourselves", "out", "over",
"own","part", "per", "perhaps", "please", "put", "rather", "re", "same",
"see", "seem", "seemed", "seeming", "seems", "serious", "several", "she",
"should", "show", "side", "since", "sincere", "six", "sixty", "so", "some",
"somehow", "someone", "something", "sometime", "sometimes", "somewhere",
"still", "such", "system", "take", "ten", "than", "that", "the", "their",
"them", "themselves", "then", "thence", "there", "thereafter", "thereby",
"therefore", "therein", "thereupon", "these", "they", "thickv", "thin",
"third", "this", "those", "though", "three", "through", "throughout", "thru",
"thus", "to", "together", "too", "top", "toward", "towards", "twelve",
"twenty", "two", "un", "under", "until", "up", "upon", "us", "very", "via",
"was", "we", "well", "were", "what", "whatever", "when", "whence",
"whenever", "where", "whereafter", "whereas", "whereby", "wherein",
"whereupon", "wherever", "whether", "which", "while", "whither", "who",
"whoever", "whole", "whom", "whose", "why", "will", "with", "within",
"without", "would", "yet", "you", "your", "yours", "yourself", "yourselves",
"the")
my_stopwords2 =
c('thou','thee','thy','ye','shall','shalt','lo','unto','hath','thereof','hast
', 'set','thine','art','yea','midst','wherefore','wilt','thyself')
```

```
Testaments=c(rep('OT',39),rep('NT',27))
Sections=c(rep('Law',5),
rep('History',12),rep('Wisdom',5),rep('Prophets',17),rep('Gospels',5),rep('Paul',13),rep("Apostles",9))
bible_new
=data.frame(Books=unique(Books),Testaments=as.factor(c(rep("OT",39),rep("NT",27))),

Sections=as.factor(c(rep("Law",5),rep("History",12),rep("Wisdom",5),rep("Prophets",17),rep("Gospels",5),rep("Paul",13),rep("Apostles",9))),
                      text=text.Book)
```

Clustering Analysis:

```
dtm_b <- CreateDtm(bible_col$text,doc_names = bible_col$Books,ngram_window = c(1, 7),
                   stopword_vec =
c(tm::stopwords("english"),tm::stopwords("SMART"),
                                     my_stopwords1, my_stopwords2),
lower = TRUE, remove_punctuation = TRUE, remove_numbers = FALSE)

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  |======================================================================| 100%
```

```
tf <- TermDocFreq(dtm_b)

vocabulary <- tf$term[tf$term_freq>2 & tf$doc_freq>1]
dtm_b <- dtm_b[ , vocabulary]

csim_b <- dtm_b / sqrt(rowSums(dtm_b*dtm_b))
csim_b <- csim_b %*% t(csim_b)

dist.mtx_b <- 1-csim_b

Testaments=c(rep('OT',39),rep('NT',27))
Sections=c(rep('Law',5),
rep('History',12),rep('Wisdom',5),rep('Prophets',17),
rep('Gospels',5),rep('Paul',13),rep("Apostles",9))
```

PCA

```
#Transforming the dtm into a matrix
m_b<-as.matrix(dtm_b)
dtm_b.pca=prcomp(m_b)
dtm_b.pca$rotation[1:5,1:5]
```

```
##                            PC1           PC2           PC3           PC4
## round_cut       -1.648058e-04 -0.0008648294 -0.0006715227 -0.0001366474
## jehovah_god_die -4.146433e-04  0.0001636758  0.0004045446 -0.0003189592
## worthy_unloose   2.809317e-05  0.0002548109  0.0002151326  0.0009181075
## saul_meet       -1.718941e-04  0.0009938088 -0.0004880269  0.0002247653
## season_jesus     2.616924e-05  0.0003256117  0.0001408742  0.0008984095
##                            PC5
## round_cut       -7.600066e-05
## jehovah_god_die  2.579996e-04
## worthy_unloose  -8.116030e-04
## saul_meet        6.699454e-04
## season_jesus    -9.047611e-04
```

```
dim(dtm_b.pca$x)
```

```
## [1] 66 66
```

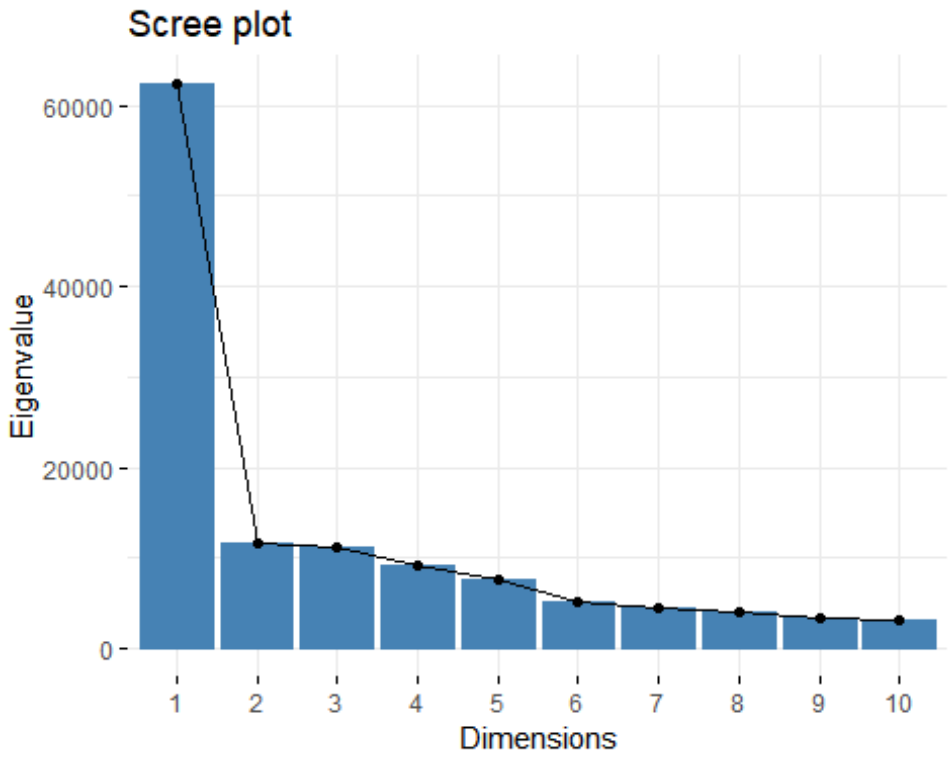
```r
dtm_b.sd=dtm_b.pca$sdev
dtm_b.var=dtm_b.pca$sdev^2
dtm_b.var[1:5]
```

```
## [1] 62365.711 11599.182 11129.915  9067.942  7667.156
```

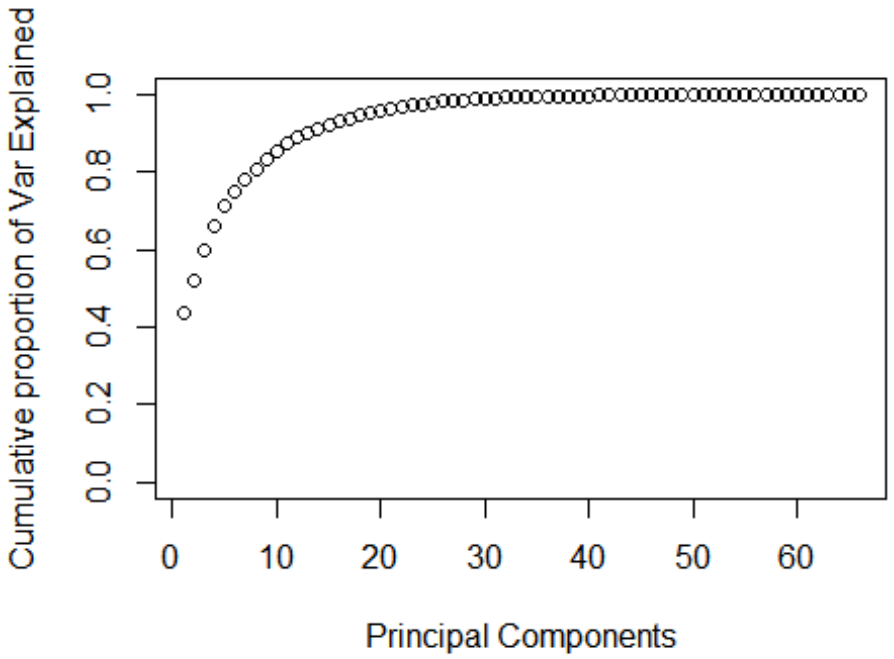
```r
pve=dtm_b.var/sum(dtm_b.var) ; cumsum(pve[1:10])
```

```
##  [1] 0.4374061 0.5187578 0.5968182 0.6604168 0.7141909 0.7504946 0.7811174
##  [8] 0.8091771 0.8327983 0.8554135
```

```r
fviz_screeplot(dtm_b.pca,np=10,choice="eigenvalue")
```




```r
plot(cumsum(pve),xlab="Principal Components", ylab="Cumulative proportion of
Var Explained", ylim=c(0,1),type='b')
```

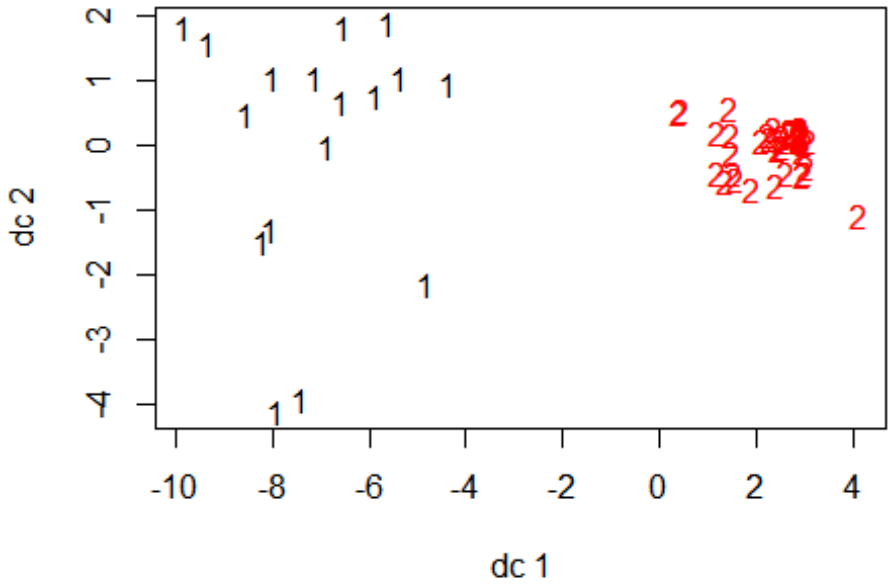



```
which.max(cumsum(pve)[cumsum(pve)<0.90])

## [1] 12

dtm_bnew=as.data.frame(dtm_b.pca$x[,1:12])
dtm_bnew1=dtm_b.pca$x[,1:12]
```

K Means:

```
set.seed(2)
km_2.fit=kmeans(dtm_bnew,2,nstart=50)
attributes(km_2.fit)

## $names
## [1] "cluster"      "centers"      "totss"        "withinss"
## [5] "tot.withinss" "betweenss"    "size"         "iter"
## [9] "ifault"
##
## $class
## [1] "kmeans"

y_k2=table(km_2.fit$cluster, bible_var$Testaments) ; y_k2

##
##      1  2
##   1  9  8
##   2 30 19

mean(km_2.fit$cluster==bible_var$Testaments)
```

```
## [1] 0.4242424

misrate_k2<-1-sum(diag(y_k2))/sum(y_k2) ; misrate_k2

## [1] 0.5757576

plotcluster(dtm_bnew,km_2.fit$cluster)
```




```
set.seed(4)
km_7.fit=kmeans(dtm_bnew,7,nstart = 50)
attributes(km_7.fit)

## $names
## [1] "cluster"      "centers"      "totss"        "withinss"
## [5] "tot.withinss" "betweenss"    "size"         "iter"
## [9] "ifault"
##
## $class
## [1] "kmeans"

y_k7=table(km_7.fit$cluster,bible_books$Sections) ; y_k7

##
##     Apostles Gospels History Law Paul Prophets Wisdom
##   1        1       0       0   0    0        1      0
##   2        1       0       3   0    1        0      0
##   3        0       0       0   1    1        0      1
##   4        4       4       4   4    9       15      4
```

```
##   5        1       0       2   0    1        0      0
##   6        1       0       1   0    1        0      0
##   7        1       1       2   0    0        1      0
```

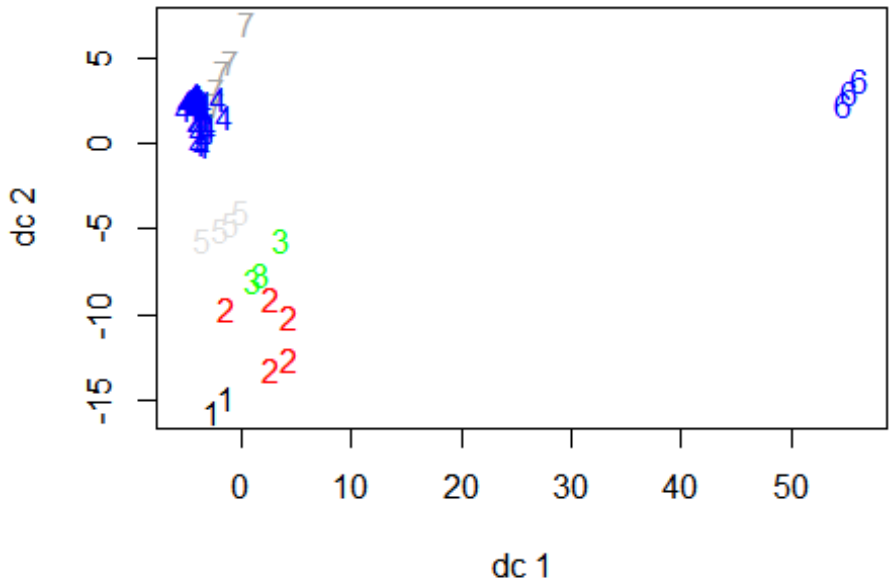
```
mean(km_7.fit$cluster == bible_books$Sections)
```

```
## [1] 0
```

```
misrate_k7<-1-sum(diag(y_k7))/sum(y_k7)  ; misrate_k7
```

```
## [1] 0.9090909
```

```
plotcluster(dtm_bnew, km_7.fit$cluster)
```

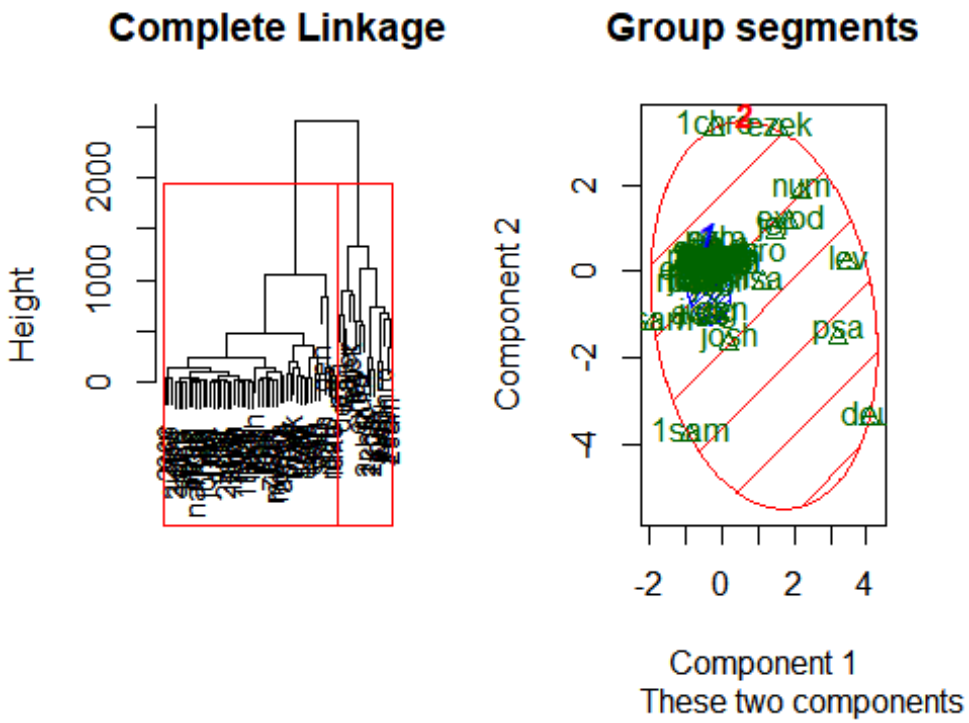


Hierarchical Clustering:

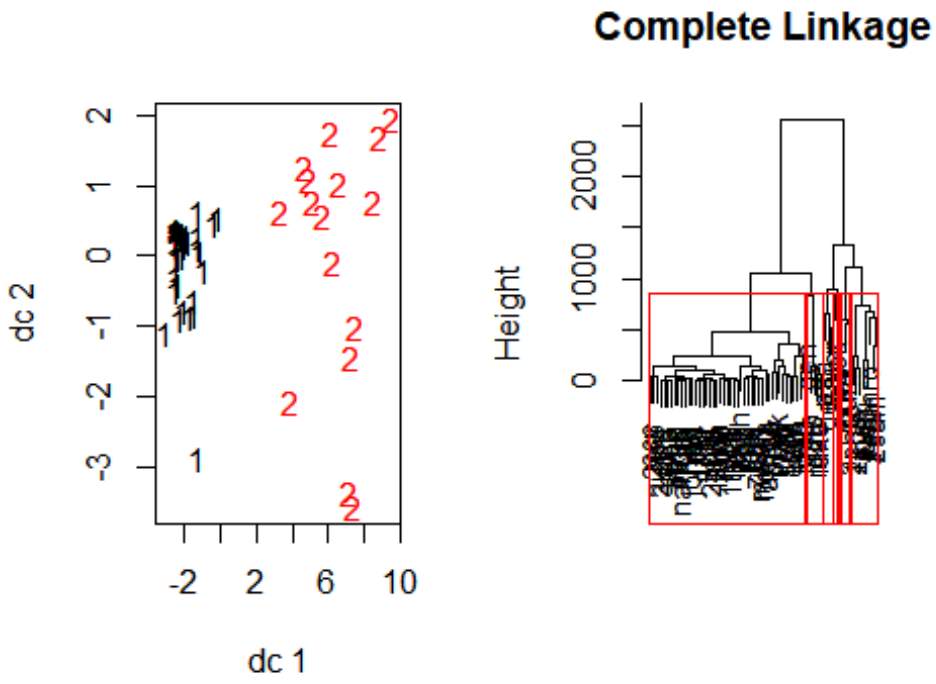
```
par(mfrow=c(1,2))
hc.ward=hclust(dist(dtm_bnew, method = "euclidean"), method="ward.D2")
plot(hc.ward,main="Complete Linkage", xlab="", sub="", cex=.9)

rect.hclust(hc.ward,k=2,border="red")
groups2=cutree(hc.ward,2)
y_h2<-table(groups2,bible_var$Testaments) ;y_h2
```

```
##
## groups2  1  2
##       1 31 19
##       2  8  8
```

```
mean(groups2 ==bible_var$Testaments)

## [1] 0.5909091

misrate_h2<-1-sum(diag(y_h2))/sum(y_h2) ; misrate_h2

## [1] 0.4090909

clusplot(dtm_bnew, groups2, color=TRUE, shade=TRUE,
         labels=2, lines=0, main= 'Group segments')
```




```
plotcluster(dtm_bnew, groups2)

plot(hc.ward,main="Complete Linkage", xlab="", sub="", cex=.9)

rect.hclust(hc.ward,k=7,border="red")
```




```
groups7=cutree(hc.ward,7)
y_h7<-table(groups7,bible_books$Sections) ;y_h7
```

```
##
## groups7 Apostles Gospels History Law Paul Prophets Wisdom
##       1        1       1       3   0    0        0      0
##       2        1       0       1   0    1        0      0
##       3        1       0       0   0    0        1      1
##       4        2       0       4   0    2        0      0
##       5        4       4       4   4    9       16      4
##       6        0       0       0   0    1        0      0
##       7        0       0       0   1    0        0      0
```

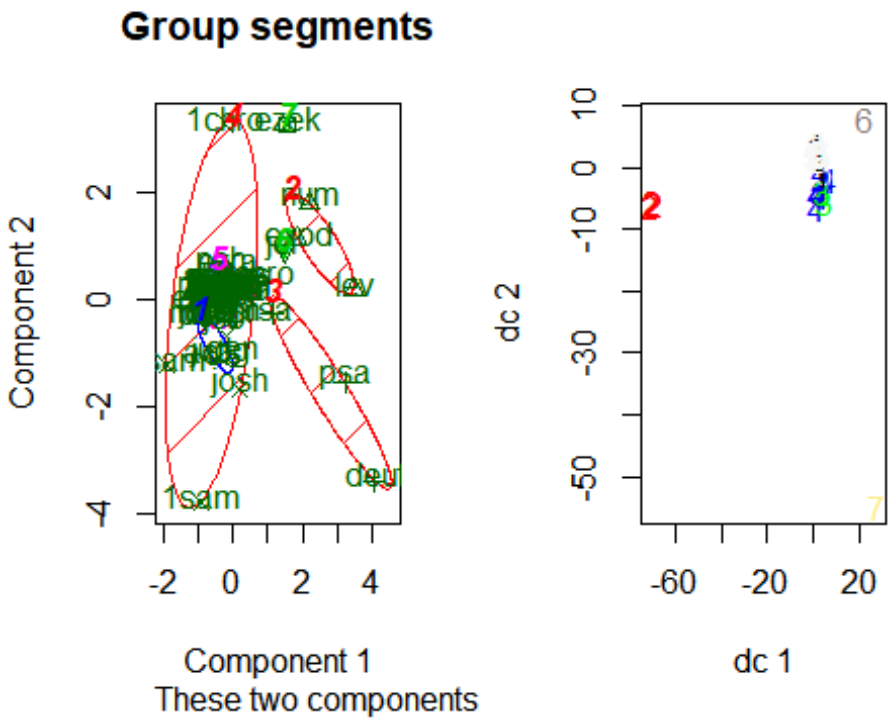
```
mean(groups7 ==bible_books$Sections)
```

```
## [1] 0
```

```
misrate_h7<-1-sum(diag(y_h7))/sum(y_h7)  ; misrate_h7
```

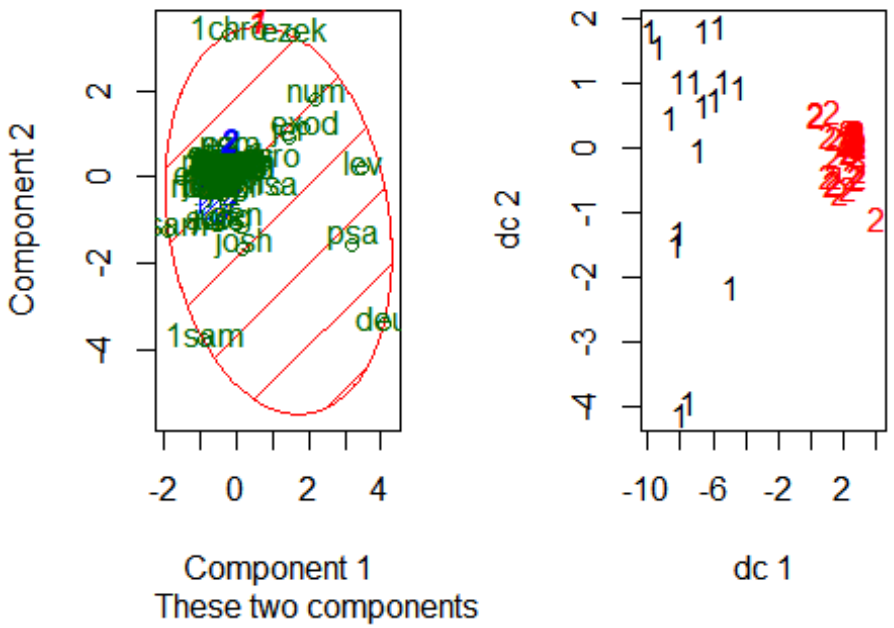
```
## [1] 0.8484848
```

```
clusplot(dtm_bnew, groups7, color=TRUE, shade=TRUE,
         labels=2, lines=0, main= 'Group segments')
plotcluster(dtm_bnew, groups7)
```




```
par(mfrow=c(1,2))
fuz2 <- cmeans(dtm_bnew, 2, 100, m=2, method="cmeans")
clusplot(dtm_bnew, fuz2$cluster, color=TRUE, shade=TRUE,
         labels=2, lines=0, main= 'Fuzzy clustering Group segments')
plotcluster(dtm_bnew, fuz2$cluster)
```

ızzy clustering Group segı




```
y_f2<-table(fuz2$cluster,bible_var$Testaments) ; y_f2
```

```
##
##      1  2
##   1  9  8
##   2 30 19
```

```
mean(fuz2$cluster ==bible_var$Testaments)
```

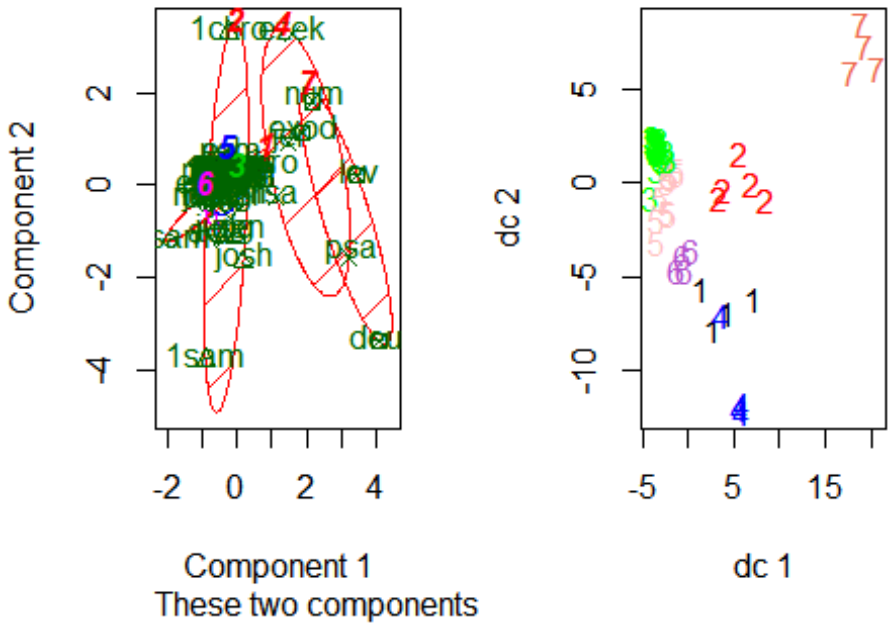
```
## [1] 0.4242424
```

```
misrate_f2<-1-sum(diag(y_f2))/sum(y_f2) ; misrate_f2
```

```
## [1] 0.5757576
```

```
fuz7 <- cmeans(dtm_bnew, 7, 100, m=2, method="cmeans")
clusplot(dtm_bnew, fuz7$cluster, color=TRUE, shade=TRUE,
         labels=2, lines=0, main= 'Fuzzy clustering Group segments')
plotcluster(dtm_bnew, fuz7$cluster)
```

ızzy clustering Group segı




```
y_f7<-table(fuz7$cluster,bible_books$Sections) ;y_f7
```

```
##
##     Apostles Gospels History Law Paul Prophets Wisdom
##   1        1       0       2   0    1        0      0
##   2        1       0       3   0    1        0      0
##   3        4       3       4   3    6       12      3
##   4        0       0       0   1    1        1      1
##   5        0       1       0   1    3        4      1
##   6        1       1       2   0    0        0      0
##   7        2       0       1   0    1        0      0
```

```
mean(fuz7$cluster ==bible_books$Sections)
```

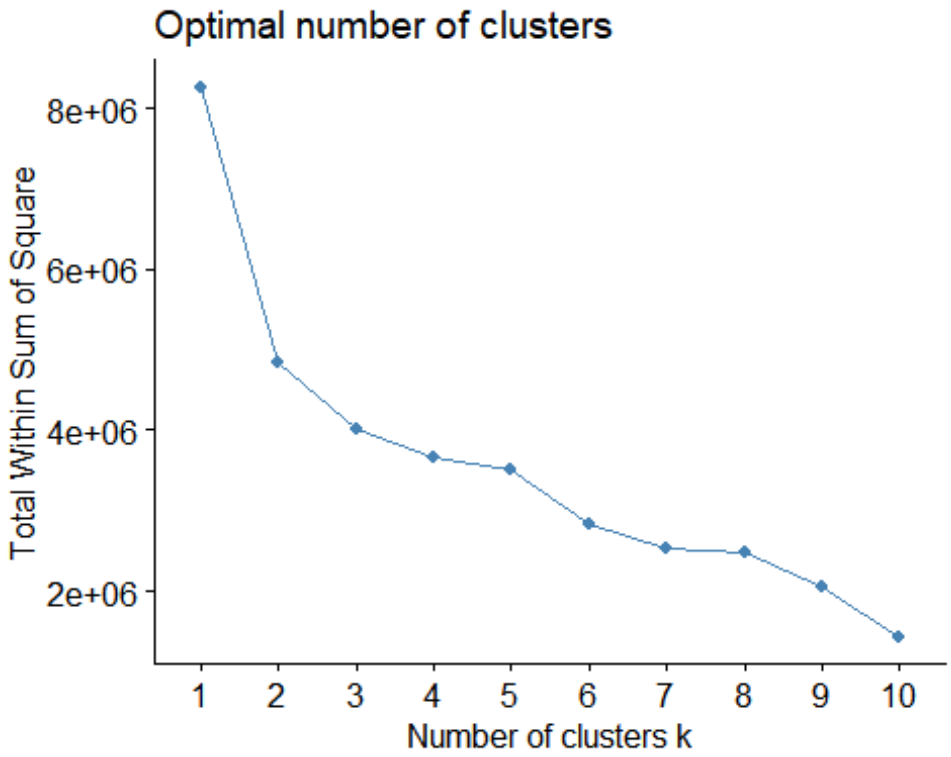
```
## [1] 0
```

```
misrate_f7<-1-sum(diag(y_f7))/sum(y_f7) ; misrate_f7
```

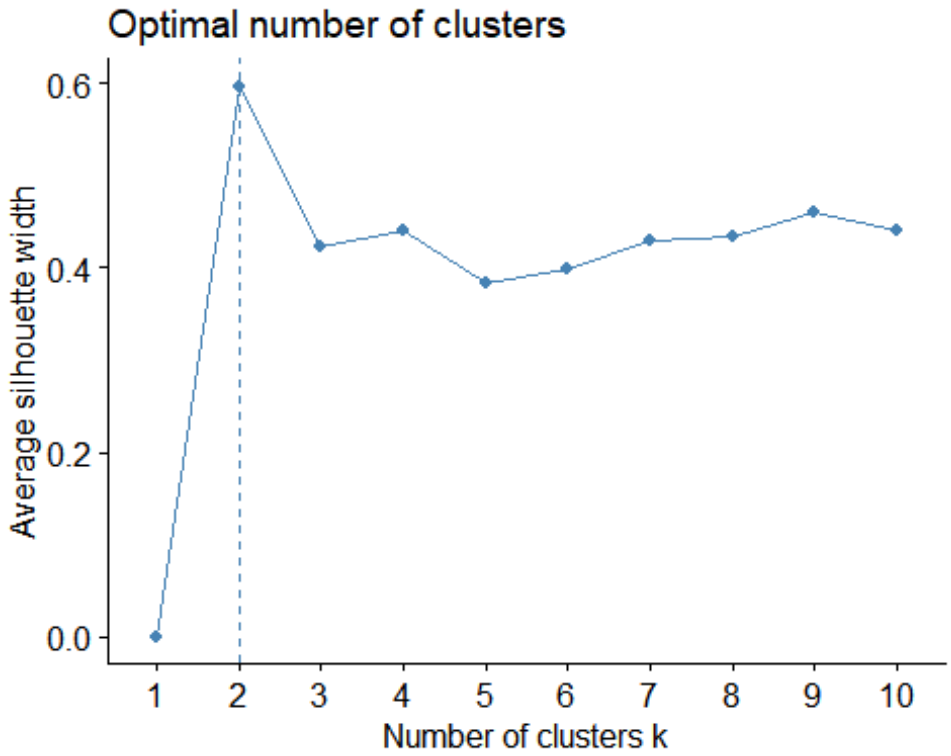
```
## [1] 0.8636364
```

NB Clust:

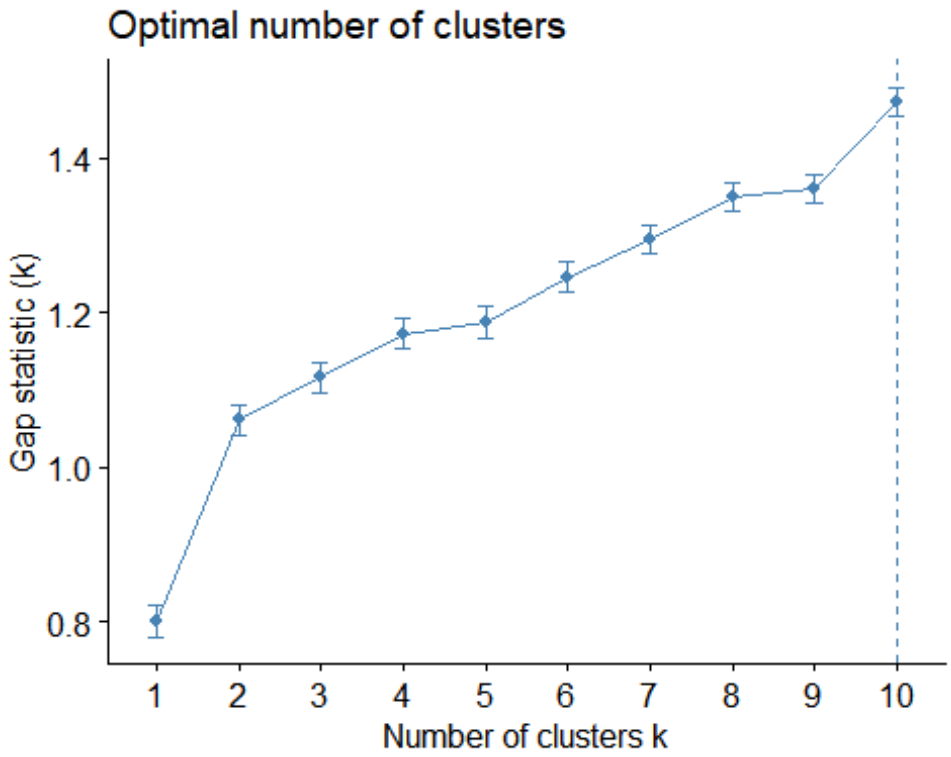
```
par(mfrow=c(2,2))
fviz_nbclust(dtm_bnew1,kmeans,method="wss") # Using elbow method - wss
```



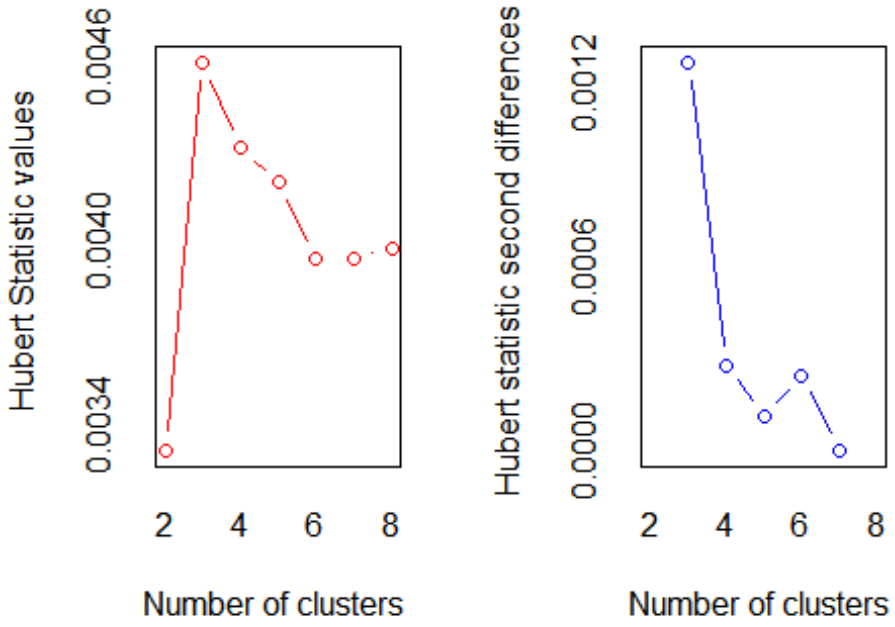

```r
fviz_nbclust(dtm_bnew1,kmeans,method="silhouette") #Using silhouette method
```



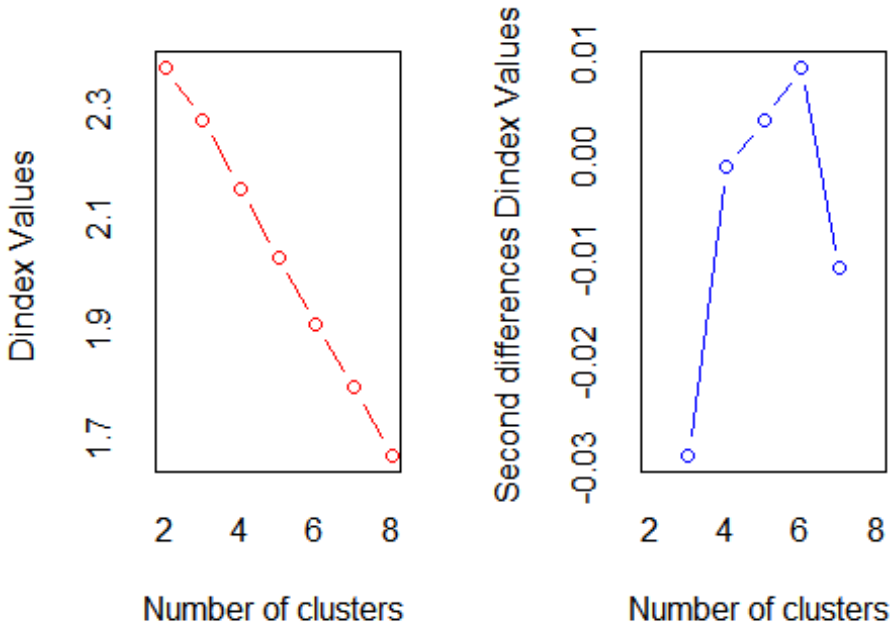

```r
fviz_nbclust(dtm_bnew1,kmeans,method="gap_stat") #Using gap_stat method
```




```
mito.nbclust<-dtm_bnew1 %>% #Using NbClust
  scale() %>%

NbClust(distance="euclidean",min.nc=2,max.nc=8,method="complete",index="all")
```



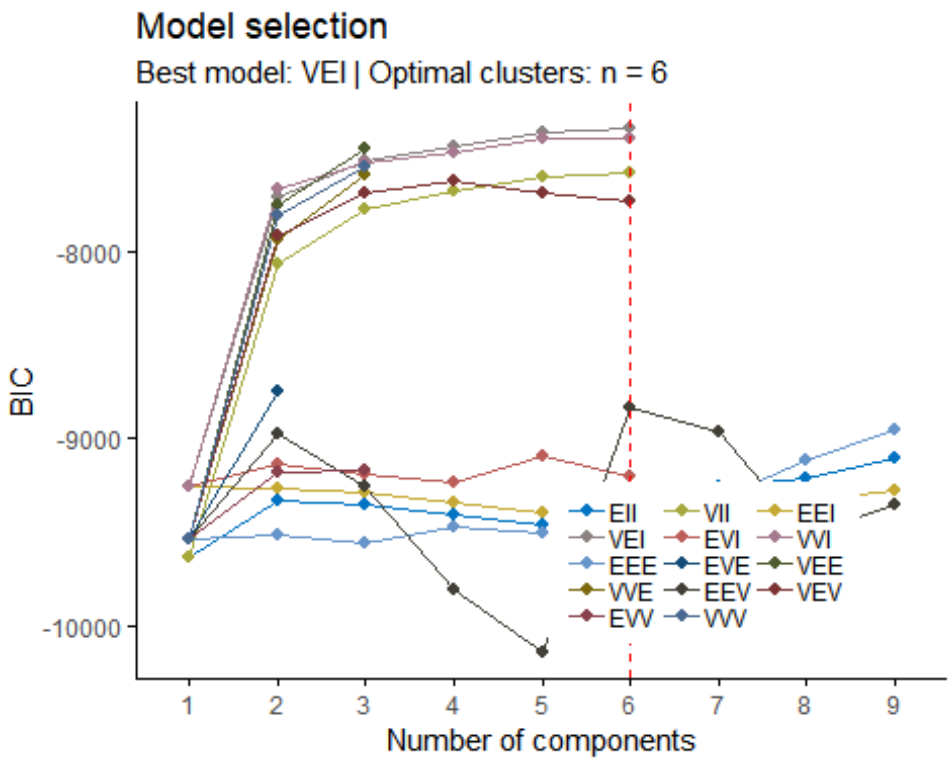

```
## *** : The Hubert index is a graphical method of determining the number of
clusters.
##                 In the plot of Hubert index, we seek a significant knee
that corresponds to a
##                 significant increase of the value of the measure i.e the
significant peak in Hubert
##                 index second differences plot.
##
```



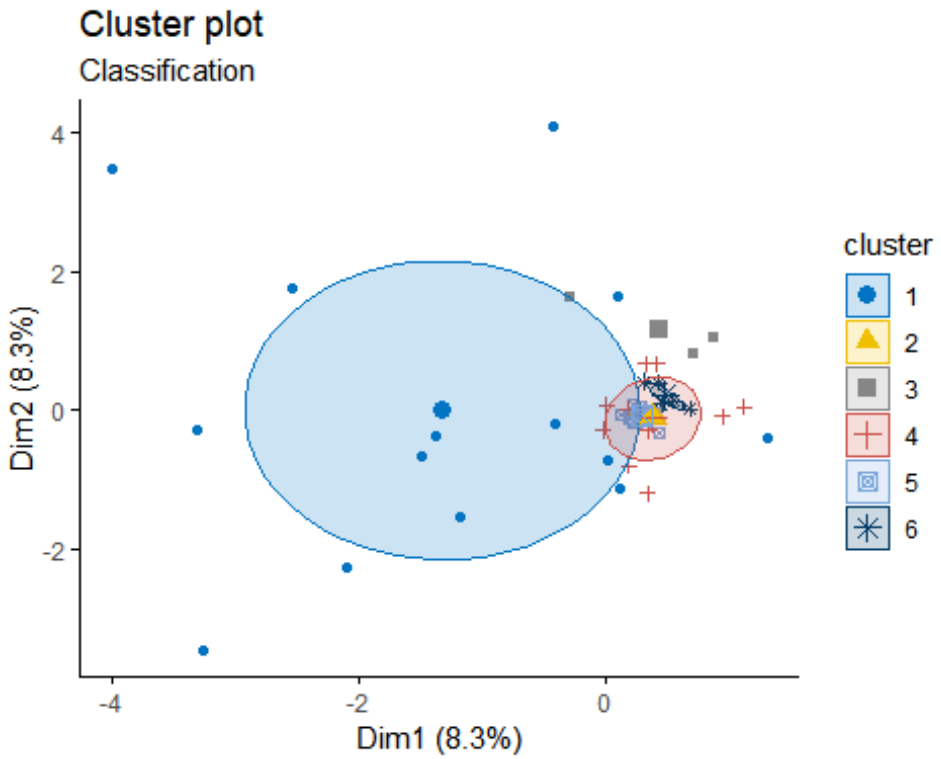

```
## *** : The D index is a graphical method of determining the number of
clusters.
##                 In the plot of D index, we seek a significant knee (the
significant peak in Dindex
##                 second differences plot) that corresponds to a significant
increase of the value of
##                 the measure.
##
## *******************************************************************
## * Among all indices:
## * 9 proposed 2 as the best number of clusters
## * 3 proposed 3 as the best number of clusters
## * 2 proposed 4 as the best number of clusters
## * 1 proposed 6 as the best number of clusters
## * 1 proposed 7 as the best number of clusters
## * 8 proposed 8 as the best number of clusters
##
##                     ***** Conclusion *****
##
## * According to the majority rule, the best number of clusters is  2
##
##
## *******************************************************************
```

Model Based Clustering:

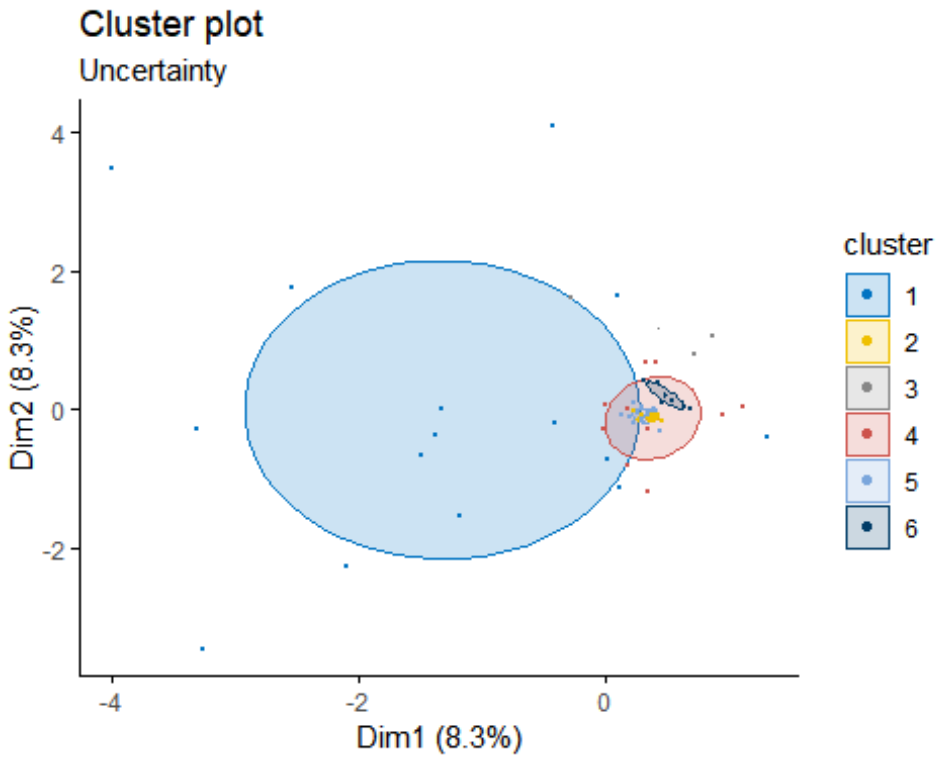
```
par(mfrow=c(1,2))
mb.fit <- Mclust(dtm_bnew)
summary(mb.fit)

## ----------------------------------------------------
## Gaussian finite mixture model fitted by EM algorithm
## ----------------------------------------------------
##
## Mclust VEI (diagonal, equal shape) model with 6 components:
##
##  log.likelihood  n df       BIC       ICL
##       -3479.037 66 94 -7351.902 -7352.688
##
## Clustering table:
##  1  2  3  4  5  6
## 14 19  3 10 15  5

mb.fit$modelName

## [1] "VEI"

mb.fit$G

## [1] 6

fviz_mclust(mb.fit, "BIC", palette = "jco")
```



```
fviz_mclust(mb.fit, "classification", geom = "point", pointsize = 1.5,
palette = "jco")

## Too few points to calculate an ellipse
```




```
fviz_mclust(mb.fit, "uncertainty", palette = "jco")

## Too few points to calculate an ellipse
```



Misclassification Rate:

```
cv_error_rate2 <- rbind(misrate_k2,misrate_h2,misrate_f2)
rownames(cv_error_rate2) <- (c('Kmeans Clustering','Hierarchical
Clustering','Fuzzy Clustering'))
colnames(cv_error_rate2) <- 'cv_error_rate2' ; round(cv_error_rate2, 4)

##                          cv_error_rate2
## Kmeans Clustering                0.5758
## Hierarchical Clustering          0.4091
## Fuzzy Clustering                 0.5758

# missclassification rate on 7 Sections
cv_error_rate7 <- rbind(misrate_k7,misrate_h7, misrate_f7)
rownames(cv_error_rate7) <- (c('Kmeans Clustering', 'Hierarchical
Clustering','Fuzzy Clustering'))
colnames(cv_error_rate7) <- 'cv_error_rate' ; round(cv_error_rate7, 4)

##                          cv_error_rate
## Kmeans Clustering               0.9091
## Hierarchical Clustering         0.8485
## Fuzzy Clustering                0.8636

bible.group_sections<-data.frame(dtm_bnew,km_7.fit$cluster)
bible.group_testaments<-data.frame(dtm_bnew,km_2.fit$cluster)

corpus1<-Corpus(VectorSource(bible_sect$text))
text_corpus1 <- tm_map(corpus1,removeWords,my_stopwords1)
```

```
## Warning in tm_map.SimpleCorpus(corpus1, removeWords, my_stopwords1):
## transformation drops documents

text_corpus1 <- tm_map(corpus1,removeWords,my_stopwords2)

## Warning in tm_map.SimpleCorpus(corpus1, removeWords, my_stopwords2):
## transformation drops documents

text_corpus1 <- tm_map(corpus1, stripWhitespace)

## Warning in tm_map.SimpleCorpus(corpus1, stripWhitespace): transformation
## drops documents

text_corpus1 <- tm_map(corpus1, content_transformer(tolower))

## Warning in tm_map.SimpleCorpus(corpus1, content_transformer(tolower)):
## transformation drops documents

text_corpus1 <- tm_map(corpus1, removeWords, stopwords("english"))

## Warning in tm_map.SimpleCorpus(corpus1, removeWords,
stopwords("english")):
## transformation drops documents

text_corpus1 <- tm_map(corpus1, stemDocument)

## Warning in tm_map.SimpleCorpus(corpus1, stemDocument): transformation
drops
## documents

text_corpus1 <- tm_map(corpus1, removeNumbers)

## Warning in tm_map.SimpleCorpus(corpus1, removeNumbers): transformation
## drops documents

text_corpus1 <- tm_map(corpus1, removePunctuation)

## Warning in tm_map.SimpleCorpus(corpus1, removePunctuation): transformation
## drops documents

dtm_b2<-DocumentTermMatrix(text_corpus1); dim(dtm_b2)

## [1] 30722 12765

dtm_b221<-removeSparseTerms(dtm_b2,sparse=0.95); dim(dtm_b221)

## [1] 30722    48

dtmr1 <-DocumentTermMatrix(text_corpus1, control=list(wordLengths=c(2, 20),
bounds = list(global = c(2,45)))) ;dim(dtmr1)

## [1] 30722  7454

freq<-sort(colSums(as.matrix(dtmr1)),decreasing = TRUE); head(freq,10)
```

```
##  nakedness     redeem appearance     eateth      apart     tables
##         58         56         56         55         54         54
##     vessel     salute    sockets     esther
##         52         52         52         52
```

```
wf1<-data.frame(word=names(freq),freq=freq); head(wf1) ; head(wf1,10)
```

```
##                   word freq
## nakedness   nakedness   58
## redeem         redeem   56
## appearance appearance   56
## eateth         eateth   55
## apart           apart   54
## tables         tables   54
```

```
##                   word freq
## nakedness   nakedness   58
## redeem         redeem   56
## appearance appearance   56
## eateth         eateth   55
## apart           apart   54
## tables         tables   54
## vessel         vessel   52
## salute         salute   52
## sockets       sockets   52
## esther         esther   52
```

```
#p1<-
ggplot(subset(wf,freq>40),aes(x=reorder(word,freq1),y=freq1))+geom_bar(stat="
identity")+
        #    theme(axis.text.x=element_text(angle=45,hjust=1)) #p1
set.seed(142)
wordcloud(names(freq),freq,min.freq=40,max.words = 100,random.order =
FALSE,rot.per = .1,
          random.color=TRUE)
```

```
## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## vessel could not be fit on page. It will not be plotted.
```

```
## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## sockets could not be fit on page. It will not be plotted.
```

```
## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## esther could not be fit on page. It will not be plotted.
```

```
## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## talents could not be fit on page. It will not be plotted.
```

```
## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## trumpets could not be fit on page. It will not be plotted.
```

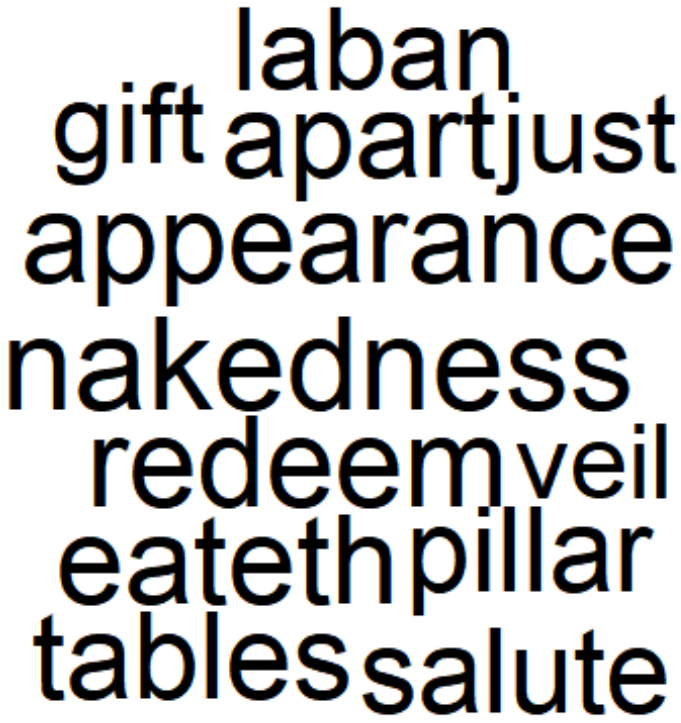
```
## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## ephah could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## next could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## haman could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## towns could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## ephod could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## weep could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## forgiven could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## shepherds could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## azariah could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## multiply could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## spear could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## joash could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## distress could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## rehoboam could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## looking could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## kind could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## weight could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## witnesses could not be fit on page. It will not be plotted.
```

```
## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## lions could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## job could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## dwelleth could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## touched could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## thorns could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## pharaohs could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## rejected could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## vengeance could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## teeth could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## recompense could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## steps could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## chamber could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## sinners could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## ishmael could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## boat could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## jesse could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## countries could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## jealousy could not be fit on page. It will not be plotted.
```

```
## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## gifts could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## gladness could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## removed could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## images could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## dismayed could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## sixth could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## asaph could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## array could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## simeon could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## flour could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## wouldest could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## doest could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## conceived could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## glorified could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## raiment could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## interpretation could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## sackcloth could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## profit could not be fit on page. It will not be plotted.
```

```
## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## created could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## staves could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## abideth could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## bars could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## vineyards could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## instruments could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## asher could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## herself could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## smoke could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## sojourn could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## indignation could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## salt could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## pleasant could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## changed could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## building could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## lies could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## satisfied could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## low could not be fit on page. It will not be plotted.
```

```
## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## forgotten could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## spirits could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## valor could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## appoint could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## issachar could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## eastward could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## shimei could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## rejoiced could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## prosper could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## sacrificed could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## bondage could not be fit on page. It will not be plotted.
```




```
wordcloud(names(freq),freq,min.freq=40,max.words = 100,random.order =
FALSE,rot.per = .35,
          colors=brewer.pal(8,"Dark2"))

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## eateth could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## tables could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## salute could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## esther could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## talents could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## trumpets could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## ephah could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## next could not be fit on page. It will not be plotted.
```

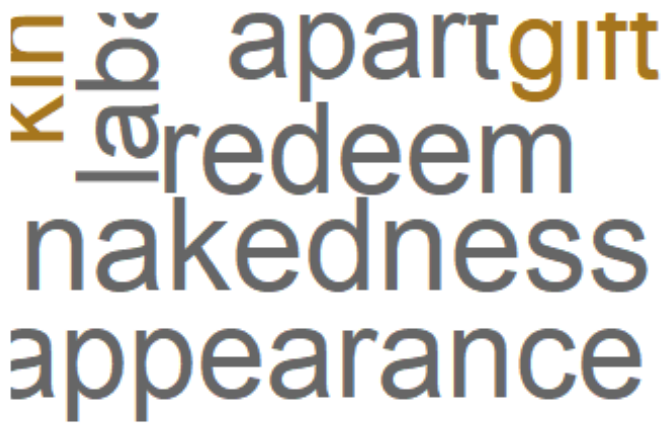
```
## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## haman could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## towns could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## ephod could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## weep could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## just could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## forgiven could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## shepherds could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## azariah could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## multiply could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## spear could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## joash could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## distress could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## rehoboam could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## looking could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## weight could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## witnesses could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## lions could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## job could not be fit on page. It will not be plotted.
```

```
## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## dwelleth could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## touched could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## thorns could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## pharaohs could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## rejected could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## vengeance could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## recompense could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## steps could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## chamber could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## sinners could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## ishmael could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## boat could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## jesse could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## countries could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## jealousy could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## gifts could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## gladness could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## removed could not be fit on page. It will not be plotted.
```

```
## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## images could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## dismayed could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## sixth could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## asaph could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## array could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## veil could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## simeon could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## flour could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## wouldest could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## doest could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## conceived could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## glorified could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## raiment could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## interpretation could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## sackcloth could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## profit could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## created could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## staves could not be fit on page. It will not be plotted.
```

```
## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## abideth could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## bars could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## vineyards could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## instruments could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## asher could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## herself could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## smoke could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## sojourn could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## indignation could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## naked could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## masters could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## sitteth could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## changed could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## building could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## lies could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## satisfied could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## low could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## forgotten could not be fit on page. It will not be plotted.
```

```
## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## repaired could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## ahaz could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## spirits could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## valor could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## appoint could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## eastward could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## rejoiced could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## prosper could not be fit on page. It will not be plotted.

## Warning in wordcloud(names(freq), freq, min.freq = 40, max.words = 100, :
## bondage could not be fit on page. It will not be plotted.
```




```
corpus<-Corpus(VectorSource(bible_col$text))
text_corpus <- tm_map(corpus,removeWords,my_stopwords1)
```

```
## Warning in tm_map.SimpleCorpus(corpus, removeWords, my_stopwords1):
## transformation drops documents

text_corpus <- tm_map(corpus,removeWords,my_stopwords2)

## Warning in tm_map.SimpleCorpus(corpus, removeWords, my_stopwords2):
## transformation drops documents

text_corpus <- tm_map(corpus, stripWhitespace)

## Warning in tm_map.SimpleCorpus(corpus, stripWhitespace): transformation
## drops documents

text_corpus <- tm_map(corpus, content_transformer(tolower))

## Warning in tm_map.SimpleCorpus(corpus, content_transformer(tolower)):
## transformation drops documents

text_corpus <- tm_map(corpus, removeWords, stopwords("english"))

## Warning in tm_map.SimpleCorpus(corpus, removeWords, stopwords("english")):
## transformation drops documents

text_corpus <- tm_map(corpus, stemDocument)

## Warning in tm_map.SimpleCorpus(corpus, stemDocument): transformation drops
## documents

text_corpus <- tm_map(corpus, removeNumbers)

## Warning in tm_map.SimpleCorpus(corpus, removeNumbers): transformation
drops
## documents

text_corpus <- tm_map(corpus, removePunctuation)

## Warning in tm_map.SimpleCorpus(corpus, removePunctuation): transformation
## drops documents

dtm_b2<-DocumentTermMatrix(text_corpus) ;dim(dtm_b2)

## [1]    66 27727

dtm_b22<-removeSparseTerms(dtm_b2,sparse=0.95) ; dim(dtm_b22);

## [1]   66 5269

dtmr <-DocumentTermMatrix(text_corpus, control=list(wordLengths=c(4, 20),
bounds = list(global = c(5,45))))
dim(dtmr) ;

## [1]   66 3965

freq<-sort(colSums(as.matrix(dtmr)),decreasing = TRUE); head(freq,20)
```

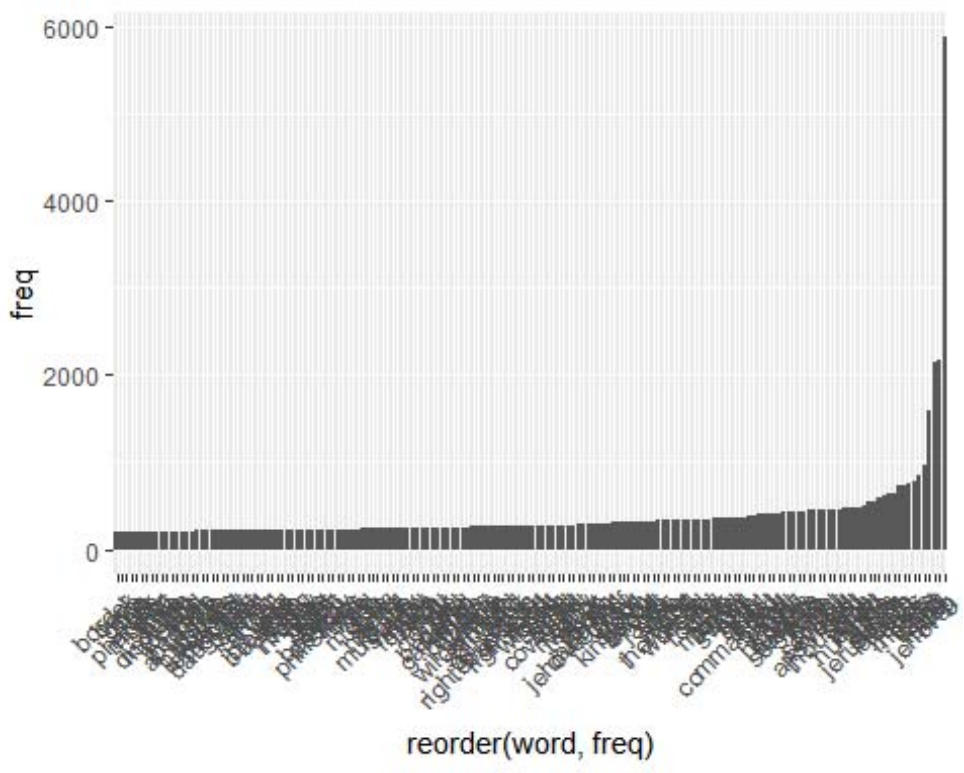
```
##   jehovah      king    israel      land     david      pass     moses
##      5870      2166      2150      1579       972       843       769
##      took     jesus     judah   fathers jerusalem     spake     kings
##       751       737       723       634       630       614       590
##     thine   hundred     egypt      thus     voice  thousand
##       547       541       492       487       487       477
```

```
wf<-data.frame(word=names(freq),freq=freq); head(wf) ; head(wf,10)
```

```
##            word freq
## jehovah jehovah 5870
## king       king 2166
## israel   israel 2150
## land       land 1579
## david     david  972
## pass       pass  843
```

```
##            word freq
## jehovah jehovah 5870
## king       king 2166
## israel   israel 2150
## land       land 1579
## david     david  972
## pass       pass  843
## moses     moses  769
## took       took  751
## jesus     jesus  737
## judah     judah  723
```

```
p<-
ggplot(subset(wf,freq>200),aes(x=reorder(word,freq),y=freq))+geom_bar(stat="i
dentity")+
            theme(axis.text.x=element_text(angle=45,hjust=1))
p ; set.seed(142)
```




```
wordcloud(names(freq),freq,min.freq=200,max.words = 100,random.order =
FALSE,rot.per = .1,
          random.color=TRUE)
```

```
wordcloud(names(freq),freq,min.freq=200,max.words = 100,random.order =
FALSE,rot.per = .35,
          colors=brewer.pal(8,"Dark2"))
```


```
corpus<-Corpus(VectorSource(bible_test$text))
text_corpus <- tm_map(corpus,removeWords,my_stopwords1)

## Warning in tm_map.SimpleCorpus(corpus, removeWords, my_stopwords1):
## transformation drops documents

text_corpus <- tm_map(corpus,removeWords,my_stopwords2)

## Warning in tm_map.SimpleCorpus(corpus, removeWords, my_stopwords2):
## transformation drops documents

text_corpus <- tm_map(corpus, stripWhitespace)

## Warning in tm_map.SimpleCorpus(corpus, stripWhitespace): transformation
## drops documents

text_corpus <- tm_map(corpus, content_transformer(tolower))

## Warning in tm_map.SimpleCorpus(corpus, content_transformer(tolower)):
## transformation drops documents

text_corpus <- tm_map(corpus, removeWords, stopwords("english"))

## Warning in tm_map.SimpleCorpus(corpus, removeWords, stopwords("english")):
## transformation drops documents
```

```
text_corpus <- tm_map(corpus, stemDocument)

## Warning in tm_map.SimpleCorpus(corpus, stemDocument): transformation drops
## documents

text_corpus <- tm_map(corpus, removeNumbers)

## Warning in tm_map.SimpleCorpus(corpus, removeNumbers): transformation
drops
## documents

text_corpus <- tm_map(corpus, removePunctuation)

## Warning in tm_map.SimpleCorpus(corpus, removePunctuation): transformation
## drops documents

dtm_b2<-DocumentTermMatrix(text_corpus);dim(dtm_b2)

## [1] 30722 12765

dtm_b22<-removeSparseTerms(dtm_b2,sparse=0.95);dim(dtm_b22)

## [1] 30722    48

dtmr <-DocumentTermMatrix(text_corpus, control=list(wordLengths=c(2, 20),
bounds = list(global = c(2,45))));dim(dtmr)

## [1] 30722  7454

freq<-sort(colSums(as.matrix(dtmr)),decreasing = TRUE); head(freq,25)

##  nakedness     redeem appearance     eateth      apart     tables
##         58         56         56         55         54         54
##     vessel     salute    sockets     esther     pillar    talents
##         52         52         52         52         52         51
##   trumpets      laban      ephah       gift       next      haman
##         51         51         50         50         50         50
##      towns      ephod       weep       just   forgiven  shepherds
##         50         50         49         49         49         49
##    azariah
##         49

wf<-data.frame(word=names(freq),freq=freq); head(wf); head(wf,100)

##                  word freq
## nakedness   nakedness   58
## redeem         redeem   56
## appearance appearance   56
## eateth         eateth   55
## apart           apart   54
## tables         tables   54
```

```
##                          word freq
## nakedness           nakedness   58
## redeem                 redeem   56
## appearance         appearance   56
## eateth                 eateth   55
## apart                   apart   54
## tables                 tables   54
## vessel                 vessel   52
## salute                 salute   52
## sockets               sockets   52
## esther                 esther   52
## pillar                 pillar   52
## talents               talents   51
## trumpets             trumpets   51
## laban                   laban   51
## ephah                   ephah   50
## gift                     gift   50
## next                     next   50
## haman                   haman   50
## towns                   towns   50
## ephod                   ephod   50
## weep                     weep   49
## just                     just   49
## forgiven             forgiven   49
## shepherds           shepherds   49
## azariah               azariah   49
## multiply             multiply   49
## spear                   spear   49
## joash                   joash   49
## distress             distress   49
## rehoboam             rehoboam   49
## looking               looking   48
## kind                     kind   48
## weight                 weight   48
## witnesses           witnesses   48
## lions                   lions   48
## job                       job   48
## dwelleth             dwelleth   48
## touched               touched   48
## thorns                 thorns   48
## pharaohs             pharaohs   48
## rejected             rejected   48
## vengeance           vengeance   48
## teeth                   teeth   47
## recompense         recompense   47
## steps                   steps   47
## chamber               chamber   47
## sinners               sinners   47
## ishmael               ishmael   47
## boat                     boat   47
```

```
## jesse                   jesse   47
## countries           countries   47
## jealousy             jealousy   47
## gifts                   gifts   46
## gladness             gladness   46
## removed               removed   46
## images                 images   46
## dismayed             dismayed   46
## sixth                   sixth   46
## asaph                   asaph   46
## array                   array   46
## veil                     veil   46
## simeon                 simeon   46
## flour                   flour   46
## wouldest             wouldest   46
## doest                   doest   46
## conceived           conceived   46
## glorified           glorified   46
## raiment               raiment   46
## interpretation interpretation   46
## sackcloth           sackcloth   46
## profit                 profit   46
## created               created   46
## staves                 staves   46
## abideth               abideth   45
## bars                     bars   45
## vineyards           vineyards   45
## instruments       instruments   45
## asher                   asher   45
## herself               herself   45
## smoke                   smoke   45
## sojourn               sojourn   45
## indignation       indignation   45
## naked                   naked   44
## salt                     salt   44
## pleasant             pleasant   44
## masters               masters   44
## sitteth               sitteth   44
## changed               changed   44
## building             building   44
## lies                     lies   44
## satisfied           satisfied   44
## low                       low   44
## forgotten           forgotten   44
## repaired             repaired   44
## ahaz                     ahaz   44
## spirits               spirits   44
## valor                   valor   44
## appoint               appoint   44
```

```
## issachar             issachar   44
## eastward             eastward   44

p<-
ggplot(subset(wf,freq>200),aes(x=reorder(word,freq),y=freq))+geom_bar(stat="i
dentity")+
            theme(axis.text.x=element_text(angle=45,hjust=1))
p ; set.seed(142)
```

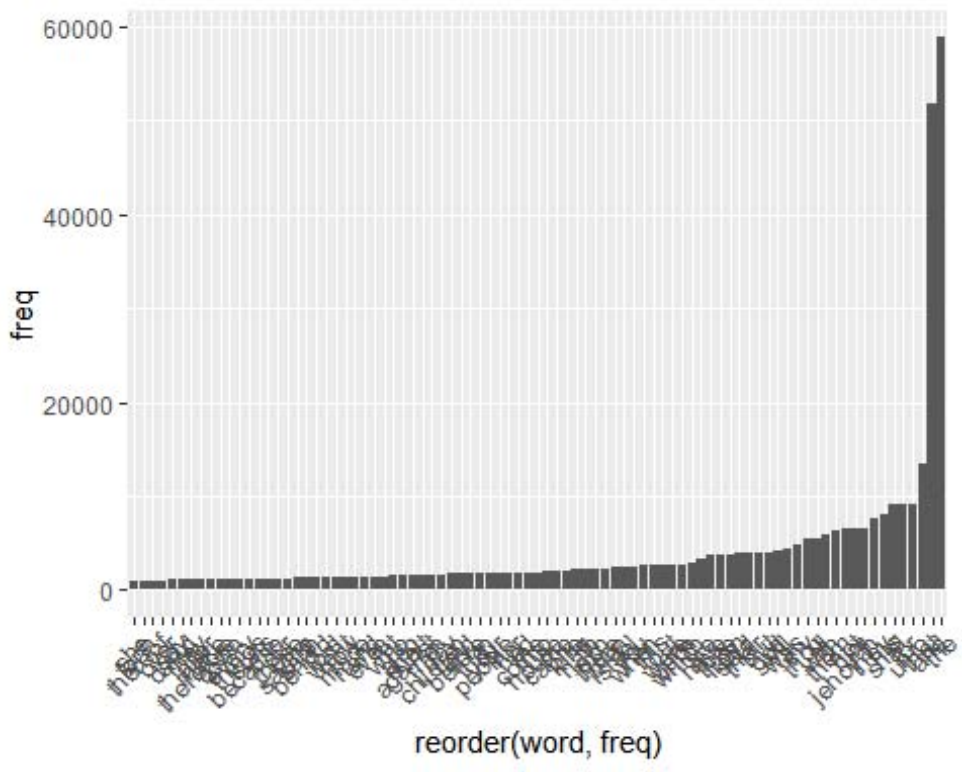

```
freq<-sort(colSums(as.matrix(dtm_b2)),decreasing = TRUE); head(freq,15)

##     the     and    that    unto     for   shall     his    they jehovah
##   58738   51682   13502    9096    9085    9071    8084    7569    6612
##     him     not    them    with     all    thou
##    6586    6543    6370    5960    5570    5477

wf<-data.frame(word=names(freq),freq=freq); head(wf)

##        word  freq
## the     the 58738
## and     and 51682
## that   that 13502
## unto   unto  9096
## for     for  9085
## shall shall  9071

head(wf,100)
```

```
##                word  freq
## the             the 58738
## and             and 51682
## that           that 13502
## unto           unto  9096
## for             for  9085
## shall         shall  9071
## his             his  8084
## they           they  7569
## jehovah     jehovah  6612
## him             him  6586
## not             not  6543
## them           them  6370
## with           with  5960
## all             all  5570
## thou           thou  5477
## thy             thy  4919
## was             was  4423
## will           will  4101
## god             god  4063
## but             but  3975
## their         their  3897
## said           said  3872
## from           from  3843
## thee           thee  3829
## have           have  3669
## are             are  3223
## which         which  2944
## upon           upon  2764
## were           were  2731
## out             out  2728
## this           this  2702
## when           when  2634
## you             you  2553
## israel       israel  2549
## man             man  2530
## there         there  2360
## son             son  2334
## hath           hath  2312
## king           king  2238
## one             one  2062
## came           came  2038
## house         house  1940
## into           into  1916
## come           come  1892
## had             had  1855
## her             her  1837
## people       people  1830
## your           your  1780
## then           then  1779
```

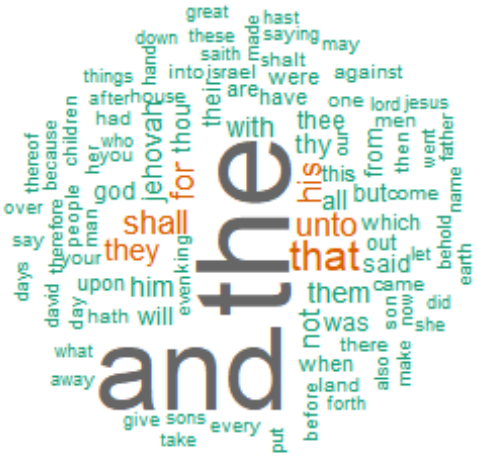
```
## before       before  1753
## land           land  1748
## children   children  1724
## day             day  1670
## men             men  1647
## against     against  1602
## shalt         shalt  1588
## also           also  1518
## who             who  1516
## let             let  1496
## even           even  1454
## hand           hand  1450
## made           made  1446
## now             now  1437
## went           went  1380
## lord           lord  1348
## behold       behold  1339
## saith         saith  1312
## saying       saying  1298
## these         these  1257
## our             our  1178
## because     because  1176
## sons           sons  1173
## things       things  1167
## every         every  1155
## down           down  1149
## therefore therefore  1143
## make           make  1093
## after         after  1092
## may             may  1089
## david         david  1079
## say             say  1073
## over           over  1054
## thereof     thereof  1028
## forth         forth  1014
## she             she  1006
## what           what   985
## away           away   984
## hast           hast   976
## did             did   970
## put             put   958
## earth         earth   956
## name           name   939
## father       father   936
## great         great   935
## give           give   922
## jesus         jesus   917
## days           days   874
## take           take   873
```

```
## pass            pass   863
## heart          heart   860
```

```
p<-
ggplot(subset(wf,freq>1000),aes(x=reorder(word,freq),y=freq))+geom_bar(stat="
identity")+
            theme(axis.text.x=element_text(angle=45,hjust=1))
p
```




```
set.seed(142)

wordcloud(names(freq),freq,min.freq=866,max.words = 100,random.order =
FALSE,rot.per = .35,
          colors=brewer.pal(8,"Dark2"))
```

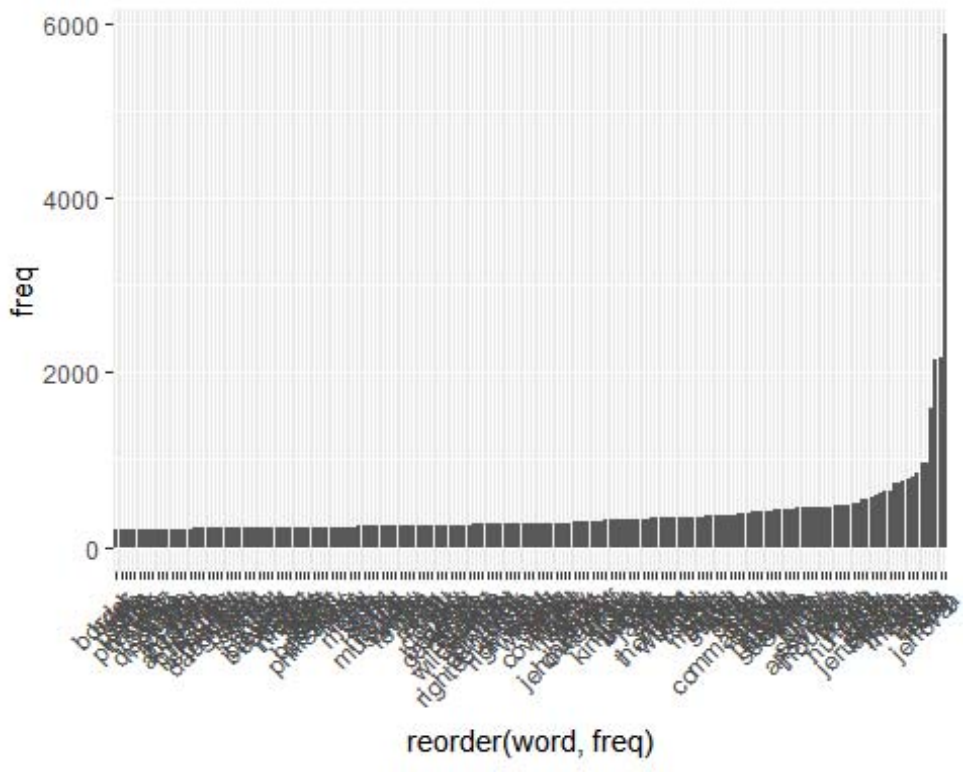



```
corpus<-Corpus(VectorSource(bible_col$text))
text_corpus <- tm_map(corpus,removeWords,my_stopwords1)

## Warning in tm_map.SimpleCorpus(corpus, removeWords, my_stopwords1):
## transformation drops documents

text_corpus <- tm_map(corpus,removeWords,my_stopwords2)

## Warning in tm_map.SimpleCorpus(corpus, removeWords, my_stopwords2):
## transformation drops documents

text_corpus <- tm_map(corpus, stripWhitespace)

## Warning in tm_map.SimpleCorpus(corpus, stripWhitespace): transformation
## drops documents

text_corpus <- tm_map(corpus, content_transformer(tolower))

## Warning in tm_map.SimpleCorpus(corpus, content_transformer(tolower)):
## transformation drops documents

text_corpus <- tm_map(corpus, removeWords, stopwords("english"))

## Warning in tm_map.SimpleCorpus(corpus, removeWords, stopwords("english")):
## transformation drops documents

text_corpus <- tm_map(corpus, stemDocument)
```

```
## Warning in tm_map.SimpleCorpus(corpus, stemDocument): transformation drops
## documents

text_corpus <- tm_map(corpus, removeNumbers)

## Warning in tm_map.SimpleCorpus(corpus, removeNumbers): transformation
drops
## documents

text_corpus <- tm_map(corpus, removePunctuation)

## Warning in tm_map.SimpleCorpus(corpus, removePunctuation): transformation
## drops documents

dtm_b2<-DocumentTermMatrix(text_corpus);dim(dtm_b2)

## [1]    66 27727

dtm_b22<-removeSparseTerms(dtm_b2,sparse=0.95);dim(dtm_b22)

## [1]   66 5269

dtmr <-DocumentTermMatrix(text_corpus, control=list(wordLengths=c(2, 20),
bounds = list(global = c(2,45))));dim(dtmr)

## [1]    66 10230

freq<-sort(colSums(as.matrix(dtmr)),decreasing = TRUE); head(freq,15)

##   jehovah      king    israel      land     david       she      pass
##      5870      2166      2150      1579       972       966       843
##       two     moses      took     jesus     judah   fathers jerusalem
##       805       769       751       737       723       634       630
##     spake
##       614

wf<-data.frame(word=names(freq),freq=freq); head(wf); head(wf,10)

##            word freq
## jehovah jehovah 5870
## king       king 2166
## israel   israel 2150
## land       land 1579
## david     david  972
## she         she  966

##            word freq
## jehovah jehovah 5870
## king       king 2166
## israel   israel 2150
## land       land 1579
## david     david  972
## she         she  966
```

```
## pass       pass  843
## two         two  805
## moses     moses  769
## took       took  751
```

```
p<-
ggplot(subset(wf,freq>200),aes(x=reorder(word,freq),y=freq))+geom_bar(stat="identity")+
            theme(axis.text.x=element_text(angle=45,hjust=1))
p ; set.seed(142)
```




```
wordcloud(names(freq),freq,min.freq=200,max.words = 100,random.order = FALSE,rot.per = .1,
          random.color=TRUE)
```

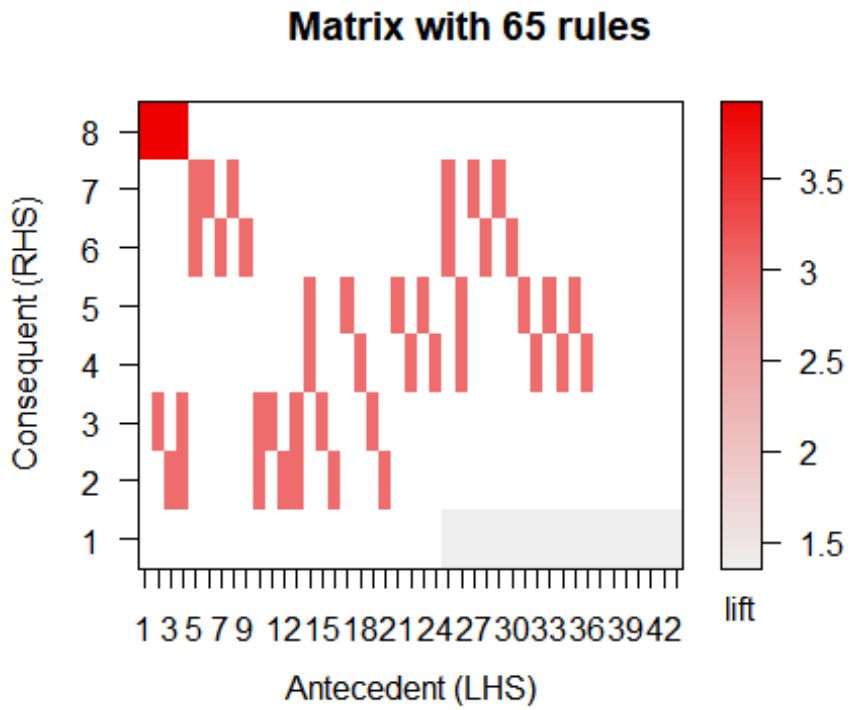

```
wordcloud(names(freq),freq,min.freq=200,max.words = 100,random.order =
FALSE,rot.per = .35,
          colors=brewer.pal(8,"Dark2"))
```

Association Rules:

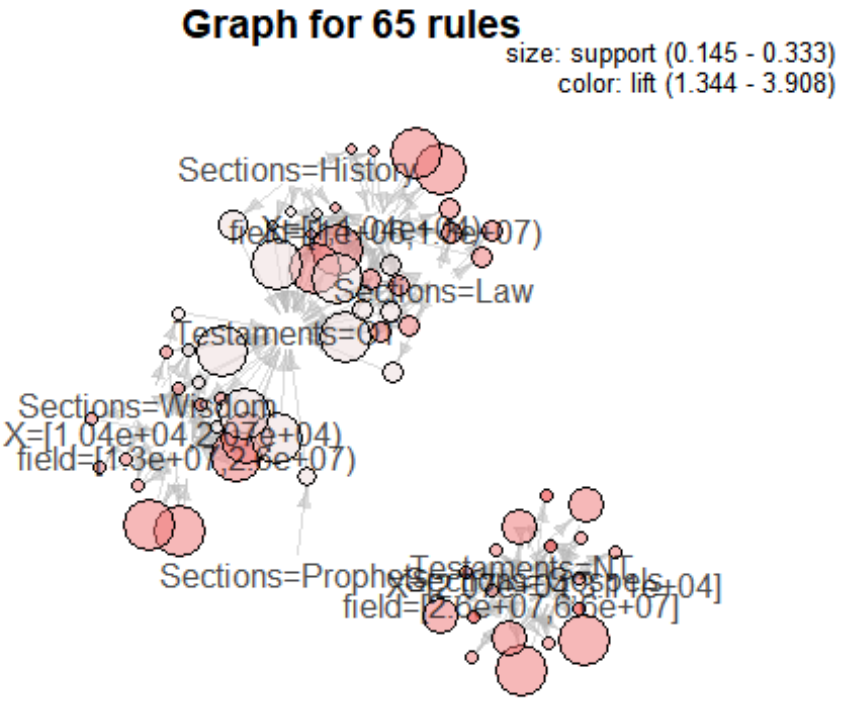
```
bible_dis<-discretizeDF(bible)
rules_bible<-apriori(bible_dis)

## Apriori
##
## Parameter specification:
##  confidence minval smax arem  aval originalSupport maxtime support minlen
##         0.8    0.1    1 none FALSE            TRUE       5     0.1      1
##  maxlen target   ext
##      10  rules FALSE
##
## Algorithmic control:
##  filter tree heap memopt load sort verbose
##     0.1 TRUE TRUE  FALSE TRUE    2    TRUE
##
## Absolute minimum support count: 3110
##
## set item appearances ...[0 item(s)] done [0.00s].
## set transactions ...[63095 item(s), 31103 transaction(s)] done [0.03s].
## sorting and recoding items ... [13 item(s)] done [0.02s].
## creating transaction tree ... done [0.00s].
## checking subsets of size 1 2 3 4 done [0.00s].
## writing ... [65 rule(s)] done [0.00s].
## creating S4 object  ... done [0.01s].

summary(rules_bible)

## set of 65 rules
##
## rule length distribution (lhs + rhs):sizes
##  2  3  4
## 23 30 12
##
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##   2.000   2.000   3.000   2.831   3.000   4.000
##
## summary of quality measures:
##     support         confidence      lift           count
##  Min.   :0.1452   Min.   :1    Min.   :1.344   Min.   : 4516
##  1st Qu.:0.1538   1st Qu.:1    1st Qu.:1.344   1st Qu.: 4785
##  Median :0.1881   Median :1    Median :3.000   Median : 5852
##  Mean   :0.2112   Mean   :1    Mean   :2.572   Mean   : 6568
##  3rd Qu.:0.2559   3rd Qu.:1    3rd Qu.:3.000   3rd Qu.: 7958
##  Max.   :0.3333   Max.   :1    Max.   :3.908   Max.   :10368
##
## mining info:
##       data ntransactions support confidence
##  bible_dis         31103     0.1        0.8
```

```r
subrules_bible<-rules_bible[quality(rules_bible)$confidence>0.5]
subrules_bible

## set of 65 rules

plot(subrules_bible,method="matrix",measure = "lift")

## Itemsets in Antecedent (LHS)
##  [1] "{X=[2.07e+04,3.11e+04],field=[2.6e+07,6.6e+07],Sections=Gospels}"
##  [2] "{X=[2.07e+04,3.11e+04],Sections=Gospels}"
##  [3] "{field=[2.6e+07,6.6e+07],Sections=Gospels}"
##  [4] "{Sections=Gospels}"
##  [5] "{Testaments=OT,Sections=Wisdom}"
##  [6] "{X=[1.04e+04,2.07e+04),Testaments=OT}"
##  [7] "{field=[1.3e+07,2.6e+07),Testaments=OT}"
##  [8] "{X=[1.04e+04,2.07e+04),Testaments=OT,Sections=Wisdom}"
##  [9] "{field=[1.3e+07,2.6e+07),Testaments=OT,Sections=Wisdom}"
## [10] "{Testaments=NT}"
## [11] "{X=[2.07e+04,3.11e+04]}"
## [12] "{field=[2.6e+07,6.6e+07]}"
## [13] "{Testaments=NT,Sections=Gospels}"
## [14] "{Testaments=OT,Sections=Law}"
## [15] "{X=[2.07e+04,3.11e+04],Testaments=NT}"
## [16] "{field=[2.6e+07,6.6e+07],Testaments=NT}"
## [17] "{X=[1,1.04e+04),Testaments=OT}"
## [18] "{field=[1e+06,1.3e+07),Testaments=OT}"
## [19] "{X=[2.07e+04,3.11e+04],Testaments=NT,Sections=Gospels}"
## [20] "{field=[2.6e+07,6.6e+07],Testaments=NT,Sections=Gospels}"
## [21] "{X=[1,1.04e+04),Testaments=OT,Sections=Law}"
## [22] "{field=[1e+06,1.3e+07),Testaments=OT,Sections=Law}"
## [23] "{X=[1,1.04e+04),Testaments=OT,Sections=History}"
## [24] "{field=[1e+06,1.3e+07),Testaments=OT,Sections=History}"
## [25] "{Sections=Wisdom}"
## [26] "{Sections=Law}"
## [27] "{X=[1.04e+04,2.07e+04)}"
## [28] "{field=[1.3e+07,2.6e+07)}"
## [29] "{X=[1.04e+04,2.07e+04),Sections=Wisdom}"
## [30] "{field=[1.3e+07,2.6e+07),Sections=Wisdom}"
## [31] "{X=[1,1.04e+04)}"
## [32] "{field=[1e+06,1.3e+07)}"
## [33] "{X=[1,1.04e+04),Sections=Law}"
## [34] "{field=[1e+06,1.3e+07),Sections=Law}"
## [35] "{X=[1,1.04e+04),Sections=History}"
## [36] "{field=[1e+06,1.3e+07),Sections=History}"
## [37] "{Sections=Prophets}"
## [38] "{Sections=History}"
## [39] "{X=[1.04e+04,2.07e+04),field=[1.3e+07,2.6e+07)}"
## [40] "{X=[1,1.04e+04),field=[1e+06,1.3e+07)}"
## [41] "{X=[1.04e+04,2.07e+04),field=[1.3e+07,2.6e+07),Sections=Wisdom}"
## [42] "{X=[1,1.04e+04),field=[1e+06,1.3e+07),Sections=Law}"
```

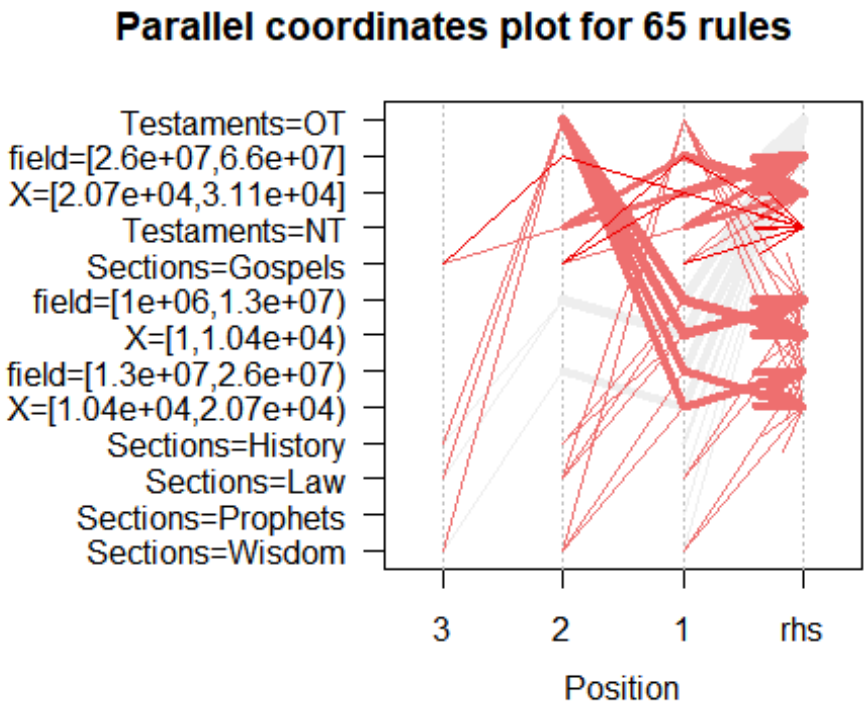
```
## [43] "{X=[1,1.04e+04),field=[1e+06,1.3e+07),Sections=History}"
## Itemsets in Consequent (RHS)
## [1] "{Testaments=OT}"           "{X=[2.07e+04,3.11e+04]}"
## [3] "{field=[2.6e+07,6.6e+07]}" "{X=[1,1.04e+04)}"
## [5] "{field=[1e+06,1.3e+07)}"   "{X=[1.04e+04,2.07e+04)}"
## [7] "{field=[1.3e+07,2.6e+07)}" "{Testaments=NT}"
```



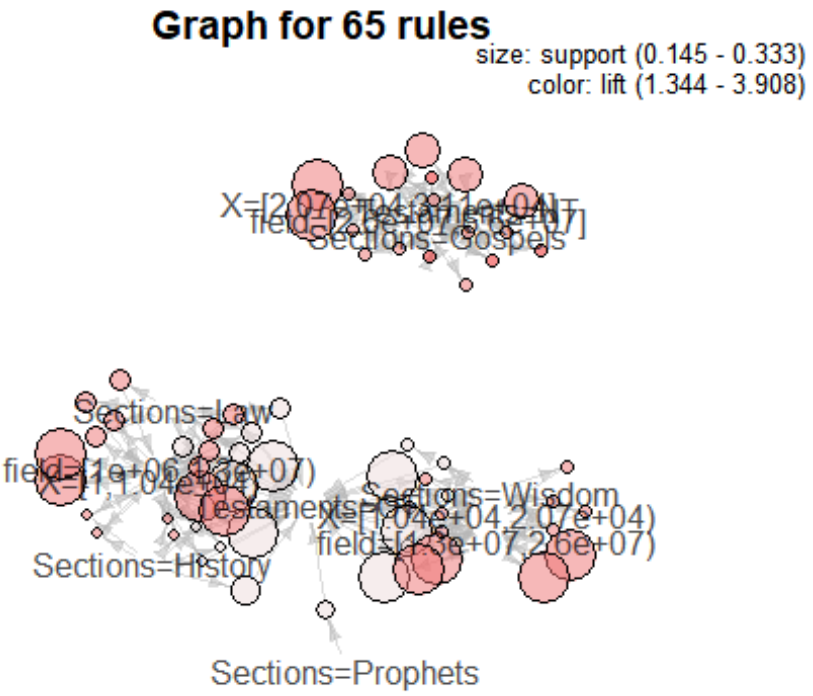

```
subrules_bible2<-head(sort(rules_bible,by="lift"),66)
plot(subrules_bible2,method = "graph")
```




```
plot(subrules_bible2, method="paracoord")
```

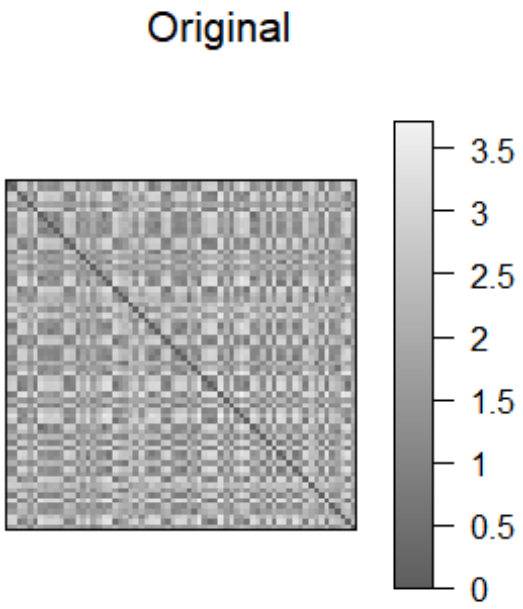


```
#sel <- plot(rules_bible, measure=c("support", "lift"), shading="confidence",
interactive=TRUE)
plot(rules_bible, method="graph")
```

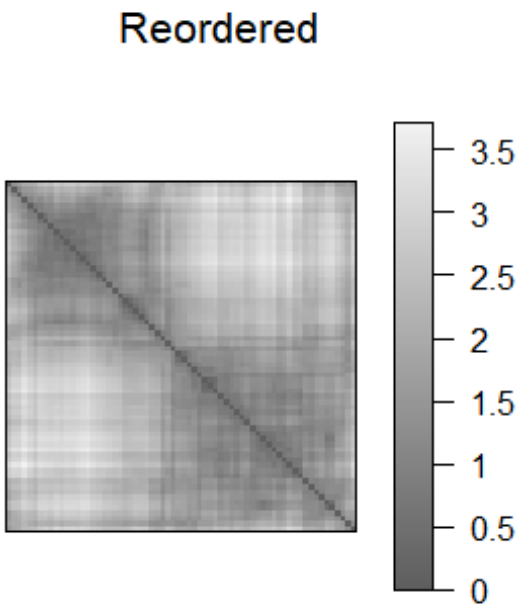


Seration Analysis:

```
x<-as.matrix(csim_b)
x<-x[sample(seq_len(nrow(x))),]
d<-dist(x)
o<-seriate(d,method="OLO")
pimage(d,main="Original")
```



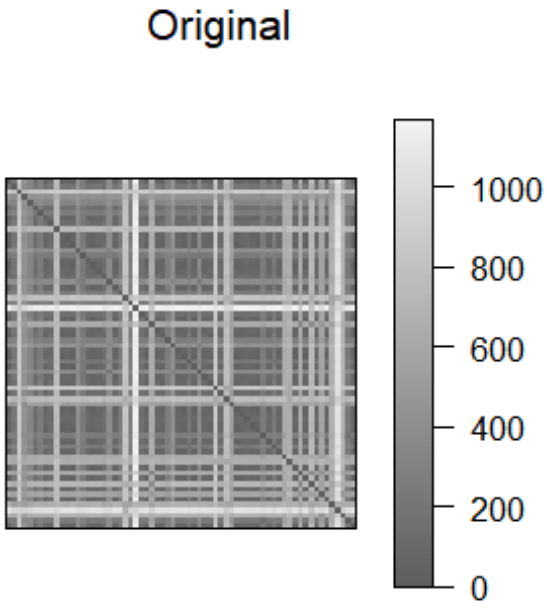

```
pimage(d,o,main="Reordered")
```



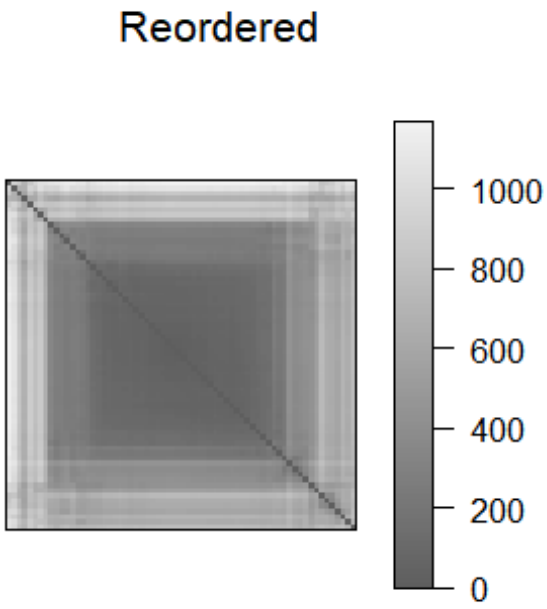

```
get_order(o)
```

```
##  [1] 24 64 26 45  4 13 40  3 51 57 31 21 46 39 65 61  6 12 38 44 30 22 59
## [24] 35 23 54 49 42 17 66  5 32 63 36 48  8 10 47  7 19 60 43 33 14 29  9
## [47] 50 52 20 55 37 34 28 41  1  2 56 62 18 25 53 16 27 11 15 58
```

```
x1<-as.matrix(dtm_b)
x1<-x1[sample(seq_len(nrow(x1))),]
d1<-dist(x1)
o1<-seriate(d1,method="OLO")
pimage(d1,main="Original")
```




```
pimage(d1,o1,main="Reordered")
```




```
get_order(o1)
```

```
##  [1] 25 63 23 62  3 42 40 54  5 24 31 22  7 49 65  2 19 41 16 59 39 50 47
## [24]  8 30 12 61 48 11 36 27 44 13  1 34 55 57 17 66 52 45 33 21 29 38 18
## [47] 46  9  6 26 51 35 15 32 37 20 14  4 43 58 28 56 60 64 53 10
```

Report

The bible was collapsed into 66 books of old and new testament. An analysis on bible was performed based on the 7 sections. From the analysis, it is evident that the words “the” is the most frequently repeated word followed by “Jehovah”.