Year Level Topic Modeling of Movies over 100 Years

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December 19, 2015

Part 2 - Year level movie genre analysis

```r
#libraries used
set.seed(1000)
library(xlsx)
```

```
## Loading required package: rJava
```

```
## Warning: package 'rJava' was built under R version 3.2.3
```

```
## Loading required package: xlsxjars
```

```r
library(dplyr)
```

```
## Warning: package 'dplyr' was built under R version 3.2.3
```

```
##
## 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
```

```r
library(tm)
```

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

```r
library(ggplot2)
```

```
## Warning: package 'ggplot2' was built under R version 3.2.3
```

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

```r
library(lsa)
```

```
## Warning: package 'lsa' was built under R version 3.2.3
```

```
## Loading required package: SnowballC
##
## Attaching package: 'lsa'
##
## The following object is masked from 'package:dplyr':
##
##     query
```

```r
library(scatterplot3d)
library(SnowballC)
library(NLP)
library(RColorBrewer)
```

```
## Warning: package 'RColorBrewer' was built under R version 3.2.3
```

```r
library(wordcloud)
```

```
## Warning: package 'wordcloud' was built under R version 3.2.3
```

```r
library(topicmodels)
library(reshape2)
library(stats)
library(RColorBrewer)
#install.packages("RColorBrewer")




set.seed(1000)
# year level analysis
year_data <- read.csv("movieTagline.csv",header = TRUE)

#Splitting the data into each year and saving each file as a text document
year_data = tbl_df(year_data)

for ( m in 1915:2014){
  year_data1=filter(year_data, year== m)
  year_data1=select(year_data1,c(4))
  write.table(year_data1, file =sprintf("%s.txt",m),row.names=FALSE)}

#Specifying the directory name and creating a corpus
dirname <- file.path("C:/Users/Kaushik Nuvvula/Desktop/EDA/Final_Exam/", "year_files")
docs <- Corpus(DirSource(dirname, encoding = "UTF-8"))
meta(docs[[1]])
```

```
##   author       : character(0)
```

```
##    datetimestamp: 2016-02-21 02:24:07
##    description  : character(0)
##    heading      : character(0)
##    id           : 1915.txt
##    language     : en
##    origin       : character(0)
```

```r
# The following steps pre-process the raw text documents.

# 1) Remove punctuations and numbers because they are generally uninformative.
docs <- tm_map(docs, removePunctuation)
docs <- tm_map(docs, removeNumbers)

# 2) Convert all words to lowercase.
docs <- tm_map(docs, content_transformer(tolower))

# 3) Remove stopwords such as "a", "the", etc.
docs <- tm_map(docs, removeWords, stopwords("english"))

# 4) Use the SnowballC package to do stemming.
#install.packages("SnowballC")
docs <- tm_map(docs, stemDocument)

# 5) Remove excess white spaces between words.
docs <- tm_map(docs, stripWhitespace)


# Inspect the first document to see what it looks like.
docs[[1]]$content
```

```
##  [1] "taglin"
##  [2] " show man may rise steppingston dead self higher thing origin ad fourpiec mutual masterpiec or
##  [3] " one first authent horror movi film dare made today brilliant horrifi enthral"
##  [4] " tale woman whose heart deaden sens right wrong whose devot win man choic"
##  [5] " mighti spectacl dawn new art fieri cross ku klux klan lincoln assassin fatal blow rob south be
##  [6] " pictur success play origin poster"
##  [7] " emphat greatest film ever produc ceasless cataract action serial wonder"
##  [8] " thrill humor photoadapt famous melodramat comedi"
##  [9] " destini dark angel"
## [10] " destini dark angel"
## [11] " oti skinner great stage success origin poster"
```
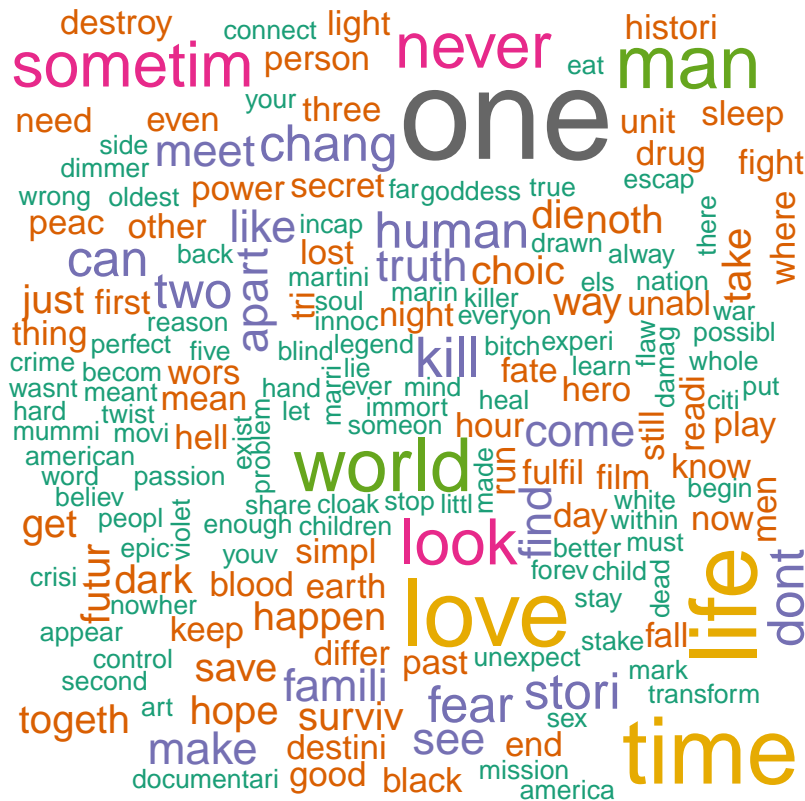
```r
# Lets visualize the entire corpus

pal <- brewer.pal(8, "Dark2")

# Inspect the words in 1915 document to see what it looks like.
#from the word bubble we see words like success, poster, origin more frequently
wordcloud(docs[1], min.freq=1, max.words = 200, random.order = TRUE, col = pal )
```

3

```r
# Inspect the words in 2014 document to see what it looks like.
#from the word bubble we see words like love, time, world  adventure kill more frequently
wordcloud(docs[100], min.freq=2, max.words = 200, random.order = TRUE, col = pal )
```

```
## Warning in wordcloud(docs[100], min.freq = 2, max.words = 200, random.order
## = TRUE, : live could not be fit on page. It will not be plotted.

## Warning in wordcloud(docs[100], min.freq = 2, max.words = 200, random.order
## = TRUE, : freedom could not be fit on page. It will not be plotted.

## Warning in wordcloud(docs[100], min.freq = 2, max.words = 200, random.order
## = TRUE, : will could not be fit on page. It will not be plotted.

## Warning in wordcloud(docs[100], min.freq = 2, max.words = 200, random.order
## = TRUE, : everyth could not be fit on page. It will not be plotted.

## Warning in wordcloud(docs[100], min.freq = 2, max.words = 200, random.order
## = TRUE, : death could not be fit on page. It will not be plotted.

## Warning in wordcloud(docs[100], min.freq = 2, max.words = 200, random.order
## = TRUE, : dream could not be fit on page. It will not be plotted.
```

```r
# Convert all documents to a term frequency matrix.
tfm <- DocumentTermMatrix(docs)

# We can check the dimension of this matrix by calling dim()
print(dim(tfm))
```

```
## [1]   100 25162
```

```r
# Use topicmodels package to conduct LDA analysis.
# As we got good topic split for k=7 in our decade  level analysis, I choose k=7 in this case as well.

set.seed(1000)
results <- LDA(tfm, k = 7, method = "Gibbs")

# Obtain the top ten words (i.e., the 10 most probable words) for each topic.
Terms <- terms(results, 10)
Terms
```

```
##       Topic 1   Topic 2   Topic 3         Topic 4    Topic 5      Topic 6
## [1,] "origin"  "der"     "sometim"       "talk"     "hes"        "film"
## [2,] "poster"  "danger"  "documentari"   "pictur"   "now"        "see"
## [3,] "cap"     "flight"  "short"         "grip"     "adventur"   "love"
## [4,] "thrill"  "und"     "what"          "none"     "video"      "man"
## [5,] "print"   "amor"    "drama"         "novel"    "cop"        "world"
## [6,] "love"    "ein"     "memori"        "scene"    "australia"  "ever"
```

```
##  [7,] "romanc"   "case"   "inspir"        "masterpiec" "game"     "stori"
##  [8,] "adventur" "feet"   "chang"         "tomb"       "murder"   "pictur"
##  [9,] "drama"    "una"    "artist"        "dash"       "nightmar" "men"
## [10,] "screen"   "fight"  "relationship"  "privat"     "action"   "girl"
##       Topic 7
##  [1,] "one"
##  [2,] "love"
##  [3,] "life"
##  [4,] "will"
##  [5,] "can"
##  [6,] "world"
##  [7,] "stori"
##  [8,] "man"
##  [9,] "get"
## [10,] "time"
```

```r
# Obtain the most likely topic assignment for each document.
Topic <- topics(results, 1)
Topic
```

```
## 1915.txt 1916.txt 1917.txt 1918.txt 1919.txt 1920.txt 1921.txt 1922.txt
##        1        1        7        1        1        1        1        1
## 1923.txt 1924.txt 1925.txt 1926.txt 1927.txt 1928.txt 1929.txt 1930.txt
##        1        1        1        1        1        1        1        1
## 1931.txt 1932.txt 1933.txt 1934.txt 1935.txt 1936.txt 1937.txt 1938.txt
##        1        1        1        1        1        1        1        1
## 1939.txt 1940.txt 1941.txt 1942.txt 1943.txt 1944.txt 1945.txt 1946.txt
##        1        1        1        1        1        1        1        1
## 1947.txt 1948.txt 1949.txt 1950.txt 1951.txt 1952.txt 1953.txt 1954.txt
##        1        1        1        1        1        1        1        1
## 1955.txt 1956.txt 1957.txt 1958.txt 1959.txt 1960.txt 1961.txt 1962.txt
##        6        6        6        6        6        6        6        6
## 1963.txt 1964.txt 1965.txt 1966.txt 1967.txt 1968.txt 1969.txt 1970.txt
##        6        6        7        6        7        7        7        7
## 1971.txt 1972.txt 1973.txt 1974.txt 1975.txt 1976.txt 1977.txt 1978.txt
##        7        7        7        7        7        7        7        7
## 1979.txt 1980.txt 1981.txt 1982.txt 1983.txt 1984.txt 1985.txt 1986.txt
##        7        7        7        7        7        7        7        7
## 1987.txt 1988.txt 1989.txt 1990.txt 1991.txt 1992.txt 1993.txt 1994.txt
##        7        7        7        7        7        7        7        7
## 1995.txt 1996.txt 1997.txt 1998.txt 1999.txt 2000.txt 2001.txt 2002.txt
##        7        7        7        7        7        7        7        7
## 2003.txt 2004.txt 2005.txt 2006.txt 2007.txt 2008.txt 2009.txt 2010.txt
##        7        7        7        7        7        7        7        7
## 2011.txt 2012.txt 2013.txt 2014.txt
##        7        7        7        7
```

```r
# Get the posterior probability for each document over each topic
posterior <- posterior(results)[[2]]
posterior
```

```
##                        1          2          3          4          5
## 1915.txt 0.262056415 0.064604186 0.096451319 0.115559600 0.05823476
```

```
## 1916.txt 0.312256050 0.039032006 0.077283372 0.142857143 0.06088993
## 1917.txt 0.208128079 0.104679803 0.113300493 0.104679803 0.09605911
## 1918.txt 0.276135742 0.034756431 0.032840722 0.140120416 0.04050356
## 1919.txt 0.371002132 0.040156361 0.047619048 0.087420043 0.04513149
## 1920.txt 0.497753819 0.063791554 0.070080863 0.101527403 0.05750225
## 1921.txt 0.442673207 0.039239730 0.052115267 0.086450031 0.04782342
## 1922.txt 0.375595238 0.046428571 0.088095238 0.092261905 0.05892857
## 1923.txt 0.452571429 0.068571429 0.056571429 0.108571429 0.04857143
## 1924.txt 0.449532409 0.034182522 0.022895840 0.097387939 0.04095453
## 1925.txt 0.436974790 0.043785935 0.046881911 0.077841663 0.04068996
## 1926.txt 0.590928359 0.036032217 0.027130140 0.071640526 0.04196694
## 1927.txt 0.404074903 0.022376634 0.033093864 0.131197739 0.02979625
## 1928.txt 0.421895861 0.008981673 0.023425173 0.172533074 0.01492900
## 1929.txt 0.509815766 0.023557838 0.019329508 0.160978556 0.03624283
## 1930.txt 0.599960372 0.021596988 0.022290470 0.076382009 0.02298395
## 1931.txt 0.489254109 0.029077118 0.037926675 0.077749684 0.03792668
## 1932.txt 0.504572690 0.021128981 0.022232734 0.077420372 0.03327026
## 1933.txt 0.567008238 0.019891501 0.045207957 0.052240305 0.04239502
## 1934.txt 0.451117848 0.016104585 0.030693444 0.047934824 0.07180750
## 1935.txt 0.682980600 0.013999118 0.013227513 0.023258377 0.03097443
## 1936.txt 0.662109620 0.022074501 0.016806723 0.028220243 0.01680672
## 1937.txt 0.604139262 0.033236867 0.016048408 0.050425327 0.01973165
## 1938.txt 0.692344383 0.009539709 0.015104539 0.032911996 0.01176564
## 1939.txt 0.600414830 0.015296863 0.016385792 0.027275084 0.02437127
## 1940.txt 0.648345052 0.012090551 0.009089350 0.029497513 0.04870520
## 1941.txt 0.667215589 0.008714148 0.011115685 0.023123370 0.02120214
## 1942.txt 0.702717831 0.011816655 0.010075253 0.012252006 0.02705392
## 1943.txt 0.737538755 0.010493680 0.007572144 0.010911042 0.02217982
## 1944.txt 0.673420658 0.013917315 0.006276436 0.023468413 0.04591349
## 1945.txt 0.616105378 0.021998914 0.015344921 0.030554047 0.03435633
## 1946.txt 0.645346907 0.017926303 0.010954963 0.018700896 0.05820516
## 1947.txt 0.632848440 0.021882382 0.017530772 0.012308840 0.03493721
## 1948.txt 0.698976237 0.017845402 0.010613318 0.023762562 0.01521555
## 1949.txt 0.638173302 0.015222482 0.016483516 0.028463340 0.03666006
## 1950.txt 0.660665002 0.019450651 0.011170982 0.015770798 0.02865028
## 1951.txt 0.477933045 0.010656479 0.019804966 0.008545290 0.02543480
## 1952.txt 0.398242630 0.021258503 0.019274376 0.017290249 0.04308390
## 1953.txt 0.490724896 0.011089055 0.017318092 0.023547128 0.02402629
## 1954.txt 0.371728872 0.017374517 0.021128271 0.044401544 0.03764479
## 1955.txt 0.290760013 0.041311889 0.024387680 0.033217702 0.02806686
## 1956.txt 0.332839872 0.016777696 0.006990706 0.015050580 0.02714039
## 1957.txt 0.294947609 0.024795103 0.012449424 0.014628073 0.04803403
## 1958.txt 0.319944790 0.025258799 0.017529331 0.027191166 0.03878537
## 1959.txt 0.188920012 0.038593215 0.013901857 0.031331051 0.05239133
## 1960.txt 0.201021961 0.020656664 0.024461840 0.027505980 0.02826701
## 1961.txt 0.187391185 0.012920370 0.018693302 0.029597727 0.05589664
## 1962.txt 0.081312599 0.019504481 0.011201898 0.027807064 0.04533474
## 1963.txt 0.184463195 0.023567064 0.028658714 0.055135292 0.05208030
## 1964.txt 0.101194805 0.016103896 0.032103896 0.032831169 0.02992208
## 1965.txt 0.058927275 0.020437805 0.016806723 0.034235917 0.08579728
## 1966.txt 0.089229666 0.019549816 0.012644606 0.021433055 0.07353601
## 1967.txt 0.079172741 0.033892128 0.017948251 0.049198251 0.07917274
## 1968.txt 0.099964330 0.013822008 0.029427501 0.024433744 0.08935259
## 1969.txt 0.060738954 0.022365969 0.026970727 0.023900888 0.08146037
```

```
## 1970.txt 0.061143236 0.023983316 0.016020476 0.027964736 0.13280880
## 1971.txt 0.045326483 0.011103745 0.030825323 0.028505138 0.10101094
## 1972.txt 0.034064441 0.017760093 0.039499224 0.030667702 0.15838509
## 1973.txt 0.042372208 0.020112887 0.024564751 0.008426743 0.17815407
## 1974.txt 0.030566994 0.013937282 0.011165664 0.024469433 0.20628761
## 1975.txt 0.020730332 0.023158990 0.024980484 0.031659294 0.18405759
## 1976.txt 0.026058357 0.020155170 0.025468038 0.030190589 0.19961208
## 1977.txt 0.038745933 0.013211082 0.016661737 0.012520950 0.20989845
## 1978.txt 0.039277231 0.020868680 0.016118086 0.042246352 0.18951476
## 1979.txt 0.048827007 0.010776273 0.014114057 0.010108716 0.19568949
## 1980.txt 0.027051042 0.031197552 0.015993682 0.037417317 0.25441801
## 1981.txt 0.018294170 0.017155866 0.018863322 0.042767705 0.19871534
## 1982.txt 0.031383829 0.011249601 0.013934164 0.018408437 0.25465005
## 1983.txt 0.023082274 0.020426232 0.015556820 0.016884842 0.25327262
## 1984.txt 0.028724069 0.022410324 0.008811490 0.021924651 0.25699022
## 1985.txt 0.029832148 0.014439639 0.017005058 0.012387305 0.23455252
## 1986.txt 0.019316584 0.010758604 0.016321291 0.027874564 0.19304358
## 1987.txt 0.035482876 0.009564949 0.016476396 0.015612465 0.17932737
## 1988.txt 0.016229393 0.018923600 0.009942908 0.017576496 0.20662005
## 1989.txt 0.022438826 0.027413951 0.032033709 0.041273226 0.21611331
## 1990.txt 0.023278497 0.023278497 0.037843813 0.018271669 0.21490344
## 1991.txt 0.022519696 0.027400125 0.030816426 0.038625113 0.19235864
## 1992.txt 0.019204494 0.044177926 0.023455291 0.028237437 0.14832245
## 1993.txt 0.023823654 0.051716829 0.040440865 0.023230182 0.16447647
## 1994.txt 0.012120168 0.059566891 0.024584985 0.021770349 0.13274743
## 1995.txt 0.012385223 0.081518258 0.027706598 0.023969678 0.14018791
## 1996.txt 0.013650583 0.100246469 0.031566973 0.015641293 0.08962935
## 1997.txt 0.008605376 0.068290372 0.021039751 0.020487112 0.11388308
## 1998.txt 0.011980396 0.070684335 0.055436558 0.016300599 0.08948993
## 1999.txt 0.006716866 0.105702266 0.042599074 0.017357797 0.06066391
## 2000.txt 0.007477204 0.115136778 0.048115502 0.005349544 0.05492401
## 2001.txt 0.011657875 0.110629381 0.031047523 0.018233495 0.04689645
## 2002.txt 0.009776384 0.075315174 0.050318984 0.018006837 0.06967579
## 2003.txt 0.009682110 0.075137593 0.059546818 0.028622968 0.03223075
## 2004.txt 0.012605939 0.060621304 0.093271752 0.008551308 0.03245229
## 2005.txt 0.005201658 0.014260586 0.108895590 0.018218369 0.03827114
## 2006.txt 0.003884668 0.011845217 0.109132995 0.036219997 0.03023197
## 2007.txt 0.009870872 0.009799418 0.128770479 0.030449650 0.02930638
## 2008.txt 0.004529191 0.013081421 0.142647700 0.023283009 0.02933066
## 2009.txt 0.002631172 0.013123274 0.143020064 0.014833943 0.02258898
## 2010.txt 0.003725362 0.015874244 0.117089132 0.024850488 0.02167785
## 2011.txt 0.008523212 0.008971241 0.129117597 0.028161802 0.02047064
## 2012.txt 0.012866274 0.006111480 0.130603055 0.013737860 0.02797377
## 2013.txt 0.005470673 0.027158614 0.120354797 0.011791158 0.01426978
## 2014.txt 0.017757752 0.038165916 0.068778161 0.017757752 0.02517890
##                          6          7
## 1915.txt 0.16014559 0.24294813
## 1916.txt 0.11553474 0.25214676
## 1917.txt 0.11330049 0.25985222
## 1918.txt 0.20908593 0.26655720
## 1919.txt 0.12722104 0.28144989
## 1920.txt 0.12039533 0.08894879
## 1921.txt 0.15082771 0.18087063
## 1922.txt 0.09226190 0.24642857
```
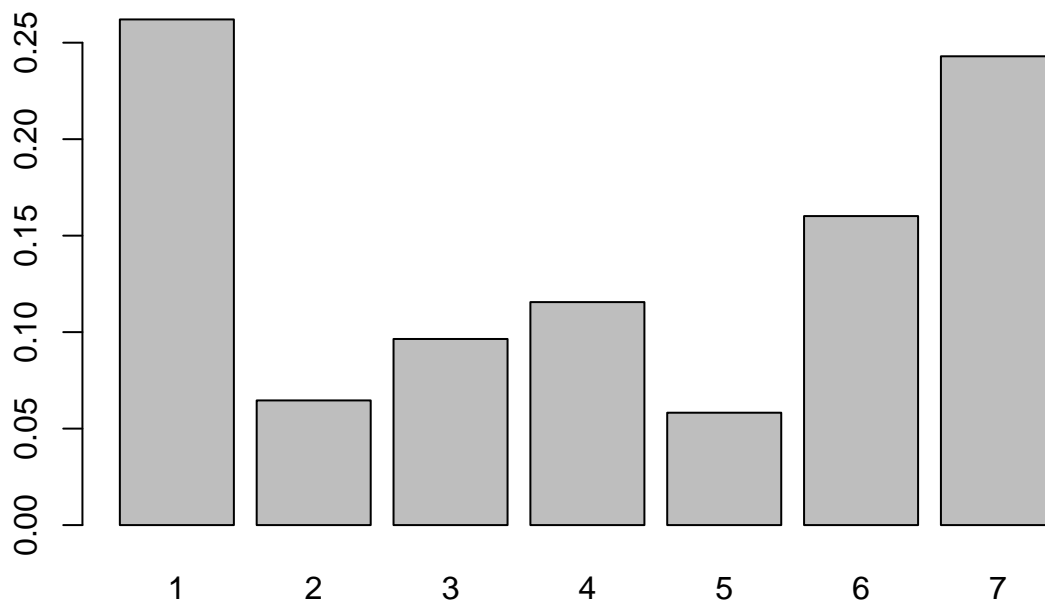
```
## 1923.txt 0.12857143 0.13657143
## 1924.txt 0.14479200 0.21025476
## 1925.txt 0.09332154 0.26050420
## 1926.txt 0.04493429 0.18736753
## 1927.txt 0.08997762 0.28948298
## 1928.txt 0.05995873 0.29827649
## 1929.txt 0.08064029 0.16943522
## 1930.txt 0.09233208 0.16445413
## 1931.txt 0.12420986 0.20385588
## 1932.txt 0.15468307 0.18669190
## 1933.txt 0.11271851 0.16053848
## 1934.txt 0.16729822 0.21504358
## 1935.txt 0.08190035 0.15365961
## 1936.txt 0.09757933 0.15640286
## 1937.txt 0.08909936 0.18731913
## 1938.txt 0.09523810 0.14309564
## 1939.txt 0.09660358 0.21965258
## 1940.txt 0.09192248 0.16034985
## 1941.txt 0.09276794 0.17586112
## 1942.txt 0.08669693 0.14938740
## 1943.txt 0.05849034 0.15281421
## 1944.txt 0.10751808 0.12948561
## 1945.txt 0.12370994 0.15793047
## 1946.txt 0.09538564 0.15348014
## 1947.txt 0.08193460 0.19855775
## 1948.txt 0.10463041 0.12895651
## 1949.txt 0.07890470 0.18609260
## 1950.txt 0.14916546 0.11512682
## 1951.txt 0.24640595 0.21121946
## 1952.txt 0.28845427 0.21239607
## 1953.txt 0.25402149 0.17927305
## 1954.txt 0.29740455 0.21031746
## 1955.txt 0.30842006 0.27383580
## 1956.txt 0.34032404 0.26087672
## 1957.txt 0.35377114 0.25137462
## 1958.txt 0.35665977 0.21463078
## 1959.txt 0.42711900 0.24774354
## 1960.txt 0.43237660 0.26570994
## 1961.txt 0.41189407 0.28360671
## 1962.txt 0.47891407 0.33592514
## 1963.txt 0.38711085 0.26898458
## 1964.txt 0.45464935 0.33319481
## 1965.txt 0.33198465 0.45181035
## 1966.txt 0.48094341 0.30266344
## 1967.txt 0.34830539 0.39231050
## 1968.txt 0.32842875 0.41457107
## 1969.txt 0.32014034 0.46442276
## 1970.txt 0.27282207 0.46525737
## 1971.txt 0.25762347 0.52560491
## 1972.txt 0.28270575 0.43691770
## 1973.txt 0.21543843 0.51093092
## 1974.txt 0.16914793 0.54442509
## 1975.txt 0.19316506 0.52224824
## 1976.txt 0.18426379 0.51425198
```

```
## 1977.txt 0.22646160 0.48250025
## 1978.txt 0.17170003 0.52027486
## 1979.txt 0.14028228 0.58020217
## 1980.txt 0.10929016 0.52463224
## 1981.txt 0.09285308 0.61135052
## 1982.txt 0.10744647 0.56292745
## 1983.txt 0.09568077 0.57509644
## 1984.txt 0.04620828 0.61493097
## 1985.txt 0.07908818 0.61269516
## 1986.txt 0.05568800 0.67699737
## 1987.txt 0.10459735 0.63893860
## 1988.txt 0.07415485 0.65655270
## 1989.txt 0.04838055 0.61234643
## 1990.txt 0.05013330 0.63229079
## 1991.txt 0.04106533 0.64721467
## 1992.txt 0.06968271 0.66691969
## 1993.txt 0.04459517 0.65171683
## 1994.txt 0.04669998 0.70251020
## 1995.txt 0.03368567 0.68054666
## 1996.txt 0.03256233 0.71670301
## 1997.txt 0.04342162 0.72427269
## 1998.txt 0.04120530 0.71490289
## 1999.txt 0.04061937 0.72634072
## 2000.txt 0.02939210 0.73960486
## 2001.txt 0.02582075 0.75571453
## 2002.txt 0.03187667 0.74503016
## 2003.txt 0.03068456 0.76409520
## 2004.txt 0.03351930 0.75897811
## 2005.txt 0.02463877 0.79051388
## 2006.txt 0.02086248 0.78782267
## 2007.txt 0.02730567 0.76449752
## 2008.txt 0.02132821 0.76579981
## 2009.txt 0.01745697 0.78634560
## 2010.txt 0.02067189 0.79611103
## 2011.txt 0.01875320 0.78600230
## 2012.txt 0.01780526 0.79090230
## 2013.txt 0.02926544 0.79168953
## 2014.txt 0.04002120 0.79234031
```

```r
#look at the posterior topic distribution for the first document and plot it visually
posterior(results)[[2]][1,]
```

```
##          1          2          3          4          5          6
## 0.26205641 0.06460419 0.09645132 0.11555960 0.05823476 0.16014559
##          7
## 0.24294813
```

```r
barplot(posterior(results)[[2]][1,])
```

```r
# Appending year column to the probability table
year = c(1915:2014)

posterior1 = cbind(posterior, year)

posterior_sort <- posterior1[order(year),]
posterior_sort
```

```
##                     1           2           3           4          5
## 1915.txt 0.262056415 0.064604186 0.096451319 0.115559600 0.05823476
## 1916.txt 0.312256050 0.039032006 0.077283372 0.142857143 0.06088993
## 1917.txt 0.208128079 0.104679803 0.113300493 0.104679803 0.09605911
## 1918.txt 0.276135742 0.034756431 0.032840722 0.140120416 0.04050356
## 1919.txt 0.371002132 0.040156361 0.047619048 0.087420043 0.04513149
## 1920.txt 0.497753819 0.063791554 0.070080863 0.101527403 0.05750225
## 1921.txt 0.442673207 0.039239730 0.052115267 0.086450031 0.04782342
## 1922.txt 0.375595238 0.046428571 0.088095238 0.092261905 0.05892857
## 1923.txt 0.452571429 0.068571429 0.056571429 0.108571429 0.04857143
## 1924.txt 0.449532409 0.034182522 0.022895840 0.097387939 0.04095453
## 1925.txt 0.436974790 0.043785935 0.046881911 0.077841663 0.04068996
## 1926.txt 0.590928359 0.036032217 0.027130140 0.071640526 0.04196694
## 1927.txt 0.404074903 0.022376634 0.033093864 0.131197739 0.02979625
## 1928.txt 0.421895861 0.008981673 0.023425173 0.172533074 0.01492900
## 1929.txt 0.509815766 0.023557838 0.019329508 0.160978556 0.03624283
## 1930.txt 0.599960372 0.021596988 0.022290470 0.076382009 0.02298395
## 1931.txt 0.489254109 0.029077118 0.037926675 0.077749684 0.03792668
```

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```
## 1932.txt 0.504572690 0.021128981 0.022232734 0.077420372 0.03327026
## 1933.txt 0.567008238 0.019891501 0.045207957 0.052240305 0.04239502
## 1934.txt 0.451117848 0.016104585 0.030693444 0.047934824 0.07180750
## 1935.txt 0.682980600 0.013999118 0.013227513 0.023258377 0.03097443
## 1936.txt 0.662109620 0.022074501 0.016806723 0.028220243 0.01680672
## 1937.txt 0.604139262 0.033236867 0.016048408 0.050425327 0.01973165
## 1938.txt 0.692344383 0.009539709 0.015104539 0.032911996 0.01176564
## 1939.txt 0.600414830 0.015296863 0.016385792 0.027275084 0.02437127
## 1940.txt 0.648345052 0.012090551 0.009089350 0.029497513 0.04870520
## 1941.txt 0.667215589 0.008714148 0.011115685 0.023123370 0.02120214
## 1942.txt 0.702717831 0.011816655 0.010075253 0.012252006 0.02705392
## 1943.txt 0.737538755 0.010493680 0.007572144 0.010911042 0.02217982
## 1944.txt 0.673420658 0.013917315 0.006276436 0.023468413 0.04591349
## 1945.txt 0.616105378 0.021998914 0.015344921 0.030554047 0.03435633
## 1946.txt 0.645346907 0.017926303 0.010954963 0.018700896 0.05820516
## 1947.txt 0.632848440 0.021882382 0.017530772 0.012308840 0.03493721
## 1948.txt 0.698976237 0.017845402 0.010613318 0.023762562 0.01521555
## 1949.txt 0.638173302 0.015222482 0.016483516 0.028463340 0.03666006
## 1950.txt 0.660665002 0.019450651 0.011170982 0.015770798 0.02865028
## 1951.txt 0.477933045 0.010656479 0.019804966 0.008545290 0.02543480
## 1952.txt 0.398242630 0.021258503 0.019274376 0.017290249 0.04308390
## 1953.txt 0.490724896 0.011089055 0.017318092 0.023547128 0.02402629
## 1954.txt 0.371728872 0.017374517 0.021128271 0.044401544 0.03764479
## 1955.txt 0.290760013 0.041311889 0.024387680 0.033217702 0.02806686
## 1956.txt 0.332839872 0.016777696 0.006990706 0.015050580 0.02714039
## 1957.txt 0.294947609 0.024795103 0.012449424 0.014628073 0.04803403
## 1958.txt 0.319944790 0.025258799 0.017529331 0.027191166 0.03878537
## 1959.txt 0.188920012 0.038593215 0.013901857 0.031331051 0.05239133
## 1960.txt 0.201021961 0.020656664 0.024461840 0.027505980 0.02826701
## 1961.txt 0.187391185 0.012920370 0.018693302 0.029597727 0.05589664
## 1962.txt 0.081312599 0.019504481 0.011201898 0.027807064 0.04533474
## 1963.txt 0.184463195 0.023567064 0.028658714 0.055135292 0.05208030
## 1964.txt 0.101194805 0.016103896 0.032103896 0.032831169 0.02992208
## 1965.txt 0.058927275 0.020437805 0.016806723 0.034235917 0.08579728
## 1966.txt 0.089229666 0.019549816 0.012644606 0.021433055 0.07353601
## 1967.txt 0.079172741 0.033892128 0.017948251 0.049198251 0.07917274
## 1968.txt 0.099964330 0.013822008 0.029427501 0.024433744 0.08935259
## 1969.txt 0.060738954 0.022365969 0.026970727 0.023900888 0.08146037
## 1970.txt 0.061143236 0.023983316 0.016020476 0.027964736 0.13280880
## 1971.txt 0.045326483 0.011103745 0.030825323 0.028505138 0.10101094
## 1972.txt 0.034064441 0.017760093 0.039499224 0.030667702 0.15838509
## 1973.txt 0.042372208 0.020112887 0.024564751 0.008426743 0.17815407
## 1974.txt 0.030566994 0.013937282 0.011165664 0.024469433 0.20628761
## 1975.txt 0.020730332 0.023158990 0.024980484 0.031659294 0.18405759
## 1976.txt 0.026058357 0.020155170 0.025468038 0.030190589 0.19961208
## 1977.txt 0.038745933 0.013211082 0.016661737 0.012520950 0.20989845
## 1978.txt 0.039277231 0.020868680 0.016118086 0.042246352 0.18951476
## 1979.txt 0.048827007 0.010776273 0.014114057 0.010108716 0.19568949
## 1980.txt 0.027051042 0.031197552 0.015993682 0.037417317 0.25441801
## 1981.txt 0.018294170 0.017155866 0.018863322 0.042767705 0.19871534
## 1982.txt 0.031383829 0.011249601 0.013934164 0.018408437 0.25465005
## 1983.txt 0.023082274 0.020426232 0.015556820 0.016884842 0.25327262
## 1984.txt 0.028724069 0.022410324 0.008811490 0.021924651 0.25699022
## 1985.txt 0.029832148 0.014439639 0.017005058 0.012387305 0.23455252
```

```
## 1986.txt 0.019316584 0.010758604 0.016321291 0.027874564 0.19304358
## 1987.txt 0.035482876 0.009564949 0.016476396 0.015612465 0.17932737
## 1988.txt 0.016229393 0.018923600 0.009942908 0.017576496 0.20662005
## 1989.txt 0.022438826 0.027413951 0.032033709 0.041273226 0.21611331
## 1990.txt 0.023278497 0.023278497 0.037843813 0.018271669 0.21490344
## 1991.txt 0.022519696 0.027400125 0.030816426 0.038625113 0.19235864
## 1992.txt 0.019204494 0.044177926 0.023455291 0.028237437 0.14832245
## 1993.txt 0.023823654 0.051716829 0.040440865 0.023230182 0.16447647
## 1994.txt 0.012120168 0.059566891 0.024584985 0.021770349 0.13274743
## 1995.txt 0.012385223 0.081518258 0.027706598 0.023969678 0.14018791
## 1996.txt 0.013650583 0.100246469 0.031566973 0.015641293 0.08962935
## 1997.txt 0.008605376 0.068290372 0.021039751 0.020487112 0.11388308
## 1998.txt 0.011980396 0.070684335 0.055436558 0.016300599 0.08948993
## 1999.txt 0.006716866 0.105702266 0.042599074 0.017357797 0.06066391
## 2000.txt 0.007477204 0.115136778 0.048115502 0.005349544 0.05492401
## 2001.txt 0.011657875 0.110629381 0.031047523 0.018233495 0.04689645
## 2002.txt 0.009776384 0.075315174 0.050318984 0.018006837 0.06967579
## 2003.txt 0.009682110 0.075137593 0.059546818 0.028622968 0.03223075
## 2004.txt 0.012605939 0.060621304 0.093271752 0.008551308 0.03245229
## 2005.txt 0.005201658 0.014260586 0.108895590 0.018218369 0.03827114
## 2006.txt 0.003884668 0.011845217 0.109132995 0.036219997 0.03023197
## 2007.txt 0.009870872 0.009799418 0.128770479 0.030449650 0.02930638
## 2008.txt 0.004529191 0.013081421 0.142647700 0.023283009 0.02933066
## 2009.txt 0.002631172 0.013123274 0.143020064 0.014833943 0.02258898
## 2010.txt 0.003725362 0.015874244 0.117089132 0.024850488 0.02167785
## 2011.txt 0.008523212 0.008971241 0.129117597 0.028161802 0.02047064
## 2012.txt 0.012866274 0.006111480 0.130603055 0.013737860 0.02797377
## 2013.txt 0.005470673 0.027158614 0.120354797 0.011791158 0.01426978
## 2014.txt 0.017757752 0.038165916 0.068778161 0.017757752 0.02517890
##                 6          7 year
## 1915.txt 0.16014559 0.24294813 1915
## 1916.txt 0.11553474 0.25214676 1916
## 1917.txt 0.11330049 0.25985222 1917
## 1918.txt 0.20908593 0.26655720 1918
## 1919.txt 0.12722104 0.28144989 1919
## 1920.txt 0.12039533 0.08894879 1920
## 1921.txt 0.15082771 0.18087063 1921
## 1922.txt 0.09226190 0.24642857 1922
## 1923.txt 0.12857143 0.13657143 1923
## 1924.txt 0.14479200 0.21025476 1924
## 1925.txt 0.09332154 0.26050420 1925
## 1926.txt 0.04493429 0.18736753 1926
## 1927.txt 0.08997762 0.28948298 1927
## 1928.txt 0.05995873 0.29827649 1928
## 1929.txt 0.08064029 0.16943522 1929
## 1930.txt 0.09233208 0.16445413 1930
## 1931.txt 0.12420986 0.20385588 1931
## 1932.txt 0.15468307 0.18669190 1932
## 1933.txt 0.11271851 0.16053848 1933
## 1934.txt 0.16729822 0.21504358 1934
## 1935.txt 0.08190035 0.15365961 1935
## 1936.txt 0.09757933 0.15640286 1936
## 1937.txt 0.08909936 0.18731913 1937
## 1938.txt 0.09523810 0.14309564 1938
```

```
## 1939.txt 0.09660358 0.21965258 1939
## 1940.txt 0.09192248 0.16034985 1940
## 1941.txt 0.09276794 0.17586112 1941
## 1942.txt 0.08669693 0.14938740 1942
## 1943.txt 0.05849034 0.15281421 1943
## 1944.txt 0.10751808 0.12948561 1944
## 1945.txt 0.12370994 0.15793047 1945
## 1946.txt 0.09538564 0.15348014 1946
## 1947.txt 0.08193460 0.19855775 1947
## 1948.txt 0.10463041 0.12895651 1948
## 1949.txt 0.07890470 0.18609260 1949
## 1950.txt 0.14916546 0.11512682 1950
## 1951.txt 0.24640595 0.21121946 1951
## 1952.txt 0.28845427 0.21239607 1952
## 1953.txt 0.25402149 0.17927305 1953
## 1954.txt 0.29740455 0.21031746 1954
## 1955.txt 0.30842006 0.27383580 1955
## 1956.txt 0.34032404 0.26087672 1956
## 1957.txt 0.35377114 0.25137462 1957
## 1958.txt 0.35665977 0.21463078 1958
## 1959.txt 0.42711900 0.24774354 1959
## 1960.txt 0.43237660 0.26570994 1960
## 1961.txt 0.41189407 0.28360671 1961
## 1962.txt 0.47891407 0.33592514 1962
## 1963.txt 0.38711085 0.26898458 1963
## 1964.txt 0.45464935 0.33319481 1964
## 1965.txt 0.33198465 0.45181035 1965
## 1966.txt 0.48094341 0.30266344 1966
## 1967.txt 0.34830539 0.39231050 1967
## 1968.txt 0.32842875 0.41457107 1968
## 1969.txt 0.32014034 0.46442276 1969
## 1970.txt 0.27282207 0.46525737 1970
## 1971.txt 0.25762347 0.52560491 1971
## 1972.txt 0.28270575 0.43691770 1972
## 1973.txt 0.21543843 0.51093092 1973
## 1974.txt 0.16914793 0.54442509 1974
## 1975.txt 0.19316506 0.52224824 1975
## 1976.txt 0.18426379 0.51425198 1976
## 1977.txt 0.22646160 0.48250025 1977
## 1978.txt 0.17170003 0.52027486 1978
## 1979.txt 0.14028228 0.58020217 1979
## 1980.txt 0.10929016 0.52463224 1980
## 1981.txt 0.09285308 0.61135052 1981
## 1982.txt 0.10744647 0.56292745 1982
## 1983.txt 0.09568077 0.57509644 1983
## 1984.txt 0.04620828 0.61493097 1984
## 1985.txt 0.07908818 0.61269516 1985
## 1986.txt 0.05568800 0.67699737 1986
## 1987.txt 0.10459735 0.63893860 1987
## 1988.txt 0.07415485 0.65655270 1988
## 1989.txt 0.04838055 0.61234643 1989
## 1990.txt 0.05013330 0.63229079 1990
## 1991.txt 0.04106533 0.64721467 1991
## 1992.txt 0.06968271 0.66691969 1992
```

```
## 1993.txt 0.04459517 0.65171683 1993
## 1994.txt 0.04669998 0.70251020 1994
## 1995.txt 0.03368567 0.68054666 1995
## 1996.txt 0.03256233 0.71670301 1996
## 1997.txt 0.04342162 0.72427269 1997
## 1998.txt 0.04120530 0.71490289 1998
## 1999.txt 0.04061937 0.72634072 1999
## 2000.txt 0.02939210 0.73960486 2000
## 2001.txt 0.02582075 0.75571453 2001
## 2002.txt 0.03187667 0.74503016 2002
## 2003.txt 0.03068456 0.76409520 2003
## 2004.txt 0.03351930 0.75897811 2004
## 2005.txt 0.02463877 0.79051388 2005
## 2006.txt 0.02086248 0.78782267 2006
## 2007.txt 0.02730567 0.76449752 2007
## 2008.txt 0.02132821 0.76579981 2008
## 2009.txt 0.01745697 0.78634560 2009
## 2010.txt 0.02067189 0.79611103 2010
## 2011.txt 0.01875320 0.78600230 2011
## 2012.txt 0.01780526 0.79090230 2012
## 2013.txt 0.02926544 0.79168953 2013
## 2014.txt 0.04002120 0.79234031 2014
```

```r
#posterior_sort1 = posterior_sort[, 1:10]

#GGplot across years
year_plot = as.data.frame.matrix(posterior_sort)

control1 <- melt(year_plot, id.var="year",variable.name = "topic",value.name = "proportion"  )


#Assigning topic names using match and index
index <- c(1, 2, 3, 4,5, 6,7)
values <- c("Thrillers/Action", "Cult/Seasonal", "Science Fiction", "Drama", "Theatrical","Horror/Terror

control1$topicname <- values[match(control1$topic, index)]

#Let us have a look at the melted dataframe
control1
```

```
##       year topic  proportion          topicname
## 1     1915     1 0.262056415 Thrillers/Action
## 2     1916     1 0.312256050 Thrillers/Action
## 3     1917     1 0.208128079 Thrillers/Action
## 4     1918     1 0.276135742 Thrillers/Action
## 5     1919     1 0.371002132 Thrillers/Action
## 6     1920     1 0.497753819 Thrillers/Action
## 7     1921     1 0.442673207 Thrillers/Action
## 8     1922     1 0.375595238 Thrillers/Action
## 9     1923     1 0.452571429 Thrillers/Action
## 10    1924     1 0.449532409 Thrillers/Action
## 11    1925     1 0.436974790 Thrillers/Action
## 12    1926     1 0.590928359 Thrillers/Action
## 13    1927     1 0.404074903 Thrillers/Action
```

```
## 14   1928      1 0.421895861 Thrillers/Action
## 15   1929      1 0.509815766 Thrillers/Action
## 16   1930      1 0.599960372 Thrillers/Action
## 17   1931      1 0.489254109 Thrillers/Action
## 18   1932      1 0.504572690 Thrillers/Action
## 19   1933      1 0.567008238 Thrillers/Action
## 20   1934      1 0.451117848 Thrillers/Action
## 21   1935      1 0.682980600 Thrillers/Action
## 22   1936      1 0.662109620 Thrillers/Action
## 23   1937      1 0.604139262 Thrillers/Action
## 24   1938      1 0.692344383 Thrillers/Action
## 25   1939      1 0.600414830 Thrillers/Action
## 26   1940      1 0.648345052 Thrillers/Action
## 27   1941      1 0.667215589 Thrillers/Action
## 28   1942      1 0.702717831 Thrillers/Action
## 29   1943      1 0.737538755 Thrillers/Action
## 30   1944      1 0.673420658 Thrillers/Action
## 31   1945      1 0.616105378 Thrillers/Action
## 32   1946      1 0.645346907 Thrillers/Action
## 33   1947      1 0.632848440 Thrillers/Action
## 34   1948      1 0.698976237 Thrillers/Action
## 35   1949      1 0.638173302 Thrillers/Action
## 36   1950      1 0.660665002 Thrillers/Action
## 37   1951      1 0.477933045 Thrillers/Action
## 38   1952      1 0.398242630 Thrillers/Action
## 39   1953      1 0.490724896 Thrillers/Action
## 40   1954      1 0.371728872 Thrillers/Action
## 41   1955      1 0.290760013 Thrillers/Action
## 42   1956      1 0.332839872 Thrillers/Action
## 43   1957      1 0.294947609 Thrillers/Action
## 44   1958      1 0.319944790 Thrillers/Action
## 45   1959      1 0.188920012 Thrillers/Action
## 46   1960      1 0.201021961 Thrillers/Action
## 47   1961      1 0.187391185 Thrillers/Action
## 48   1962      1 0.081312599 Thrillers/Action
## 49   1963      1 0.184463195 Thrillers/Action
## 50   1964      1 0.101194805 Thrillers/Action
## 51   1965      1 0.058927275 Thrillers/Action
## 52   1966      1 0.089229666 Thrillers/Action
## 53   1967      1 0.079172741 Thrillers/Action
## 54   1968      1 0.099964330 Thrillers/Action
## 55   1969      1 0.060738954 Thrillers/Action
## 56   1970      1 0.061143236 Thrillers/Action
## 57   1971      1 0.045326483 Thrillers/Action
## 58   1972      1 0.034064441 Thrillers/Action
## 59   1973      1 0.042372208 Thrillers/Action
## 60   1974      1 0.030566994 Thrillers/Action
## 61   1975      1 0.020730332 Thrillers/Action
## 62   1976      1 0.026058357 Thrillers/Action
## 63   1977      1 0.038745933 Thrillers/Action
## 64   1978      1 0.039277231 Thrillers/Action
## 65   1979      1 0.048827007 Thrillers/Action
## 66   1980      1 0.027051042 Thrillers/Action
## 67   1981      1 0.018294170 Thrillers/Action
```

```
## 68  1982     1 0.031383829 Thrillers/Action
## 69  1983     1 0.023082274 Thrillers/Action
## 70  1984     1 0.028724069 Thrillers/Action
## 71  1985     1 0.029832148 Thrillers/Action
## 72  1986     1 0.019316584 Thrillers/Action
## 73  1987     1 0.035482876 Thrillers/Action
## 74  1988     1 0.016229393 Thrillers/Action
## 75  1989     1 0.022438826 Thrillers/Action
## 76  1990     1 0.023278497 Thrillers/Action
## 77  1991     1 0.022519696 Thrillers/Action
## 78  1992     1 0.019204494 Thrillers/Action
## 79  1993     1 0.023823654 Thrillers/Action
## 80  1994     1 0.012120168 Thrillers/Action
## 81  1995     1 0.012385223 Thrillers/Action
## 82  1996     1 0.013650583 Thrillers/Action
## 83  1997     1 0.008605376 Thrillers/Action
## 84  1998     1 0.011980396 Thrillers/Action
## 85  1999     1 0.006716866 Thrillers/Action
## 86  2000     1 0.007477204 Thrillers/Action
## 87  2001     1 0.011657875 Thrillers/Action
## 88  2002     1 0.009776384 Thrillers/Action
## 89  2003     1 0.009682110 Thrillers/Action
## 90  2004     1 0.012605939 Thrillers/Action
## 91  2005     1 0.005201658 Thrillers/Action
## 92  2006     1 0.003884668 Thrillers/Action
## 93  2007     1 0.009870872 Thrillers/Action
## 94  2008     1 0.004529191 Thrillers/Action
## 95  2009     1 0.002631172 Thrillers/Action
## 96  2010     1 0.003725362 Thrillers/Action
## 97  2011     1 0.008523212 Thrillers/Action
## 98  2012     1 0.012866274 Thrillers/Action
## 99  2013     1 0.005470673 Thrillers/Action
## 100 2014     1 0.017757752 Thrillers/Action
## 101 1915     2 0.064604186    Cult/Seasonal
## 102 1916     2 0.039032006    Cult/Seasonal
## 103 1917     2 0.104679803    Cult/Seasonal
## 104 1918     2 0.034756431    Cult/Seasonal
## 105 1919     2 0.040156361    Cult/Seasonal
## 106 1920     2 0.063791554    Cult/Seasonal
## 107 1921     2 0.039239730    Cult/Seasonal
## 108 1922     2 0.046428571    Cult/Seasonal
## 109 1923     2 0.068571429    Cult/Seasonal
## 110 1924     2 0.034182522    Cult/Seasonal
## 111 1925     2 0.043785935    Cult/Seasonal
## 112 1926     2 0.036032217    Cult/Seasonal
## 113 1927     2 0.022376634    Cult/Seasonal
## 114 1928     2 0.008981673    Cult/Seasonal
## 115 1929     2 0.023557838    Cult/Seasonal
## 116 1930     2 0.021596988    Cult/Seasonal
## 117 1931     2 0.029077118    Cult/Seasonal
## 118 1932     2 0.021128981    Cult/Seasonal
## 119 1933     2 0.019891501    Cult/Seasonal
## 120 1934     2 0.016104585    Cult/Seasonal
## 121 1935     2 0.013999118    Cult/Seasonal
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## 122 1936      2 0.022074501    Cult/Seasonal
## 123 1937      2 0.033236867    Cult/Seasonal
## 124 1938      2 0.009539709    Cult/Seasonal
## 125 1939      2 0.015296863    Cult/Seasonal
## 126 1940      2 0.012090551    Cult/Seasonal
## 127 1941      2 0.008714148    Cult/Seasonal
## 128 1942      2 0.011816655    Cult/Seasonal
## 129 1943      2 0.010493680    Cult/Seasonal
## 130 1944      2 0.013917315    Cult/Seasonal
## 131 1945      2 0.021998914    Cult/Seasonal
## 132 1946      2 0.017926303    Cult/Seasonal
## 133 1947      2 0.021882382    Cult/Seasonal
## 134 1948      2 0.017845402    Cult/Seasonal
## 135 1949      2 0.015222482    Cult/Seasonal
## 136 1950      2 0.019450651    Cult/Seasonal
## 137 1951      2 0.010656479    Cult/Seasonal
## 138 1952      2 0.021258503    Cult/Seasonal
## 139 1953      2 0.011089055    Cult/Seasonal
## 140 1954      2 0.017374517    Cult/Seasonal
## 141 1955      2 0.041311889    Cult/Seasonal
## 142 1956      2 0.016777696    Cult/Seasonal
## 143 1957      2 0.024795103    Cult/Seasonal
## 144 1958      2 0.025258799    Cult/Seasonal
## 145 1959      2 0.038593215    Cult/Seasonal
## 146 1960      2 0.020656664    Cult/Seasonal
## 147 1961      2 0.012920370    Cult/Seasonal
## 148 1962      2 0.019504481    Cult/Seasonal
## 149 1963      2 0.023567064    Cult/Seasonal
## 150 1964      2 0.016103896    Cult/Seasonal
## 151 1965      2 0.020437805    Cult/Seasonal
## 152 1966      2 0.019549816    Cult/Seasonal
## 153 1967      2 0.033892128    Cult/Seasonal
## 154 1968      2 0.013822008    Cult/Seasonal
## 155 1969      2 0.022365969    Cult/Seasonal
## 156 1970      2 0.023983316    Cult/Seasonal
## 157 1971      2 0.011103745    Cult/Seasonal
## 158 1972      2 0.017760093    Cult/Seasonal
## 159 1973      2 0.020112887    Cult/Seasonal
## 160 1974      2 0.013937282    Cult/Seasonal
## 161 1975      2 0.023158990    Cult/Seasonal
## 162 1976      2 0.020155170    Cult/Seasonal
## 163 1977      2 0.013211082    Cult/Seasonal
## 164 1978      2 0.020868680    Cult/Seasonal
## 165 1979      2 0.010776273    Cult/Seasonal
## 166 1980      2 0.031197552    Cult/Seasonal
## 167 1981      2 0.017155866    Cult/Seasonal
## 168 1982      2 0.011249601    Cult/Seasonal
## 169 1983      2 0.020426232    Cult/Seasonal
## 170 1984      2 0.022410324    Cult/Seasonal
## 171 1985      2 0.014439639    Cult/Seasonal
## 172 1986      2 0.010758604    Cult/Seasonal
## 173 1987      2 0.009564949    Cult/Seasonal
## 174 1988      2 0.018923600    Cult/Seasonal
## 175 1989      2 0.027413951    Cult/Seasonal
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## 176 1990   2 0.023278497   Cult/Seasonal
## 177 1991   2 0.027400125   Cult/Seasonal
## 178 1992   2 0.044177926   Cult/Seasonal
## 179 1993   2 0.051716829   Cult/Seasonal
## 180 1994   2 0.059566891   Cult/Seasonal
## 181 1995   2 0.081518258   Cult/Seasonal
## 182 1996   2 0.100246469   Cult/Seasonal
## 183 1997   2 0.068290372   Cult/Seasonal
## 184 1998   2 0.070684335   Cult/Seasonal
## 185 1999   2 0.105702266   Cult/Seasonal
## 186 2000   2 0.115136778   Cult/Seasonal
## 187 2001   2 0.110629381   Cult/Seasonal
## 188 2002   2 0.075315174   Cult/Seasonal
## 189 2003   2 0.075137593   Cult/Seasonal
## 190 2004   2 0.060621304   Cult/Seasonal
## 191 2005   2 0.014260586   Cult/Seasonal
## 192 2006   2 0.011845217   Cult/Seasonal
## 193 2007   2 0.009799418   Cult/Seasonal
## 194 2008   2 0.013081421   Cult/Seasonal
## 195 2009   2 0.013123274   Cult/Seasonal
## 196 2010   2 0.015874244   Cult/Seasonal
## 197 2011   2 0.008971241   Cult/Seasonal
## 198 2012   2 0.006111480   Cult/Seasonal
## 199 2013   2 0.027158614   Cult/Seasonal
## 200 2014   2 0.038165916   Cult/Seasonal
## 201 1915   3 0.096451319   Science Fiction
## 202 1916   3 0.077283372   Science Fiction
## 203 1917   3 0.113300493   Science Fiction
## 204 1918   3 0.032840722   Science Fiction
## 205 1919   3 0.047619048   Science Fiction
## 206 1920   3 0.070080863   Science Fiction
## 207 1921   3 0.052115267   Science Fiction
## 208 1922   3 0.088095238   Science Fiction
## 209 1923   3 0.056571429   Science Fiction
## 210 1924   3 0.022895840   Science Fiction
## 211 1925   3 0.046881911   Science Fiction
## 212 1926   3 0.027130140   Science Fiction
## 213 1927   3 0.033093864   Science Fiction
## 214 1928   3 0.023425173   Science Fiction
## 215 1929   3 0.019329508   Science Fiction
## 216 1930   3 0.022290470   Science Fiction
## 217 1931   3 0.037926675   Science Fiction
## 218 1932   3 0.022232734   Science Fiction
## 219 1933   3 0.045207957   Science Fiction
## 220 1934   3 0.030693444   Science Fiction
## 221 1935   3 0.013227513   Science Fiction
## 222 1936   3 0.016806723   Science Fiction
## 223 1937   3 0.016048408   Science Fiction
## 224 1938   3 0.015104539   Science Fiction
## 225 1939   3 0.016385792   Science Fiction
## 226 1940   3 0.009089350   Science Fiction
## 227 1941   3 0.011115685   Science Fiction
## 228 1942   3 0.010075253   Science Fiction
## 229 1943   3 0.007572144   Science Fiction
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## 230 1944      3 0.006276436  Science Fiction
## 231 1945      3 0.015344921  Science Fiction
## 232 1946      3 0.010954963  Science Fiction
## 233 1947      3 0.017530772  Science Fiction
## 234 1948      3 0.010613318  Science Fiction
## 235 1949      3 0.016483516  Science Fiction
## 236 1950      3 0.011170982  Science Fiction
## 237 1951      3 0.019804966  Science Fiction
## 238 1952      3 0.019274376  Science Fiction
## 239 1953      3 0.017318092  Science Fiction
## 240 1954      3 0.021128271  Science Fiction
## 241 1955      3 0.024387680  Science Fiction
## 242 1956      3 0.006990706  Science Fiction
## 243 1957      3 0.012449424  Science Fiction
## 244 1958      3 0.017529331  Science Fiction
## 245 1959      3 0.013901857  Science Fiction
## 246 1960      3 0.024461840  Science Fiction
## 247 1961      3 0.018693302  Science Fiction
## 248 1962      3 0.011201898  Science Fiction
## 249 1963      3 0.028658714  Science Fiction
## 250 1964      3 0.032103896  Science Fiction
## 251 1965      3 0.016806723  Science Fiction
## 252 1966      3 0.012644606  Science Fiction
## 253 1967      3 0.017948251  Science Fiction
## 254 1968      3 0.029427501  Science Fiction
## 255 1969      3 0.026970727  Science Fiction
## 256 1970      3 0.016020476  Science Fiction
## 257 1971      3 0.030825323  Science Fiction
## 258 1972      3 0.039499224  Science Fiction
## 259 1973      3 0.024564751  Science Fiction
## 260 1974      3 0.011165664  Science Fiction
## 261 1975      3 0.024980484  Science Fiction
## 262 1976      3 0.025468038  Science Fiction
## 263 1977      3 0.016661737  Science Fiction
## 264 1978      3 0.016118086  Science Fiction
## 265 1979      3 0.014114057  Science Fiction
## 266 1980      3 0.015993682  Science Fiction
## 267 1981      3 0.018863322  Science Fiction
## 268 1982      3 0.013934164  Science Fiction
## 269 1983      3 0.015556820  Science Fiction
## 270 1984      3 0.008811490  Science Fiction
## 271 1985      3 0.017005058  Science Fiction
## 272 1986      3 0.016321291  Science Fiction
## 273 1987      3 0.016476396  Science Fiction
## 274 1988      3 0.009942908  Science Fiction
## 275 1989      3 0.032033709  Science Fiction
## 276 1990      3 0.037843813  Science Fiction
## 277 1991      3 0.030816426  Science Fiction
## 278 1992      3 0.023455291  Science Fiction
## 279 1993      3 0.040440865  Science Fiction
## 280 1994      3 0.024584985  Science Fiction
## 281 1995      3 0.027706598  Science Fiction
## 282 1996      3 0.031566973  Science Fiction
## 283 1997      3 0.021039751  Science Fiction
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## 284 1998      3 0.055436558  Science Fiction
## 285 1999      3 0.042599074  Science Fiction
## 286 2000      3 0.048115502  Science Fiction
## 287 2001      3 0.031047523  Science Fiction
## 288 2002      3 0.050318984  Science Fiction
## 289 2003      3 0.059546818  Science Fiction
## 290 2004      3 0.093271752  Science Fiction
## 291 2005      3 0.108895590  Science Fiction
## 292 2006      3 0.109132995  Science Fiction
## 293 2007      3 0.128770479  Science Fiction
## 294 2008      3 0.142647700  Science Fiction
## 295 2009      3 0.143020064  Science Fiction
## 296 2010      3 0.117089132  Science Fiction
## 297 2011      3 0.129117597  Science Fiction
## 298 2012      3 0.130603055  Science Fiction
## 299 2013      3 0.120354797  Science Fiction
## 300 2014      3 0.068778161  Science Fiction
## 301 1915      4 0.115559600            Drama
## 302 1916      4 0.142857143            Drama
## 303 1917      4 0.104679803            Drama
## 304 1918      4 0.140120416            Drama
## 305 1919      4 0.087420043            Drama
## 306 1920      4 0.101527403            Drama
## 307 1921      4 0.086450031            Drama
## 308 1922      4 0.092261905            Drama
## 309 1923      4 0.108571429            Drama
## 310 1924      4 0.097387939            Drama
## 311 1925      4 0.077841663            Drama
## 312 1926      4 0.071640526            Drama
## 313 1927      4 0.131197739            Drama
## 314 1928      4 0.172533074            Drama
## 315 1929      4 0.160978556            Drama
## 316 1930      4 0.076382009            Drama
## 317 1931      4 0.077749684            Drama
## 318 1932      4 0.077420372            Drama
## 319 1933      4 0.052240305            Drama
## 320 1934      4 0.047934824            Drama
## 321 1935      4 0.023258377            Drama
## 322 1936      4 0.028220243            Drama
## 323 1937      4 0.050425327            Drama
## 324 1938      4 0.032911996            Drama
## 325 1939      4 0.027275084            Drama
## 326 1940      4 0.029497513            Drama
## 327 1941      4 0.023123370            Drama
## 328 1942      4 0.012252006            Drama
## 329 1943      4 0.010911042            Drama
## 330 1944      4 0.023468413            Drama
## 331 1945      4 0.030554047            Drama
## 332 1946      4 0.018700896            Drama
## 333 1947      4 0.012308840            Drama
## 334 1948      4 0.023762562            Drama
## 335 1949      4 0.028463340            Drama
## 336 1950      4 0.015770798            Drama
## 337 1951      4 0.008545290            Drama
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## 338 1952      4 0.017290249          Drama
## 339 1953      4 0.023547128          Drama
## 340 1954      4 0.044401544          Drama
## 341 1955      4 0.033217702          Drama
## 342 1956      4 0.015050580          Drama
## 343 1957      4 0.014628073          Drama
## 344 1958      4 0.027191166          Drama
## 345 1959      4 0.031331051          Drama
## 346 1960      4 0.027505980          Drama
## 347 1961      4 0.029597727          Drama
## 348 1962      4 0.027807064          Drama
## 349 1963      4 0.055135292          Drama
## 350 1964      4 0.032831169          Drama
## 351 1965      4 0.034235917          Drama
## 352 1966      4 0.021433055          Drama
## 353 1967      4 0.049198251          Drama
## 354 1968      4 0.024433744          Drama
## 355 1969      4 0.023900888          Drama
## 356 1970      4 0.027964736          Drama
## 357 1971      4 0.028505138          Drama
## 358 1972      4 0.030667702          Drama
## 359 1973      4 0.008426743          Drama
## 360 1974      4 0.024469433          Drama
## 361 1975      4 0.031659294          Drama
## 362 1976      4 0.030190589          Drama
## 363 1977      4 0.012520950          Drama
## 364 1978      4 0.042246352          Drama
## 365 1979      4 0.010108716          Drama
## 366 1980      4 0.037417317          Drama
## 367 1981      4 0.042767705          Drama
## 368 1982      4 0.018408437          Drama
## 369 1983      4 0.016884842          Drama
## 370 1984      4 0.021924651          Drama
## 371 1985      4 0.012387305          Drama
## 372 1986      4 0.027874564          Drama
## 373 1987      4 0.015612465          Drama
## 374 1988      4 0.017576496          Drama
## 375 1989      4 0.041273226          Drama
## 376 1990      4 0.018271669          Drama
## 377 1991      4 0.038625113          Drama
## 378 1992      4 0.028237437          Drama
## 379 1993      4 0.023230182          Drama
## 380 1994      4 0.021770349          Drama
## 381 1995      4 0.023969678          Drama
## 382 1996      4 0.015641293          Drama
## 383 1997      4 0.020487112          Drama
## 384 1998      4 0.016300599          Drama
## 385 1999      4 0.017357797          Drama
## 386 2000      4 0.005349544          Drama
## 387 2001      4 0.018233495          Drama
## 388 2002      4 0.018006837          Drama
## 389 2003      4 0.028622968          Drama
## 390 2004      4 0.008551308          Drama
## 391 2005      4 0.018218369          Drama
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## 392 2006     4 0.036219997         Drama
## 393 2007     4 0.030449650         Drama
## 394 2008     4 0.023283009         Drama
## 395 2009     4 0.014833943         Drama
## 396 2010     4 0.024850488         Drama
## 397 2011     4 0.028161802         Drama
## 398 2012     4 0.013737860         Drama
## 399 2013     4 0.011791158         Drama
## 400 2014     4 0.017757752         Drama
## 401 1915     5 0.058234759     Theatrical
## 402 1916     5 0.060889930     Theatrical
## 403 1917     5 0.096059113     Theatrical
## 404 1918     5 0.040503558     Theatrical
## 405 1919     5 0.045131485     Theatrical
## 406 1920     5 0.057502246     Theatrical
## 407 1921     5 0.047823421     Theatrical
## 408 1922     5 0.058928571     Theatrical
## 409 1923     5 0.048571429     Theatrical
## 410 1924     5 0.040954531     Theatrical
## 411 1925     5 0.040689960     Theatrical
## 412 1926     5 0.041966935     Theatrical
## 413 1927     5 0.029796255     Theatrical
## 414 1928     5 0.014928996     Theatrical
## 415 1929     5 0.036242827     Theatrical
## 416 1930     5 0.022983951     Theatrical
## 417 1931     5 0.037926675     Theatrical
## 418 1932     5 0.033270262     Theatrical
## 419 1933     5 0.042395017     Theatrical
## 420 1934     5 0.071807503     Theatrical
## 421 1935     5 0.030974427     Theatrical
## 422 1936     5 0.016806723     Theatrical
## 423 1937     5 0.019731650     Theatrical
## 424 1938     5 0.011765641     Theatrical
## 425 1939     5 0.024371273     Theatrical
## 426 1940     5 0.048705196     Theatrical
## 427 1941     5 0.021202141     Theatrical
## 428 1942     5 0.027053921     Theatrical
## 429 1943     5 0.022179824     Theatrical
## 430 1944     5 0.045913494     Theatrical
## 431 1945     5 0.034356328     Theatrical
## 432 1946     5 0.058205157     Theatrical
## 433 1947     5 0.034937212     Theatrical
## 434 1948     5 0.015215554     Theatrical
## 435 1949     5 0.036660061     Theatrical
## 436 1950     5 0.028650283     Theatrical
## 437 1951     5 0.025434804     Theatrical
## 438 1952     5 0.043083900     Theatrical
## 439 1953     5 0.024026285     Theatrical
## 440 1954     5 0.037644788     Theatrical
## 441 1955     5 0.028066856     Theatrical
## 442 1956     5 0.027140390     Theatrical
## 443 1957     5 0.048034028     Theatrical
## 444 1958     5 0.038785369     Theatrical
## 445 1959     5 0.052391327     Theatrical
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## 446 1960      5 0.028267015        Theatrical
## 447 1961      5 0.055896637        Theatrical
## 448 1962      5 0.045334739        Theatrical
## 449 1963      5 0.052080303        Theatrical
## 450 1964      5 0.029922078        Theatrical
## 451 1965      5 0.085797282        Theatrical
## 452 1966      5 0.073536006        Theatrical
## 453 1967      5 0.079172741        Theatrical
## 454 1968      5 0.089352595        Theatrical
## 455 1969      5 0.081460366        Theatrical
## 456 1970      5 0.132808797        Theatrical
## 457 1971      5 0.101010938        Theatrical
## 458 1972      5 0.158385093        Theatrical
## 459 1973      5 0.178154066        Theatrical
## 460 1974      5 0.206287615        Theatrical
## 461 1975      5 0.184057594        Theatrical
## 462 1976      5 0.199612076        Theatrical
## 463 1977      5 0.209898452        Theatrical
## 464 1978      5 0.189514761        Theatrical
## 465 1979      5 0.195689491        Theatrical
## 466 1980      5 0.254418008        Theatrical
## 467 1981      5 0.198715343        Theatrical
## 468 1982      5 0.254650048        Theatrical
## 469 1983      5 0.253272624        Theatrical
## 470 1984      5 0.256990217        Theatrical
## 471 1985      5 0.234552518        Theatrical
## 472 1986      5 0.193043585        Theatrical
## 473 1987      5 0.179327368        Theatrical
## 474 1988      5 0.206620053        Theatrical
## 475 1989      5 0.216113311        Theatrical
## 476 1990      5 0.214903440        Theatrical
## 477 1991      5 0.192358642        Theatrical
## 478 1992      5 0.148322453        Theatrical
## 479 1993      5 0.164476473        Theatrical
## 480 1994      5 0.132747429        Theatrical
## 481 1995      5 0.140187914        Theatrical
## 482 1996      5 0.089629349        Theatrical
## 483 1997      5 0.113883077        Theatrical
## 484 1998      5 0.089489926        Theatrical
## 485 1999      5 0.060663909        Theatrical
## 486 2000      5 0.054924012        Theatrical
## 487 2001      5 0.046896452        Theatrical
## 488 2002      5 0.069675790        Theatrical
## 489 2003      5 0.032230751        Theatrical
## 490 2004      5 0.032452289        Theatrical
## 491 2005      5 0.038271140        Theatrical
## 492 2006      5 0.030231973        Theatrical
## 493 2007      5 0.029306385        Theatrical
## 494 2008      5 0.029330657        Theatrical
## 495 2009      5 0.022588975        Theatrical
## 496 2010      5 0.021677850        Theatrical
## 497 2011      5 0.020470643        Theatrical
## 498 2012      5 0.027973769        Theatrical
## 499 2013      5 0.014269780        Theatrical
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## 500 2014    5 0.025178903     Theatrical
## 501 1915    6 0.160145587   Horror/Terror
## 502 1916    6 0.115534738   Horror/Terror
## 503 1917    6 0.113300493   Horror/Terror
## 504 1918    6 0.209085933   Horror/Terror
## 505 1919    6 0.127221038   Horror/Terror
## 506 1920    6 0.120395328   Horror/Terror
## 507 1921    6 0.150827713   Horror/Terror
## 508 1922    6 0.092261905   Horror/Terror
## 509 1923    6 0.128571429   Horror/Terror
## 510 1924    6 0.144792003   Horror/Terror
## 511 1925    6 0.093321539   Horror/Terror
## 512 1926    6 0.044934294   Horror/Terror
## 513 1927    6 0.089977623   Horror/Terror
## 514 1928    6 0.059958733   Horror/Terror
## 515 1929    6 0.080640290   Horror/Terror
## 516 1930    6 0.092332078   Horror/Terror
## 517 1931    6 0.124209861   Horror/Terror
## 518 1932    6 0.154683065   Horror/Terror
## 519 1933    6 0.112718505   Horror/Terror
## 520 1934    6 0.167298219   Horror/Terror
## 521 1935    6 0.081900353   Horror/Terror
## 522 1936    6 0.097579330   Horror/Terror
## 523 1937    6 0.089099360   Horror/Terror
## 524 1938    6 0.095238095   Horror/Terror
## 525 1939    6 0.096603578   Horror/Terror
## 526 1940    6 0.091922483   Horror/Terror
## 527 1941    6 0.092767943   Horror/Terror
## 528 1942    6 0.086696934   Horror/Terror
## 529 1943    6 0.058490341   Horror/Terror
## 530 1944    6 0.107518079   Horror/Terror
## 531 1945    6 0.123709940   Horror/Terror
## 532 1946    6 0.095385637   Horror/Terror
## 533 1947    6 0.081934602   Horror/Terror
## 534 1948    6 0.104630412   Horror/Terror
## 535 1949    6 0.078904702   Horror/Terror
## 536 1950    6 0.149165462   Horror/Terror
## 537 1951    6 0.246405952   Horror/Terror
## 538 1952    6 0.288454271   Horror/Terror
## 539 1953    6 0.254021494   Horror/Terror
## 540 1954    6 0.297404547   Horror/Terror
## 541 1955    6 0.308420057   Horror/Terror
## 542 1956    6 0.340324040   Horror/Terror
## 543 1957    6 0.353771138   Horror/Terror
## 544 1958    6 0.356659765   Horror/Terror
## 545 1959    6 0.427118996   Horror/Terror
## 546 1960    6 0.432376604   Horror/Terror
## 547 1961    6 0.411894071   Horror/Terror
## 548 1962    6 0.478914075   Horror/Terror
## 549 1963    6 0.387110852   Horror/Terror
## 550 1964    6 0.454649351   Horror/Terror
## 551 1965    6 0.331984646   Horror/Terror
## 552 1966    6 0.480943413   Horror/Terror
## 553 1967    6 0.348305394   Horror/Terror
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## 554 1968      6 0.328428750      Horror/Terror
## 555 1969      6 0.320140335      Horror/Terror
## 556 1970      6 0.272822068      Horror/Terror
## 557 1971      6 0.257623467      Horror/Terror
## 558 1972      6 0.282705745      Horror/Terror
## 559 1973      6 0.215438429      Horror/Terror
## 560 1974      6 0.169147925      Horror/Terror
## 561 1975      6 0.193165062      Horror/Terror
## 562 1976      6 0.184263788      Horror/Terror
## 563 1977      6 0.226461599      Horror/Terror
## 564 1978      6 0.171700034      Horror/Terror
## 565 1979      6 0.140282281      Horror/Terror
## 566 1980      6 0.109290157      Horror/Terror
## 567 1981      6 0.092853077      Horror/Terror
## 568 1982      6 0.107446469      Horror/Terror
## 569 1983      6 0.095680769      Horror/Terror
## 570 1984      6 0.046208284      Horror/Terror
## 571 1985      6 0.079088177      Horror/Terror
## 572 1986      6 0.055688000      Horror/Terror
## 573 1987      6 0.104597346      Horror/Terror
## 574 1988      6 0.074154853      Horror/Terror
## 575 1989      6 0.048380546      Horror/Terror
## 576 1990      6 0.050133299      Horror/Terror
## 577 1991      6 0.041065328      Horror/Terror
## 578 1992      6 0.069682708      Horror/Terror
## 579 1993      6 0.044595167      Horror/Terror
## 580 1994      6 0.046699983      Horror/Terror
## 581 1995      6 0.033685672      Horror/Terror
## 582 1996      6 0.032562328      Horror/Terror
## 583 1997      6 0.043421624      Horror/Terror
## 584 1998      6 0.041205300      Horror/Terror
## 585 1999      6 0.040619366      Horror/Terror
## 586 2000      6 0.029392097      Horror/Terror
## 587 2001      6 0.025820748      Horror/Terror
## 588 2002      6 0.031876674      Horror/Terror
## 589 2003      6 0.030684558      Horror/Terror
## 590 2004      6 0.033519298      Horror/Terror
## 591 2005      6 0.024638774      Horror/Terror
## 592 2006      6 0.020862477      Horror/Terror
## 593 2007      6 0.027305670      Horror/Terror
## 594 2008      6 0.021328214      Horror/Terror
## 595 2009      6 0.017456969      Horror/Terror
## 596 2010      6 0.020671892      Horror/Terror
## 597 2011      6 0.018753200      Horror/Terror
## 598 2012      6 0.017805263      Horror/Terror
## 599 2013      6 0.029265443      Horror/Terror
## 600 2014      6 0.040021203      Horror/Terror
## 601 1915      7 0.242948135      Romance/Fiction
## 602 1916      7 0.252146760      Romance/Fiction
## 603 1917      7 0.259852217      Romance/Fiction
## 604 1918      7 0.266557198      Romance/Fiction
## 605 1919      7 0.281449893      Romance/Fiction
## 606 1920      7 0.088948787      Romance/Fiction
## 607 1921      7 0.180870632      Romance/Fiction
```

```
## 608 1922      7 0.246428571  Romance/Fiction
## 609 1923      7 0.136571429  Romance/Fiction
## 610 1924      7 0.210254757  Romance/Fiction
## 611 1925      7 0.260504202  Romance/Fiction
## 612 1926      7 0.187367529  Romance/Fiction
## 613 1927      7 0.289482982  Romance/Fiction
## 614 1928      7 0.298276490  Romance/Fiction
## 615 1929      7 0.169435216  Romance/Fiction
## 616 1930      7 0.164454131  Romance/Fiction
## 617 1931      7 0.203855879  Romance/Fiction
## 618 1932      7 0.186691895  Romance/Fiction
## 619 1933      7 0.160538477  Romance/Fiction
## 620 1934      7 0.215043577  Romance/Fiction
## 621 1935      7 0.153659612  Romance/Fiction
## 622 1936      7 0.156402860  Romance/Fiction
## 623 1937      7 0.187319127  Romance/Fiction
## 624 1938      7 0.143095636  Romance/Fiction
## 625 1939      7 0.219652580  Romance/Fiction
## 626 1940      7 0.160349854  Romance/Fiction
## 627 1941      7 0.175861123  Romance/Fiction
## 628 1942      7 0.149387400  Romance/Fiction
## 629 1943      7 0.152814214  Romance/Fiction
## 630 1944      7 0.129485605  Romance/Fiction
## 631 1945      7 0.157930473  Romance/Fiction
## 632 1946      7 0.153480137  Romance/Fiction
## 633 1947      7 0.198557752  Romance/Fiction
## 634 1948      7 0.128956514  Romance/Fiction
## 635 1949      7 0.186092596  Romance/Fiction
## 636 1950      7 0.115126823  Romance/Fiction
## 637 1951      7 0.211219463  Romance/Fiction
## 638 1952      7 0.212396070  Romance/Fiction
## 639 1953      7 0.179273051  Romance/Fiction
## 640 1954      7 0.210317460  Romance/Fiction
## 641 1955      7 0.273835804  Romance/Fiction
## 642 1956      7 0.260876717  Romance/Fiction
## 643 1957      7 0.251374624  Romance/Fiction
## 644 1958      7 0.214630780  Romance/Fiction
## 645 1959      7 0.247743542  Romance/Fiction
## 646 1960      7 0.265709937  Romance/Fiction
## 647 1961      7 0.283606708  Romance/Fiction
## 648 1962      7 0.335925145  Romance/Fiction
## 649 1963      7 0.268984580  Romance/Fiction
## 650 1964      7 0.333194805  Romance/Fiction
## 651 1965      7 0.451810354  Romance/Fiction
## 652 1966      7 0.302663438  Romance/Fiction
## 653 1967      7 0.392310496  Romance/Fiction
## 654 1968      7 0.414571072  Romance/Fiction
## 655 1969      7 0.464422761  Romance/Fiction
## 656 1970      7 0.465257370  Romance/Fiction
## 657 1971      7 0.525604906  Romance/Fiction
## 658 1972      7 0.436917702  Romance/Fiction
## 659 1973      7 0.510930917  Romance/Fiction
## 660 1974      7 0.544425087  Romance/Fiction
## 661 1975      7 0.522248244  Romance/Fiction
```

```
## 662 1976      7 0.514251982  Romance/Fiction
## 663 1977      7 0.482500246  Romance/Fiction
## 664 1978      7 0.520274856  Romance/Fiction
## 665 1979      7 0.580202174  Romance/Fiction
## 666 1980      7 0.524632244  Romance/Fiction
## 667 1981      7 0.611350516  Romance/Fiction
## 668 1982      7 0.562927453  Romance/Fiction
## 669 1983      7 0.575096440  Romance/Fiction
## 670 1984      7 0.614930965  Romance/Fiction
## 671 1985      7 0.612695155  Romance/Fiction
## 672 1986      7 0.676997371  Romance/Fiction
## 673 1987      7 0.638938599  Romance/Fiction
## 674 1988      7 0.656552697  Romance/Fiction
## 675 1989      7 0.612346431  Romance/Fiction
## 676 1990      7 0.632290786  Romance/Fiction
## 677 1991      7 0.647214669  Romance/Fiction
## 678 1992      7 0.666919690  Romance/Fiction
## 679 1993      7 0.651716829  Romance/Fiction
## 680 1994      7 0.702510196  Romance/Fiction
## 681 1995      7 0.680546658  Romance/Fiction
## 682 1996      7 0.716703005  Romance/Fiction
## 683 1997      7 0.724272688  Romance/Fiction
## 684 1998      7 0.714902886  Romance/Fiction
## 685 1999      7 0.726340722  Romance/Fiction
## 686 2000      7 0.739604863  Romance/Fiction
## 687 2001      7 0.755714527  Romance/Fiction
## 688 2002      7 0.745030157  Romance/Fiction
## 689 2003      7 0.764095201  Romance/Fiction
## 690 2004      7 0.758978111  Romance/Fiction
## 691 2005      7 0.790513884  Romance/Fiction
## 692 2006      7 0.787822674  Romance/Fiction
## 693 2007      7 0.764497525  Romance/Fiction
## 694 2008      7 0.765799808  Romance/Fiction
## 695 2009      7 0.786345604  Romance/Fiction
## 696 2010      7 0.796111031  Romance/Fiction
## 697 2011      7 0.786002304  Romance/Fiction
## 698 2012      7 0.790902299  Romance/Fiction
## 699 2013      7 0.791689535  Romance/Fiction
## 700 2014      7 0.792340313  Romance/Fiction
```

```r
#Here is the stacked bar plot
library(ggplot2)
ggplot(control1, aes(x = year, y = proportion, fill = topicname)) +
  geom_bar(stat = "identity")  +labs(title="Movie Genres Across each year using Gibbs LDA - Clear Topics
```

vie Genres Across each year using Gibbs LDA – Clear Topics (Advised)
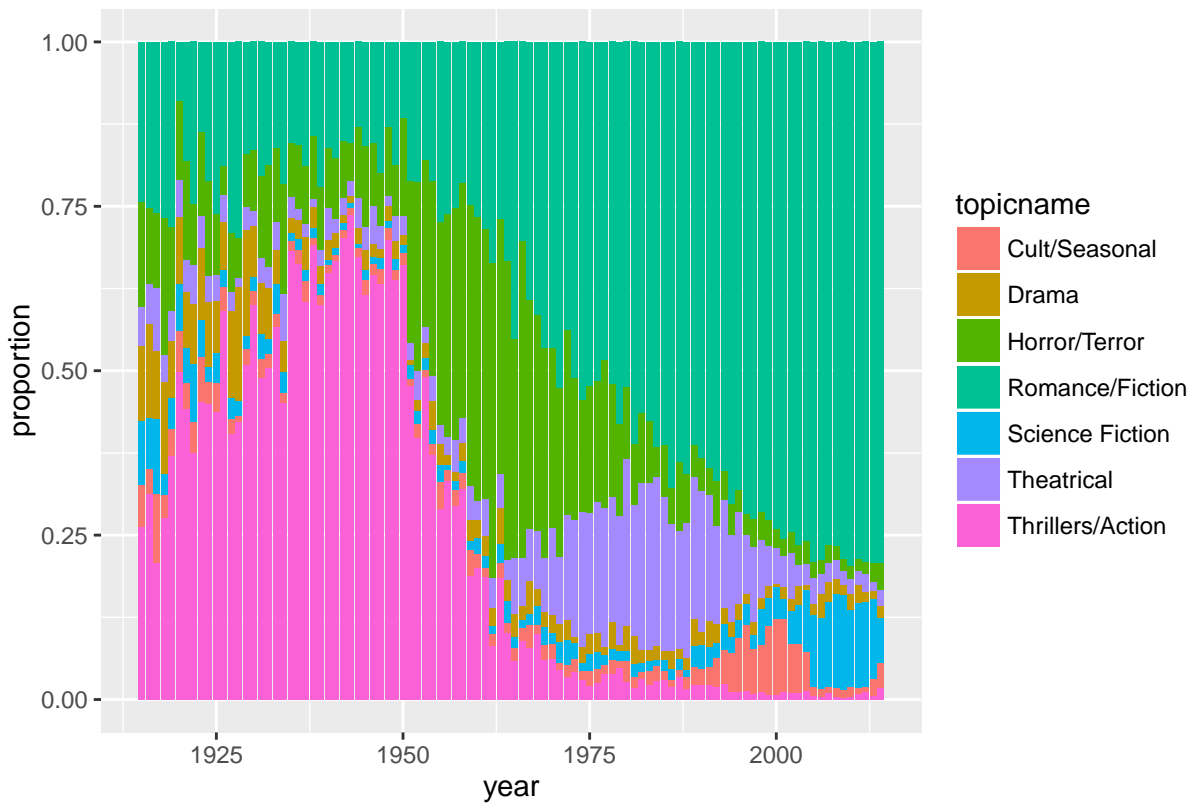

```
#Alternately lets visualize using line graph can show the trend clearly
ggplot(control1, aes(x = year, y = proportion, colour = topicname)) +
  geom_line(stat = "identity", size = 1.2 ) +labs(title="Movie Genres Across each year using Gibbs LDA
```
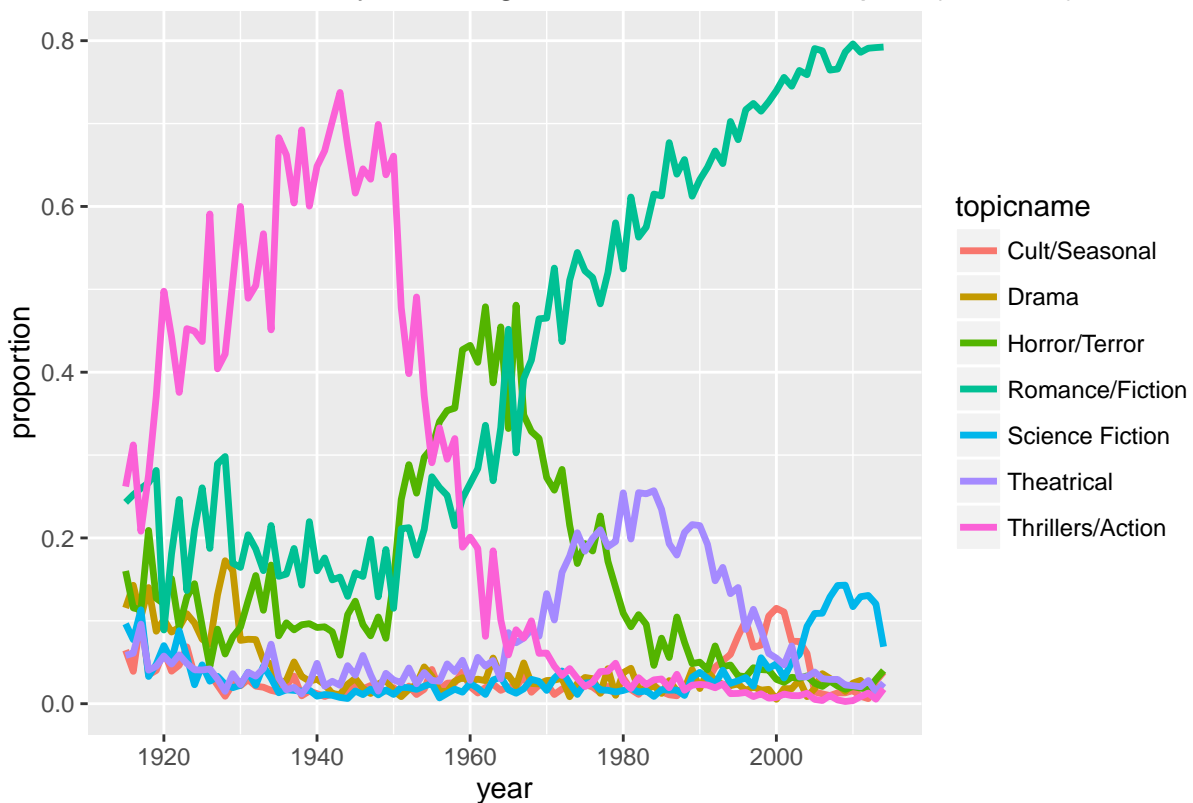
```r
#examine the main topic for document 1
# In a similar way we can examine topics for multiple documents
Terms[,7]
```

```
## [1] "one"   "love"  "life"  "will"  "can"   "world" "stori" "man"
## [9] "get"   "time"
```

```r
# Appendix trying LDA with VEM
# I tried using variational expectation maximization (VEM)
#Howver as we see, from the plots the topics are not well split across this data set
# Hence, I  prefer using gibbs method on this data set rather than VEM
set.seed(1000)
results_VEM <- LDA(tfm, k = 7, method = "VEM")

# Obtain the top ten words (i.e., the 10 most probable words) for each topic.
Terms <- terms(results_VEM, 10)
Terms
```

```
##          Topic 1  Topic 2 Topic 3 Topic 4 Topic 5  Topic 6 Topic 7
## [1,] "origin" "one"   "one"   "one"   "love"   "one"   "one"
## [2,] "poster" "love"  "love"  "love"  "stori"  "love"  "love"
## [3,] "cap"    "life"  "world" "life"  "man"    "life"  "life"
## [4,] "thrill" "will"  "man"   "will"  "world"  "will"  "can"
## [5,] "print"  "can"   "time"  "stori" "origin" "can"   "world"
## [6,] "love"   "world" "hes"   "can"   "one"    "world" "man"
```

```
##  [7,] "stori"  "man"   "will"  "world" "film"   "stori" "will"
##  [8,] "screen" "stori" "can"   "man"   "see"    "get"   "stori"
##  [9,] "action" "get"   "new"   "live"  "ever"   "man"   "get"
## [10,] "romanc" "time"  "stori" "get"   "girl"   "never" "just"
```

```r
# Obtain the most likely topic assignment for each document.
Topic <- topics(results_VEM, 1)
Topic
```

```
## 1915.txt 1916.txt 1917.txt 1918.txt 1919.txt 1920.txt 1921.txt 1922.txt
##        1        1        3        4        1        1        1        1
## 1923.txt 1924.txt 1925.txt 1926.txt 1927.txt 1928.txt 1929.txt 1930.txt
##        1        1        1        1        1        4        1        1
## 1931.txt 1932.txt 1933.txt 1934.txt 1935.txt 1936.txt 1937.txt 1938.txt
##        1        5        1        1        1        1        1        1
## 1939.txt 1940.txt 1941.txt 1942.txt 1943.txt 1944.txt 1945.txt 1946.txt
##        1        1        1        1        1        1        1        1
## 1947.txt 1948.txt 1949.txt 1950.txt 1951.txt 1952.txt 1953.txt 1954.txt
##        1        1        1        1        1        1        5        5
## 1955.txt 1956.txt 1957.txt 1958.txt 1959.txt 1960.txt 1961.txt 1962.txt
##        5        5        5        5        5        3        4        5
## 1963.txt 1964.txt 1965.txt 1966.txt 1967.txt 1968.txt 1969.txt 1970.txt
##        5        4        4        5        3        5        5        5
## 1971.txt 1972.txt 1973.txt 1974.txt 1975.txt 1976.txt 1977.txt 1978.txt
##        3        3        5        5        4        4        5        4
## 1979.txt 1980.txt 1981.txt 1982.txt 1983.txt 1984.txt 1985.txt 1986.txt
##        3        3        3        3        2        3        3        3
## 1987.txt 1988.txt 1989.txt 1990.txt 1991.txt 1992.txt 1993.txt 1994.txt
##        5        3        3        7        7        3        7        3
## 1995.txt 1996.txt 1997.txt 1998.txt 1999.txt 2000.txt 2001.txt 2002.txt
##        3        3        7        7        3        7        2        6
## 2003.txt 2004.txt 2005.txt 2006.txt 2007.txt 2008.txt 2009.txt 2010.txt
##        2        2        2        2        7        6        4        4
## 2011.txt 2012.txt 2013.txt 2014.txt
##        6        6        6        6
```

```r
# Get the posterior probability for each document over each topic
posterior <- posterior(results_VEM)[[2]]
posterior
```

```
##                      1            2            3            4            5
## 1915.txt 8.038204e-01 2.044471e-04 2.044471e-04 2.044471e-04 2.044471e-04
## 1916.txt 8.586155e-01 1.645260e-04 1.645260e-04 1.645260e-04 1.645260e-04
## 1917.txt 4.612887e-01 3.311577e-04 5.370555e-01 3.311577e-04 3.311577e-04
## 1918.txt 4.768982e-01 4.639846e-05 4.639846e-05 5.228698e-01 4.639846e-05
## 1919.txt 8.213264e-01 6.220923e-05 1.425057e-01 6.220923e-05 6.220923e-05
## 1920.txt 9.987958e-01 2.007010e-04 2.007010e-04 2.007010e-04 2.007010e-04
## 1921.txt 9.992823e-01 1.196112e-04 1.196112e-04 1.196112e-04 1.196112e-04
## 1922.txt 8.494045e-01 1.152080e-04 1.152080e-04 1.152080e-04 1.152080e-04
## 1923.txt 9.993433e-01 1.094520e-04 1.094520e-04 1.094520e-04 1.094520e-04
## 1924.txt 9.063442e-01 5.572174e-05 5.572174e-05 5.572174e-05 5.572174e-05
## 1925.txt 8.397871e-01 8.020106e-05 8.020106e-05 1.598119e-01 8.020106e-05
## 1926.txt 9.995423e-01 7.629091e-05 7.629091e-05 7.629091e-05 7.629091e-05
```

```
## 1927.txt 5.053510e-01 1.883431e-05 1.883431e-05 4.945548e-01 1.883431e-05
## 1928.txt 4.867850e-01 9.507696e-06 9.507696e-06 5.131674e-01 9.507696e-06
## 1929.txt 9.996894e-01 5.177128e-05 5.177128e-05 5.177128e-05 5.177128e-05
## 1930.txt 9.999056e-01 1.573619e-05 1.573619e-05 1.573619e-05 1.573619e-05
## 1931.txt 8.659416e-01 5.447472e-05 5.447472e-05 1.337860e-01 5.447472e-05
## 1932.txt 4.827300e-01 2.558793e-05 2.558793e-05 2.558793e-05 5.171421e-01
## 1933.txt 9.998012e-01 3.313481e-05 3.313481e-05 3.313481e-05 3.313481e-05
## 1934.txt 9.998133e-01 3.111139e-05 3.111139e-05 3.111139e-05 3.111139e-05
## 1935.txt 9.998945e-01 1.757985e-05 1.757985e-05 1.757985e-05 1.757985e-05
## 1936.txt 9.998793e-01 2.011396e-05 2.011396e-05 2.011396e-05 2.011396e-05
## 1937.txt 9.999168e-01 1.387274e-05 1.387274e-05 1.387274e-05 1.387274e-05
## 1938.txt 9.999248e-01 1.253879e-05 1.253879e-05 1.253879e-05 1.253879e-05
## 1939.txt 9.999514e-01 8.098317e-06 8.098317e-06 8.098317e-06 8.098317e-06
## 1940.txt 9.999187e-01 1.355514e-05 1.355514e-05 1.355514e-05 1.355514e-05
## 1941.txt 9.999353e-01 1.078028e-05 1.078028e-05 1.078028e-05 1.078028e-05
## 1942.txt 9.999415e-01 9.748863e-06 9.748863e-06 9.748863e-06 9.748863e-06
## 1943.txt 9.999440e-01 9.337493e-06 9.337493e-06 9.337493e-06 9.337493e-06
## 1944.txt 9.999357e-01 1.071700e-05 1.071700e-05 1.071700e-05 1.071700e-05
## 1945.txt 9.998688e-01 2.186012e-05 2.186012e-05 2.186012e-05 2.186012e-05
## 1946.txt 9.998941e-01 1.765067e-05 1.765067e-05 1.765067e-05 1.765067e-05
## 1947.txt 8.306046e-01 1.993097e-05 1.993097e-05 1.993097e-05 1.692958e-01
## 1948.txt 9.999107e-01 1.489117e-05 1.489117e-05 1.489117e-05 1.489117e-05
## 1949.txt 5.323450e-01 1.426107e-05 1.426107e-05 1.426107e-05 4.675837e-01
## 1950.txt 9.998733e-01 2.112242e-05 2.112242e-05 2.112242e-05 2.112242e-05
## 1951.txt 8.586941e-01 1.597720e-05 1.597720e-05 1.597720e-05 1.412260e-01
## 1952.txt 7.308340e-01 1.498283e-05 1.498283e-05 1.498283e-05 2.690911e-01
## 1953.txt 3.389461e-01 1.075382e-05 1.075382e-05 1.075382e-05 6.610002e-01
## 1954.txt 1.561758e-01 1.708625e-05 1.708625e-05 1.708625e-05 8.437388e-01
## 1955.txt 6.325490e-02 1.673386e-05 1.673386e-05 1.673386e-05 9.366614e-01
## 1956.txt 1.619758e-01 1.298471e-05 1.298471e-05 1.298471e-05 8.379593e-01
## 1957.txt 6.803869e-02 1.650690e-05 1.650690e-05 1.650690e-05 9.318788e-01
## 1958.txt 1.366883e-01 2.223734e-05 2.223734e-05 2.223734e-05 8.632005e-01
## 1959.txt 1.650690e-05 1.650690e-05 1.650690e-05 1.650690e-05 9.999010e-01
## 1960.txt 1.363985e-01 1.732953e-05 4.600980e-01 1.732953e-05 4.034341e-01
## 1961.txt 1.248784e-01 1.451621e-05 1.451621e-05 5.189710e-01 3.560926e-01
## 1962.txt 2.118370e-05 2.118370e-05 2.118370e-05 2.118370e-05 9.998729e-01
## 1963.txt 2.350170e-05 2.350170e-05 2.350170e-05 2.350170e-05 9.998590e-01
## 1964.txt 1.653181e-05 1.653181e-05 1.653181e-05 5.437200e-01 4.561973e-01
## 1965.txt 1.650690e-05 1.650690e-05 1.650690e-05 6.522058e-01 3.477116e-01
## 1966.txt 1.419638e-05 1.419638e-05 1.419638e-05 1.419638e-05 9.999148e-01
## 1967.txt 1.931489e-02 1.443016e-05 8.015337e-01 1.443016e-05 1.790936e-01
## 1968.txt 1.411406e-05 1.411406e-05 1.411406e-05 7.977932e-02 9.201501e-01
## 1969.txt 1.748165e-05 1.748165e-05 1.748165e-05 1.748165e-05 8.446262e-01
## 1970.txt 1.503424e-05 1.503424e-05 1.503424e-05 1.503424e-05 9.109830e-01
## 1971.txt 1.308553e-05 1.308553e-05 9.137801e-01 1.308553e-05 8.615447e-02
## 1972.txt 1.540424e-05 1.540424e-05 8.742934e-01 1.540424e-05 1.256296e-01
## 1973.txt 1.253879e-05 1.253879e-05 9.449059e-02 1.253879e-05 7.333530e-01
## 1974.txt 1.248875e-05 1.248875e-05 3.482699e-01 1.248875e-05 6.516676e-01
## 1975.txt 1.371640e-05 1.371640e-05 1.371640e-05 7.860967e-01 2.138348e-01
## 1976.txt 1.332430e-05 1.332430e-05 1.438120e-01 8.057647e-01 5.037001e-02
## 1977.txt 1.565746e-05 1.565746e-05 2.935392e-01 1.565746e-05 6.898898e-01
## 1978.txt 1.340583e-05 1.340583e-05 2.326355e-01 7.020039e-01 6.530697e-02
## 1979.txt 1.512767e-05 1.512767e-05 9.999092e-01 1.512767e-05 1.512767e-05
## 1980.txt 1.567987e-05 1.567987e-05 9.999059e-01 1.567987e-05 1.567987e-05
```

```
## 1981.txt 1.283258e-05 1.283258e-05 9.999230e-01 1.283258e-05 1.283258e-05
## 1982.txt 1.002547e-05 1.002547e-05 9.999398e-01 1.002547e-05 1.002547e-05
## 1983.txt 9.916554e-06 5.204472e-01 4.404257e-01 9.916554e-06 3.908740e-02
## 1984.txt 1.090369e-05 1.090369e-05 9.999346e-01 1.090369e-05 1.090369e-05
## 1985.txt 1.153524e-05 1.153524e-05 4.774584e-01 1.153524e-05 3.864827e-01
## 1986.txt 9.578365e-06 9.578365e-06 9.999425e-01 9.578365e-06 9.578365e-06
## 1987.txt 9.671394e-06 9.671394e-06 2.984656e-01 9.671394e-06 3.835481e-01
## 1988.txt 1.006231e-05 1.006231e-05 9.999396e-01 1.006231e-05 1.006231e-05
## 1989.txt 7.925461e-06 7.925461e-06 9.999524e-01 7.925461e-06 7.925461e-06
## 1990.txt 1.020290e-05 1.020290e-05 2.745738e-01 1.020290e-05 2.875225e-01
## 1991.txt 1.095823e-05 1.095823e-05 2.761005e-01 1.095823e-05 1.095823e-05
## 1992.txt 1.195707e-05 1.195707e-05 8.118332e-01 1.195707e-05 1.195707e-05
## 1993.txt 1.339764e-05 1.339764e-05 1.339764e-05 1.339764e-05 3.697210e-01
## 1994.txt 8.988843e-06 8.988843e-06 8.606832e-01 8.988843e-06 8.988843e-06
## 1995.txt 8.341931e-06 8.341931e-06 9.680049e-01 8.341931e-06 8.341931e-06
## 1996.txt 7.390707e-06 7.390707e-06 7.542275e-01 7.390707e-06 7.390707e-06
## 1997.txt 6.137923e-06 6.137923e-06 6.137923e-06 6.137923e-06 6.137923e-06
## 1998.txt 5.638694e-06 5.638694e-06 5.638694e-06 5.638694e-06 5.638694e-06
## 1999.txt 5.488937e-06 5.488937e-06 7.644898e-01 5.488937e-06 5.488937e-06
## 2000.txt 4.711068e-06 4.711068e-06 4.711068e-06 4.711068e-06 4.711068e-06
## 2001.txt 3.724982e-06 9.999777e-01 3.724982e-06 3.724982e-06 3.724982e-06
## 2002.txt 3.364564e-06 3.364564e-06 3.364564e-06 3.364564e-06 3.364564e-06
## 2003.txt 2.840974e-06 9.949442e-01 2.840974e-06 2.840974e-06 2.840974e-06
## 2004.txt 2.350014e-06 9.999859e-01 2.350014e-06 2.350014e-06 2.350014e-06
## 2005.txt 1.935238e-06 9.999884e-01 1.935238e-06 1.935238e-06 1.935238e-06
## 2006.txt 1.548742e-06 9.985930e-01 1.548742e-06 1.548742e-06 1.548742e-06
## 2007.txt 1.570954e-06 1.570954e-06 1.570954e-06 1.570954e-06 1.570954e-06
## 2008.txt 1.342340e-06 1.342340e-06 1.342340e-06 1.342340e-06 1.342340e-06
## 2009.txt 1.252759e-06 1.252759e-06 1.252759e-06 7.358467e-01 1.252759e-06
## 2010.txt 1.701773e-06 1.701773e-06 1.701773e-06 7.889184e-01 1.701773e-06
## 2011.txt 1.641953e-06 1.641953e-06 1.641953e-06 1.641953e-06 1.641953e-06
## 2012.txt 1.596949e-06 1.596949e-06 1.596949e-06 1.596949e-06 1.596949e-06
## 2013.txt 2.731858e-06 2.731858e-06 2.731858e-06 2.731858e-06 2.731858e-06
## 2014.txt 2.130732e-05 2.130732e-05 2.130732e-05 2.130732e-05 2.130732e-05
##                         6            7
## 1915.txt 1.951574e-01 2.044471e-04
## 1916.txt 1.405618e-01 1.645260e-04
## 1917.txt 3.311577e-04 3.311577e-04
## 1918.txt 4.639846e-05 4.639846e-05
## 1919.txt 3.591907e-02 6.220923e-05
## 1920.txt 2.007010e-04 2.007010e-04
## 1921.txt 1.196112e-04 1.196112e-04
## 1922.txt 1.152080e-04 1.500194e-01
## 1923.txt 1.094520e-04 1.094520e-04
## 1924.txt 5.572174e-05 9.337719e-02
## 1925.txt 8.020106e-05 8.020106e-05
## 1926.txt 7.629091e-05 7.629091e-05
## 1927.txt 1.883431e-05 1.883431e-05
## 1928.txt 9.507696e-06 9.507696e-06
## 1929.txt 5.177128e-05 5.177128e-05
## 1930.txt 1.573619e-05 1.573619e-05
## 1931.txt 5.447472e-05 5.447472e-05
## 1932.txt 2.558793e-05 2.558793e-05
## 1933.txt 3.313481e-05 3.313481e-05
```

```
## 1934.txt 3.111139e-05 3.111139e-05
## 1935.txt 1.757985e-05 1.757985e-05
## 1936.txt 2.011396e-05 2.011396e-05
## 1937.txt 1.387274e-05 1.387274e-05
## 1938.txt 1.253879e-05 1.253879e-05
## 1939.txt 8.098317e-06 8.098317e-06
## 1940.txt 1.355514e-05 1.355514e-05
## 1941.txt 1.078028e-05 1.078028e-05
## 1942.txt 9.748863e-06 9.748863e-06
## 1943.txt 9.337493e-06 9.337493e-06
## 1944.txt 1.071700e-05 1.071700e-05
## 1945.txt 2.186012e-05 2.186012e-05
## 1946.txt 1.765067e-05 1.765067e-05
## 1947.txt 1.993097e-05 1.993097e-05
## 1948.txt 1.489117e-05 1.489117e-05
## 1949.txt 1.426107e-05 1.426107e-05
## 1950.txt 2.112242e-05 2.112242e-05
## 1951.txt 1.597720e-05 1.597720e-05
## 1952.txt 1.498283e-05 1.498283e-05
## 1953.txt 1.075382e-05 1.075382e-05
## 1954.txt 1.708625e-05 1.708625e-05
## 1955.txt 1.673386e-05 1.673386e-05
## 1956.txt 1.298471e-05 1.298471e-05
## 1957.txt 1.650690e-05 1.650690e-05
## 1958.txt 2.223734e-05 2.223734e-05
## 1959.txt 1.650690e-05 1.650690e-05
## 1960.txt 1.732953e-05 1.732953e-05
## 1961.txt 1.451621e-05 1.451621e-05
## 1962.txt 2.118370e-05 2.118370e-05
## 1963.txt 2.350170e-05 2.350170e-05
## 1964.txt 1.653181e-05 1.653181e-05
## 1965.txt 1.650690e-05 1.650690e-05
## 1966.txt 1.419638e-05 1.419638e-05
## 1967.txt 1.443016e-05 1.443016e-05
## 1968.txt 1.411406e-05 1.411406e-05
## 1969.txt 1.748165e-05 1.552864e-01
## 1970.txt 1.503424e-05 8.894185e-02
## 1971.txt 1.308553e-05 1.308553e-05
## 1972.txt 1.540424e-05 1.540424e-05
## 1973.txt 1.253879e-05 1.721063e-01
## 1974.txt 1.248875e-05 1.248875e-05
## 1975.txt 1.371640e-05 1.371640e-05
## 1976.txt 1.332430e-05 1.332430e-05
## 1977.txt 1.565746e-05 1.650833e-02
## 1978.txt 1.340583e-05 1.340583e-05
## 1979.txt 1.512767e-05 1.512767e-05
## 1980.txt 1.567987e-05 1.567987e-05
## 1981.txt 1.283258e-05 1.283258e-05
## 1982.txt 1.002547e-05 1.002547e-05
## 1983.txt 9.916554e-06 9.916554e-06
## 1984.txt 1.090369e-05 1.090369e-05
## 1985.txt 1.153524e-05 1.360127e-01
## 1986.txt 9.578365e-06 9.578365e-06
## 1987.txt 9.671394e-06 3.179475e-01
```

```
## 1988.txt 1.006231e-05 1.006231e-05
## 1989.txt 7.925461e-06 7.925461e-06
## 1990.txt 1.020290e-05 4.378629e-01
## 1991.txt 1.095823e-05 7.238447e-01
## 1992.txt 1.195707e-05 1.881071e-01
## 1993.txt 1.339764e-05 6.302120e-01
## 1994.txt 8.988843e-06 1.392719e-01
## 1995.txt 8.341931e-06 3.195340e-02
## 1996.txt 7.390707e-06 2.457355e-01
## 1997.txt 6.137923e-06 9.999632e-01
## 1998.txt 5.638694e-06 9.999662e-01
## 1999.txt 5.488937e-06 2.354827e-01
## 2000.txt 4.711068e-06 9.999717e-01
## 2001.txt 3.724982e-06 3.724982e-06
## 2002.txt 8.808295e-01 1.191537e-01
## 2003.txt 2.840974e-06 5.041612e-03
## 2004.txt 2.350014e-06 2.350014e-06
## 2005.txt 1.935238e-06 1.935238e-06
## 2006.txt 1.548742e-06 1.399250e-03
## 2007.txt 1.570954e-06 9.999906e-01
## 2008.txt 9.999919e-01 1.342340e-06
## 2009.txt 1.155187e-03 2.629931e-01
## 2010.txt 1.701773e-06 2.110731e-01
## 2011.txt 9.597612e-01 4.023061e-02
## 2012.txt 9.999904e-01 1.596949e-06
## 2013.txt 9.999836e-01 2.731858e-06
## 2014.txt 9.998722e-01 2.130732e-05
```

```
#look at the posterior topic distribution for the first document and plot it visually
posterior(results_VEM)[[2]][1,]
```

```
##           1           2           3           4           5
## 0.8038204054 0.0002044471 0.0002044471 0.0002044471 0.0002044471
##           6           7
## 0.1951573592 0.0002044471
```

```
barplot(posterior(results_VEM)[[2]][1,])
```

```
# Appending year column to the probability table
year = c(1915:2014)

posterior1 = cbind(posterior, year)

posterior_sort <- posterior1[order(year),]
posterior_sort
```

```
##                     1            2            3            4            5
## 1915.txt 8.038204e-01 2.044471e-04 2.044471e-04 2.044471e-04 2.044471e-04
## 1916.txt 8.586155e-01 1.645260e-04 1.645260e-04 1.645260e-04 1.645260e-04
## 1917.txt 4.612887e-01 3.311577e-04 5.370555e-01 3.311577e-04 3.311577e-04
## 1918.txt 4.768982e-01 4.639846e-05 4.639846e-05 5.228698e-01 4.639846e-05
## 1919.txt 8.213264e-01 6.220923e-05 1.425057e-01 6.220923e-05 6.220923e-05
## 1920.txt 9.987958e-01 2.007010e-04 2.007010e-04 2.007010e-04 2.007010e-04
## 1921.txt 9.992823e-01 1.196112e-04 1.196112e-04 1.196112e-04 1.196112e-04
## 1922.txt 8.494045e-01 1.152080e-04 1.152080e-04 1.152080e-04 1.152080e-04
## 1923.txt 9.993433e-01 1.094520e-04 1.094520e-04 1.094520e-04 1.094520e-04
## 1924.txt 9.063442e-01 5.572174e-05 5.572174e-05 5.572174e-05 5.572174e-05
## 1925.txt 8.397871e-01 8.020106e-05 8.020106e-05 1.598119e-01 8.020106e-05
## 1926.txt 9.995423e-01 7.629091e-05 7.629091e-05 7.629091e-05 7.629091e-05
## 1927.txt 5.053510e-01 1.883431e-05 1.883431e-05 4.945548e-01 1.883431e-05
## 1928.txt 4.867850e-01 9.507696e-06 9.507696e-06 5.131674e-01 9.507696e-06
## 1929.txt 9.996894e-01 5.177128e-05 5.177128e-05 5.177128e-05 5.177128e-05
## 1930.txt 9.999056e-01 1.573619e-05 1.573619e-05 1.573619e-05 1.573619e-05
## 1931.txt 8.659416e-01 5.447472e-05 5.447472e-05 1.337860e-01 5.447472e-05
```

```
## 1932.txt 4.827300e-01 2.558793e-05 2.558793e-05 2.558793e-05 5.171421e-01
## 1933.txt 9.998012e-01 3.313481e-05 3.313481e-05 3.313481e-05 3.313481e-05
## 1934.txt 9.998133e-01 3.111139e-05 3.111139e-05 3.111139e-05 3.111139e-05
## 1935.txt 9.998945e-01 1.757985e-05 1.757985e-05 1.757985e-05 1.757985e-05
## 1936.txt 9.998793e-01 2.011396e-05 2.011396e-05 2.011396e-05 2.011396e-05
## 1937.txt 9.999168e-01 1.387274e-05 1.387274e-05 1.387274e-05 1.387274e-05
## 1938.txt 9.999248e-01 1.253879e-05 1.253879e-05 1.253879e-05 1.253879e-05
## 1939.txt 9.999514e-01 8.098317e-06 8.098317e-06 8.098317e-06 8.098317e-06
## 1940.txt 9.999187e-01 1.355514e-05 1.355514e-05 1.355514e-05 1.355514e-05
## 1941.txt 9.999353e-01 1.078028e-05 1.078028e-05 1.078028e-05 1.078028e-05
## 1942.txt 9.999415e-01 9.748863e-06 9.748863e-06 9.748863e-06 9.748863e-06
## 1943.txt 9.999440e-01 9.337493e-06 9.337493e-06 9.337493e-06 9.337493e-06
## 1944.txt 9.999357e-01 1.071700e-05 1.071700e-05 1.071700e-05 1.071700e-05
## 1945.txt 9.998688e-01 2.186012e-05 2.186012e-05 2.186012e-05 2.186012e-05
## 1946.txt 9.998941e-01 1.765067e-05 1.765067e-05 1.765067e-05 1.765067e-05
## 1947.txt 8.306046e-01 1.993097e-05 1.993097e-05 1.993097e-05 1.692958e-01
## 1948.txt 9.999107e-01 1.489117e-05 1.489117e-05 1.489117e-05 1.489117e-05
## 1949.txt 5.323450e-01 1.426107e-05 1.426107e-05 1.426107e-05 4.675837e-01
## 1950.txt 9.998733e-01 2.112242e-05 2.112242e-05 2.112242e-05 2.112242e-05
## 1951.txt 8.586941e-01 1.597720e-05 1.597720e-05 1.597720e-05 1.412260e-01
## 1952.txt 7.308340e-01 1.498283e-05 1.498283e-05 1.498283e-05 2.690911e-01
## 1953.txt 3.389461e-01 1.075382e-05 1.075382e-05 1.075382e-05 6.610002e-01
## 1954.txt 1.561758e-01 1.708625e-05 1.708625e-05 1.708625e-05 8.437388e-01
## 1955.txt 6.325490e-02 1.673386e-05 1.673386e-05 1.673386e-05 9.366614e-01
## 1956.txt 1.619758e-01 1.298471e-05 1.298471e-05 1.298471e-05 8.379593e-01
## 1957.txt 6.803869e-02 1.650690e-05 1.650690e-05 1.650690e-05 9.318788e-01
## 1958.txt 1.366883e-01 2.223734e-05 2.223734e-05 2.223734e-05 8.632005e-01
## 1959.txt 1.650690e-05 1.650690e-05 1.650690e-05 1.650690e-05 9.999010e-01
## 1960.txt 1.363985e-01 1.732953e-05 4.600980e-01 1.732953e-05 4.034341e-01
## 1961.txt 1.248784e-01 1.451621e-05 1.451621e-05 5.189710e-01 3.560926e-01
## 1962.txt 2.118370e-05 2.118370e-05 2.118370e-05 2.118370e-05 9.998729e-01
## 1963.txt 2.350170e-05 2.350170e-05 2.350170e-05 2.350170e-05 9.998590e-01
## 1964.txt 1.653181e-05 1.653181e-05 1.653181e-05 5.437200e-01 4.561973e-01
## 1965.txt 1.650690e-05 1.650690e-05 1.650690e-05 6.522058e-01 3.477116e-01
## 1966.txt 1.419638e-05 1.419638e-05 1.419638e-05 1.419638e-05 9.999148e-01
## 1967.txt 1.931489e-02 1.443016e-05 8.015337e-01 1.443016e-05 1.790936e-01
## 1968.txt 1.411406e-05 1.411406e-05 1.411406e-05 7.977932e-02 9.201501e-01
## 1969.txt 1.748165e-05 1.748165e-05 1.748165e-05 1.748165e-05 8.446262e-01
## 1970.txt 1.503424e-05 1.503424e-05 1.503424e-05 1.503424e-05 9.109830e-01
## 1971.txt 1.308553e-05 1.308553e-05 9.137801e-01 1.308553e-05 8.615447e-02
## 1972.txt 1.540424e-05 1.540424e-05 8.742934e-01 1.540424e-05 1.256296e-01
## 1973.txt 1.253879e-05 1.253879e-05 9.449059e-02 1.253879e-05 7.333530e-01
## 1974.txt 1.248875e-05 1.248875e-05 3.482699e-01 1.248875e-05 6.516676e-01
## 1975.txt 1.371640e-05 1.371640e-05 1.371640e-05 7.860967e-01 2.138348e-01
## 1976.txt 1.332430e-05 1.332430e-05 1.438120e-01 8.057647e-01 5.037001e-02
## 1977.txt 1.565746e-05 1.565746e-05 2.935392e-01 1.565746e-05 6.898898e-01
## 1978.txt 1.340583e-05 1.340583e-05 2.326355e-01 7.020039e-01 6.530697e-02
## 1979.txt 1.512767e-05 1.512767e-05 9.999092e-01 1.512767e-05 1.512767e-05
## 1980.txt 1.567987e-05 1.567987e-05 9.999059e-01 1.567987e-05 1.567987e-05
## 1981.txt 1.283258e-05 1.283258e-05 9.999230e-01 1.283258e-05 1.283258e-05
## 1982.txt 1.002547e-05 1.002547e-05 9.999398e-01 1.002547e-05 1.002547e-05
## 1983.txt 9.916554e-06 5.204472e-01 4.404257e-01 9.916554e-06 3.908740e-02
## 1984.txt 1.090369e-05 1.090369e-05 9.999346e-01 1.090369e-05 1.090369e-05
## 1985.txt 1.153524e-05 1.153524e-05 4.774584e-01 1.153524e-05 3.864827e-01
```

```
## 1986.txt 9.578365e-06 9.578365e-06 9.999425e-01 9.578365e-06 9.578365e-06
## 1987.txt 9.671394e-06 9.671394e-06 2.984656e-01 9.671394e-06 3.835481e-01
## 1988.txt 1.006231e-05 1.006231e-05 9.999396e-01 1.006231e-05 1.006231e-05
## 1989.txt 7.925461e-06 7.925461e-06 9.999524e-01 7.925461e-06 7.925461e-06
## 1990.txt 1.020290e-05 1.020290e-05 2.745738e-01 1.020290e-05 2.875225e-01
## 1991.txt 1.095823e-05 1.095823e-05 2.761005e-01 1.095823e-05 1.095823e-05
## 1992.txt 1.195707e-05 1.195707e-05 8.118332e-01 1.195707e-05 1.195707e-05
## 1993.txt 1.339764e-05 1.339764e-05 1.339764e-05 1.339764e-05 3.697210e-01
## 1994.txt 8.988843e-06 8.988843e-06 8.606832e-01 8.988843e-06 8.988843e-06
## 1995.txt 8.341931e-06 8.341931e-06 9.680049e-01 8.341931e-06 8.341931e-06
## 1996.txt 7.390707e-06 7.390707e-06 7.542275e-01 7.390707e-06 7.390707e-06
## 1997.txt 6.137923e-06 6.137923e-06 6.137923e-06 6.137923e-06 6.137923e-06
## 1998.txt 5.638694e-06 5.638694e-06 5.638694e-06 5.638694e-06 5.638694e-06
## 1999.txt 5.488937e-06 5.488937e-06 7.644898e-01 5.488937e-06 5.488937e-06
## 2000.txt 4.711068e-06 4.711068e-06 4.711068e-06 4.711068e-06 4.711068e-06
## 2001.txt 3.724982e-06 9.999777e-01 3.724982e-06 3.724982e-06 3.724982e-06
## 2002.txt 3.364564e-06 3.364564e-06 3.364564e-06 3.364564e-06 3.364564e-06
## 2003.txt 2.840974e-06 9.949442e-01 2.840974e-06 2.840974e-06 2.840974e-06
## 2004.txt 2.350014e-06 9.999859e-01 2.350014e-06 2.350014e-06 2.350014e-06
## 2005.txt 1.935238e-06 9.999884e-01 1.935238e-06 1.935238e-06 1.935238e-06
## 2006.txt 1.548742e-06 9.985930e-01 1.548742e-06 1.548742e-06 1.548742e-06
## 2007.txt 1.570954e-06 1.570954e-06 1.570954e-06 1.570954e-06 1.570954e-06
## 2008.txt 1.342340e-06 1.342340e-06 1.342340e-06 1.342340e-06 1.342340e-06
## 2009.txt 1.252759e-06 1.252759e-06 1.252759e-06 7.358467e-01 1.252759e-06
## 2010.txt 1.701773e-06 1.701773e-06 1.701773e-06 7.889184e-01 1.701773e-06
## 2011.txt 1.641953e-06 1.641953e-06 1.641953e-06 1.641953e-06 1.641953e-06
## 2012.txt 1.596949e-06 1.596949e-06 1.596949e-06 1.596949e-06 1.596949e-06
## 2013.txt 2.731858e-06 2.731858e-06 2.731858e-06 2.731858e-06 2.731858e-06
## 2014.txt 2.130732e-05 2.130732e-05 2.130732e-05 2.130732e-05 2.130732e-05
##                         6             7 year
## 1915.txt 1.951574e-01 2.044471e-04 1915
## 1916.txt 1.405618e-01 1.645260e-04 1916
## 1917.txt 3.311577e-04 3.311577e-04 1917
## 1918.txt 4.639846e-05 4.639846e-05 1918
## 1919.txt 3.591907e-02 6.220923e-05 1919
## 1920.txt 2.007010e-04 2.007010e-04 1920
## 1921.txt 1.196112e-04 1.196112e-04 1921
## 1922.txt 1.152080e-04 1.500194e-01 1922
## 1923.txt 1.094520e-04 1.094520e-04 1923
## 1924.txt 5.572174e-05 9.337719e-02 1924
## 1925.txt 8.020106e-05 8.020106e-05 1925
## 1926.txt 7.629091e-05 7.629091e-05 1926
## 1927.txt 1.883431e-05 1.883431e-05 1927
## 1928.txt 9.507696e-06 9.507696e-06 1928
## 1929.txt 5.177128e-05 5.177128e-05 1929
## 1930.txt 1.573619e-05 1.573619e-05 1930
## 1931.txt 5.447472e-05 5.447472e-05 1931
## 1932.txt 2.558793e-05 2.558793e-05 1932
## 1933.txt 3.313481e-05 3.313481e-05 1933
## 1934.txt 3.111139e-05 3.111139e-05 1934
## 1935.txt 1.757985e-05 1.757985e-05 1935
## 1936.txt 2.011396e-05 2.011396e-05 1936
## 1937.txt 1.387274e-05 1.387274e-05 1937
## 1938.txt 1.253879e-05 1.253879e-05 1938
```

```
## 1939.txt 8.098317e-06 8.098317e-06 1939
## 1940.txt 1.355514e-05 1.355514e-05 1940
## 1941.txt 1.078028e-05 1.078028e-05 1941
## 1942.txt 9.748863e-06 9.748863e-06 1942
## 1943.txt 9.337493e-06 9.337493e-06 1943
## 1944.txt 1.071700e-05 1.071700e-05 1944
## 1945.txt 2.186012e-05 2.186012e-05 1945
## 1946.txt 1.765067e-05 1.765067e-05 1946
## 1947.txt 1.993097e-05 1.993097e-05 1947
## 1948.txt 1.489117e-05 1.489117e-05 1948
## 1949.txt 1.426107e-05 1.426107e-05 1949
## 1950.txt 2.112242e-05 2.112242e-05 1950
## 1951.txt 1.597720e-05 1.597720e-05 1951
## 1952.txt 1.498283e-05 1.498283e-05 1952
## 1953.txt 1.075382e-05 1.075382e-05 1953
## 1954.txt 1.708625e-05 1.708625e-05 1954
## 1955.txt 1.673386e-05 1.673386e-05 1955
## 1956.txt 1.298471e-05 1.298471e-05 1956
## 1957.txt 1.650690e-05 1.650690e-05 1957
## 1958.txt 2.223734e-05 2.223734e-05 1958
## 1959.txt 1.650690e-05 1.650690e-05 1959
## 1960.txt 1.732953e-05 1.732953e-05 1960
## 1961.txt 1.451621e-05 1.451621e-05 1961
## 1962.txt 2.118370e-05 2.118370e-05 1962
## 1963.txt 2.350170e-05 2.350170e-05 1963
## 1964.txt 1.653181e-05 1.653181e-05 1964
## 1965.txt 1.650690e-05 1.650690e-05 1965
## 1966.txt 1.419638e-05 1.419638e-05 1966
## 1967.txt 1.443016e-05 1.443016e-05 1967
## 1968.txt 1.411406e-05 1.411406e-05 1968
## 1969.txt 1.748165e-05 1.552864e-01 1969
## 1970.txt 1.503424e-05 8.894185e-02 1970
## 1971.txt 1.308553e-05 1.308553e-05 1971
## 1972.txt 1.540424e-05 1.540424e-05 1972
## 1973.txt 1.253879e-05 1.721063e-01 1973
## 1974.txt 1.248875e-05 1.248875e-05 1974
## 1975.txt 1.371640e-05 1.371640e-05 1975
## 1976.txt 1.332430e-05 1.332430e-05 1976
## 1977.txt 1.565746e-05 1.650833e-02 1977
## 1978.txt 1.340583e-05 1.340583e-05 1978
## 1979.txt 1.512767e-05 1.512767e-05 1979
## 1980.txt 1.567987e-05 1.567987e-05 1980
## 1981.txt 1.283258e-05 1.283258e-05 1981
## 1982.txt 1.002547e-05 1.002547e-05 1982
## 1983.txt 9.916554e-06 9.916554e-06 1983
## 1984.txt 1.090369e-05 1.090369e-05 1984
## 1985.txt 1.153524e-05 1.360127e-01 1985
## 1986.txt 9.578365e-06 9.578365e-06 1986
## 1987.txt 9.671394e-06 3.179475e-01 1987
## 1988.txt 1.006231e-05 1.006231e-05 1988
## 1989.txt 7.925461e-06 7.925461e-06 1989
## 1990.txt 1.020290e-05 4.378629e-01 1990
## 1991.txt 1.095823e-05 7.238447e-01 1991
## 1992.txt 1.195707e-05 1.881071e-01 1992
```

```
## 1993.txt 1.339764e-05 6.302120e-01 1993
## 1994.txt 8.988843e-06 1.392719e-01 1994
## 1995.txt 8.341931e-06 3.195340e-02 1995
## 1996.txt 7.390707e-06 2.457355e-01 1996
## 1997.txt 6.137923e-06 9.999632e-01 1997
## 1998.txt 5.638694e-06 9.999662e-01 1998
## 1999.txt 5.488937e-06 2.354827e-01 1999
## 2000.txt 4.711068e-06 9.999717e-01 2000
## 2001.txt 3.724982e-06 3.724982e-06 2001
## 2002.txt 8.808295e-01 1.191537e-01 2002
## 2003.txt 2.840974e-06 5.041612e-03 2003
## 2004.txt 2.350014e-06 2.350014e-06 2004
## 2005.txt 1.935238e-06 1.935238e-06 2005
## 2006.txt 1.548742e-06 1.399250e-03 2006
## 2007.txt 1.570954e-06 9.999906e-01 2007
## 2008.txt 9.999919e-01 1.342340e-06 2008
## 2009.txt 1.155187e-03 2.629931e-01 2009
## 2010.txt 1.701773e-06 2.110731e-01 2010
## 2011.txt 9.597612e-01 4.023061e-02 2011
## 2012.txt 9.999904e-01 1.596949e-06 2012
## 2013.txt 9.999836e-01 2.731858e-06 2013
## 2014.txt 9.998722e-01 2.130732e-05 2014
```

```r
#posterior_sort1 = posterior_sort[, 1:10]

#GGplot across years
year_plot = as.data.frame.matrix(posterior_sort)

control1 <- melt(year_plot, id.var="year",variable.name = "topic",value.name = "proportion"  )


#Assigning topic names using match and index
index <- c(1, 2, 3, 4, 5, 6, 7)
values <- c("Romance", "Love/Fiction", "Love", "Thrill", "Life","World","Insipirational")
control1$topicname <- values[match(control1$topic, index)]

#Let us have a look at the melted dataframe
control1
```

```
##       year topic   proportion       topicname
## 1     1915     1 8.038204e-01       Romance
## 2     1916     1 8.586155e-01       Romance
## 3     1917     1 4.612887e-01       Romance
## 4     1918     1 4.768982e-01       Romance
## 5     1919     1 8.213264e-01       Romance
## 6     1920     1 9.987958e-01       Romance
## 7     1921     1 9.992823e-01       Romance
## 8     1922     1 8.494045e-01       Romance
## 9     1923     1 9.993433e-01       Romance
## 10    1924     1 9.063442e-01       Romance
## 11    1925     1 8.397871e-01       Romance
## 12    1926     1 9.995423e-01       Romance
## 13    1927     1 5.053510e-01       Romance
## 14    1928     1 4.867850e-01       Romance
```

```
## 15   1929     1 9.996894e-01        Romance
## 16   1930     1 9.999056e-01        Romance
## 17   1931     1 8.659416e-01        Romance
## 18   1932     1 4.827300e-01        Romance
## 19   1933     1 9.998012e-01        Romance
## 20   1934     1 9.998133e-01        Romance
## 21   1935     1 9.998945e-01        Romance
## 22   1936     1 9.998793e-01        Romance
## 23   1937     1 9.999168e-01        Romance
## 24   1938     1 9.999248e-01        Romance
## 25   1939     1 9.999514e-01        Romance
## 26   1940     1 9.999187e-01        Romance
## 27   1941     1 9.999353e-01        Romance
## 28   1942     1 9.999415e-01        Romance
## 29   1943     1 9.999440e-01        Romance
## 30   1944     1 9.999357e-01        Romance
## 31   1945     1 9.998688e-01        Romance
## 32   1946     1 9.998941e-01        Romance
## 33   1947     1 8.306046e-01        Romance
## 34   1948     1 9.999107e-01        Romance
## 35   1949     1 5.323450e-01        Romance
## 36   1950     1 9.998733e-01        Romance
## 37   1951     1 8.586941e-01        Romance
## 38   1952     1 7.308340e-01        Romance
## 39   1953     1 3.389461e-01        Romance
## 40   1954     1 1.561758e-01        Romance
## 41   1955     1 6.325490e-02        Romance
## 42   1956     1 1.619758e-01        Romance
## 43   1957     1 6.803869e-02        Romance
## 44   1958     1 1.366883e-01        Romance
## 45   1959     1 1.650690e-05        Romance
## 46   1960     1 1.363985e-01        Romance
## 47   1961     1 1.248784e-01        Romance
## 48   1962     1 2.118370e-05        Romance
## 49   1963     1 2.350170e-05        Romance
## 50   1964     1 1.653181e-05        Romance
## 51   1965     1 1.650690e-05        Romance
## 52   1966     1 1.419638e-05        Romance
## 53   1967     1 1.931489e-02        Romance
## 54   1968     1 1.411406e-05        Romance
## 55   1969     1 1.748165e-05        Romance
## 56   1970     1 1.503424e-05        Romance
## 57   1971     1 1.308553e-05        Romance
## 58   1972     1 1.540424e-05        Romance
## 59   1973     1 1.253879e-05        Romance
## 60   1974     1 1.248875e-05        Romance
## 61   1975     1 1.371640e-05        Romance
## 62   1976     1 1.332430e-05        Romance
## 63   1977     1 1.565746e-05        Romance
## 64   1978     1 1.340583e-05        Romance
## 65   1979     1 1.512767e-05        Romance
## 66   1980     1 1.567987e-05        Romance
## 67   1981     1 1.283258e-05        Romance
## 68   1982     1 1.002547e-05        Romance
```

```
## 69  1983   1 9.916554e-06         Romance
## 70  1984   1 1.090369e-05         Romance
## 71  1985   1 1.153524e-05         Romance
## 72  1986   1 9.578365e-06         Romance
## 73  1987   1 9.671394e-06         Romance
## 74  1988   1 1.006231e-05         Romance
## 75  1989   1 7.925461e-06         Romance
## 76  1990   1 1.020290e-05         Romance
## 77  1991   1 1.095823e-05         Romance
## 78  1992   1 1.195707e-05         Romance
## 79  1993   1 1.339764e-05         Romance
## 80  1994   1 8.988843e-06         Romance
## 81  1995   1 8.341931e-06         Romance
## 82  1996   1 7.390707e-06         Romance
## 83  1997   1 6.137923e-06         Romance
## 84  1998   1 5.638694e-06         Romance
## 85  1999   1 5.488937e-06         Romance
## 86  2000   1 4.711068e-06         Romance
## 87  2001   1 3.724982e-06         Romance
## 88  2002   1 3.364564e-06         Romance
## 89  2003   1 2.840974e-06         Romance
## 90  2004   1 2.350014e-06         Romance
## 91  2005   1 1.935238e-06         Romance
## 92  2006   1 1.548742e-06         Romance
## 93  2007   1 1.570954e-06         Romance
## 94  2008   1 1.342340e-06         Romance
## 95  2009   1 1.252759e-06         Romance
## 96  2010   1 1.701773e-06         Romance
## 97  2011   1 1.641953e-06         Romance
## 98  2012   1 1.596949e-06         Romance
## 99  2013   1 2.731858e-06         Romance
## 100 2014   1 2.130732e-05         Romance
## 101 1915   2 2.044471e-04     Love/Fiction
## 102 1916   2 1.645260e-04     Love/Fiction
## 103 1917   2 3.311577e-04     Love/Fiction
## 104 1918   2 4.639846e-05     Love/Fiction
## 105 1919   2 6.220923e-05     Love/Fiction
## 106 1920   2 2.007010e-04     Love/Fiction
## 107 1921   2 1.196112e-04     Love/Fiction
## 108 1922   2 1.152080e-04     Love/Fiction
## 109 1923   2 1.094520e-04     Love/Fiction
## 110 1924   2 5.572174e-05     Love/Fiction
## 111 1925   2 8.020106e-05     Love/Fiction
## 112 1926   2 7.629091e-05     Love/Fiction
## 113 1927   2 1.883431e-05     Love/Fiction
## 114 1928   2 9.507696e-06     Love/Fiction
## 115 1929   2 5.177128e-05     Love/Fiction
## 116 1930   2 1.573619e-05     Love/Fiction
## 117 1931   2 5.447472e-05     Love/Fiction
## 118 1932   2 2.558793e-05     Love/Fiction
## 119 1933   2 3.313481e-05     Love/Fiction
## 120 1934   2 3.111139e-05     Love/Fiction
## 121 1935   2 1.757985e-05     Love/Fiction
## 122 1936   2 2.011396e-05     Love/Fiction
```

```
## 123 1937      2 1.387274e-05    Love/Fiction
## 124 1938      2 1.253879e-05    Love/Fiction
## 125 1939      2 8.098317e-06    Love/Fiction
## 126 1940      2 1.355514e-05    Love/Fiction
## 127 1941      2 1.078028e-05    Love/Fiction
## 128 1942      2 9.748863e-06    Love/Fiction
## 129 1943      2 9.337493e-06    Love/Fiction
## 130 1944      2 1.071700e-05    Love/Fiction
## 131 1945      2 2.186012e-05    Love/Fiction
## 132 1946      2 1.765067e-05    Love/Fiction
## 133 1947      2 1.993097e-05    Love/Fiction
## 134 1948      2 1.489117e-05    Love/Fiction
## 135 1949      2 1.426107e-05    Love/Fiction
## 136 1950      2 2.112242e-05    Love/Fiction
## 137 1951      2 1.597720e-05    Love/Fiction
## 138 1952      2 1.498283e-05    Love/Fiction
## 139 1953      2 1.075382e-05    Love/Fiction
## 140 1954      2 1.708625e-05    Love/Fiction
## 141 1955      2 1.673386e-05    Love/Fiction
## 142 1956      2 1.298471e-05    Love/Fiction
## 143 1957      2 1.650690e-05    Love/Fiction
## 144 1958      2 2.223734e-05    Love/Fiction
## 145 1959      2 1.650690e-05    Love/Fiction
## 146 1960      2 1.732953e-05    Love/Fiction
## 147 1961      2 1.451621e-05    Love/Fiction
## 148 1962      2 2.118370e-05    Love/Fiction
## 149 1963      2 2.350170e-05    Love/Fiction
## 150 1964      2 1.653181e-05    Love/Fiction
## 151 1965      2 1.650690e-05    Love/Fiction
## 152 1966      2 1.419638e-05    Love/Fiction
## 153 1967      2 1.443016e-05    Love/Fiction
## 154 1968      2 1.411406e-05    Love/Fiction
## 155 1969      2 1.748165e-05    Love/Fiction
## 156 1970      2 1.503424e-05    Love/Fiction
## 157 1971      2 1.308553e-05    Love/Fiction
## 158 1972      2 1.540424e-05    Love/Fiction
## 159 1973      2 1.253879e-05    Love/Fiction
## 160 1974      2 1.248875e-05    Love/Fiction
## 161 1975      2 1.371640e-05    Love/Fiction
## 162 1976      2 1.332430e-05    Love/Fiction
## 163 1977      2 1.565746e-05    Love/Fiction
## 164 1978      2 1.340583e-05    Love/Fiction
## 165 1979      2 1.512767e-05    Love/Fiction
## 166 1980      2 1.567987e-05    Love/Fiction
## 167 1981      2 1.283258e-05    Love/Fiction
## 168 1982      2 1.002547e-05    Love/Fiction
## 169 1983      2 5.204472e-01    Love/Fiction
## 170 1984      2 1.090369e-05    Love/Fiction
## 171 1985      2 1.153524e-05    Love/Fiction
## 172 1986      2 9.578365e-06    Love/Fiction
## 173 1987      2 9.671394e-06    Love/Fiction
## 174 1988      2 1.006231e-05    Love/Fiction
## 175 1989      2 7.925461e-06    Love/Fiction
## 176 1990      2 1.020290e-05    Love/Fiction
```

```
## 177 1991      2 1.095823e-05      Love/Fiction
## 178 1992      2 1.195707e-05      Love/Fiction
## 179 1993      2 1.339764e-05      Love/Fiction
## 180 1994      2 8.988843e-06      Love/Fiction
## 181 1995      2 8.341931e-06      Love/Fiction
## 182 1996      2 7.390707e-06      Love/Fiction
## 183 1997      2 6.137923e-06      Love/Fiction
## 184 1998      2 5.638694e-06      Love/Fiction
## 185 1999      2 5.488937e-06      Love/Fiction
## 186 2000      2 4.711068e-06      Love/Fiction
## 187 2001      2 9.999777e-01      Love/Fiction
## 188 2002      2 3.364564e-06      Love/Fiction
## 189 2003      2 9.949442e-01      Love/Fiction
## 190 2004      2 9.999859e-01      Love/Fiction
## 191 2005      2 9.999884e-01      Love/Fiction
## 192 2006      2 9.985930e-01      Love/Fiction
## 193 2007      2 1.570954e-06      Love/Fiction
## 194 2008      2 1.342340e-06      Love/Fiction
## 195 2009      2 1.252759e-06      Love/Fiction
## 196 2010      2 1.701773e-06      Love/Fiction
## 197 2011      2 1.641953e-06      Love/Fiction
## 198 2012      2 1.596949e-06      Love/Fiction
## 199 2013      2 2.731858e-06      Love/Fiction
## 200 2014      2 2.130732e-05      Love/Fiction
## 201 1915      3 2.044471e-04              Love
## 202 1916      3 1.645260e-04              Love
## 203 1917      3 5.370555e-01              Love
## 204 1918      3 4.639846e-05              Love
## 205 1919      3 1.425057e-01              Love
## 206 1920      3 2.007010e-04              Love
## 207 1921      3 1.196112e-04              Love
## 208 1922      3 1.152080e-04              Love
## 209 1923      3 1.094520e-04              Love
## 210 1924      3 5.572174e-05              Love
## 211 1925      3 8.020106e-05              Love
## 212 1926      3 7.629091e-05              Love
## 213 1927      3 1.883431e-05              Love
## 214 1928      3 9.507696e-06              Love
## 215 1929      3 5.177128e-05              Love
## 216 1930      3 1.573619e-05              Love
## 217 1931      3 5.447472e-05              Love
## 218 1932      3 2.558793e-05              Love
## 219 1933      3 3.313481e-05              Love
## 220 1934      3 3.111139e-05              Love
## 221 1935      3 1.757985e-05              Love
## 222 1936      3 2.011396e-05              Love
## 223 1937      3 1.387274e-05              Love
## 224 1938      3 1.253879e-05              Love
## 225 1939      3 8.098317e-06              Love
## 226 1940      3 1.355514e-05              Love
## 227 1941      3 1.078028e-05              Love
## 228 1942      3 9.748863e-06              Love
## 229 1943      3 9.337493e-06              Love
## 230 1944      3 1.071700e-05              Love
```

```
## 231 1945    3 2.186012e-05         Love
## 232 1946    3 1.765067e-05         Love
## 233 1947    3 1.993097e-05         Love
## 234 1948    3 1.489117e-05         Love
## 235 1949    3 1.426107e-05         Love
## 236 1950    3 2.112242e-05         Love
## 237 1951    3 1.597720e-05         Love
## 238 1952    3 1.498283e-05         Love
## 239 1953    3 1.075382e-05         Love
## 240 1954    3 1.708625e-05         Love
## 241 1955    3 1.673386e-05         Love
## 242 1956    3 1.298471e-05         Love
## 243 1957    3 1.650690e-05         Love
## 244 1958    3 2.223734e-05         Love
## 245 1959    3 1.650690e-05         Love
## 246 1960    3 4.600980e-01         Love
## 247 1961    3 1.451621e-05         Love
## 248 1962    3 2.118370e-05         Love
## 249 1963    3 2.350170e-05         Love
## 250 1964    3 1.653181e-05         Love
## 251 1965    3 1.650690e-05         Love
## 252 1966    3 1.419638e-05         Love
## 253 1967    3 8.015337e-01         Love
## 254 1968    3 1.411406e-05         Love
## 255 1969    3 1.748165e-05         Love
## 256 1970    3 1.503424e-05         Love
## 257 1971    3 9.137801e-01         Love
## 258 1972    3 8.742934e-01         Love
## 259 1973    3 9.449059e-02         Love
## 260 1974    3 3.482699e-01         Love
## 261 1975    3 1.371640e-05         Love
## 262 1976    3 1.438120e-01         Love
## 263 1977    3 2.935392e-01         Love
## 264 1978    3 2.326355e-01         Love
## 265 1979    3 9.999092e-01         Love
## 266 1980    3 9.999059e-01         Love
## 267 1981    3 9.999230e-01         Love
## 268 1982    3 9.999398e-01         Love
## 269 1983    3 4.404257e-01         Love
## 270 1984    3 9.999346e-01         Love
## 271 1985    3 4.774584e-01         Love
## 272 1986    3 9.999425e-01         Love
## 273 1987    3 2.984656e-01         Love
## 274 1988    3 9.999396e-01         Love
## 275 1989    3 9.999524e-01         Love
## 276 1990    3 2.745738e-01         Love
## 277 1991    3 2.761005e-01         Love
## 278 1992    3 8.118332e-01         Love
## 279 1993    3 1.339764e-05         Love
## 280 1994    3 8.606832e-01         Love
## 281 1995    3 9.680049e-01         Love
## 282 1996    3 7.542275e-01         Love
## 283 1997    3 6.137923e-06         Love
## 284 1998    3 5.638694e-06         Love
```

```
## 285 1999        3 7.644898e-01            Love
## 286 2000        3 4.711068e-06            Love
## 287 2001        3 3.724982e-06            Love
## 288 2002        3 3.364564e-06            Love
## 289 2003        3 2.840974e-06            Love
## 290 2004        3 2.350014e-06            Love
## 291 2005        3 1.935238e-06            Love
## 292 2006        3 1.548742e-06            Love
## 293 2007        3 1.570954e-06            Love
## 294 2008        3 1.342340e-06            Love
## 295 2009        3 1.252759e-06            Love
## 296 2010        3 1.701773e-06            Love
## 297 2011        3 1.641953e-06            Love
## 298 2012        3 1.596949e-06            Love
## 299 2013        3 2.731858e-06            Love
## 300 2014        3 2.130732e-05            Love
## 301 1915        4 2.044471e-04            Thrill
## 302 1916        4 1.645260e-04            Thrill
## 303 1917        4 3.311577e-04            Thrill
## 304 1918        4 5.228698e-01            Thrill
## 305 1919        4 6.220923e-05            Thrill
## 306 1920        4 2.007010e-04            Thrill
## 307 1921        4 1.196112e-04            Thrill
## 308 1922        4 1.152080e-04            Thrill
## 309 1923        4 1.094520e-04            Thrill
## 310 1924        4 5.572174e-05            Thrill
## 311 1925        4 1.598119e-01            Thrill
## 312 1926        4 7.629091e-05            Thrill
## 313 1927        4 4.945548e-01            Thrill
## 314 1928        4 5.131674e-01            Thrill
## 315 1929        4 5.177128e-05            Thrill
## 316 1930        4 1.573619e-05            Thrill
## 317 1931        4 1.337860e-01            Thrill
## 318 1932        4 2.558793e-05            Thrill
## 319 1933        4 3.313481e-05            Thrill
## 320 1934        4 3.111139e-05            Thrill
## 321 1935        4 1.757985e-05            Thrill
## 322 1936        4 2.011396e-05            Thrill
## 323 1937        4 1.387274e-05            Thrill
## 324 1938        4 1.253879e-05            Thrill
## 325 1939        4 8.098317e-06            Thrill
## 326 1940        4 1.355514e-05            Thrill
## 327 1941        4 1.078028e-05            Thrill
## 328 1942        4 9.748863e-06            Thrill
## 329 1943        4 9.337493e-06            Thrill
## 330 1944        4 1.071700e-05            Thrill
## 331 1945        4 2.186012e-05            Thrill
## 332 1946        4 1.765067e-05            Thrill
## 333 1947        4 1.993097e-05            Thrill
## 334 1948        4 1.489117e-05            Thrill
## 335 1949        4 1.426107e-05            Thrill
## 336 1950        4 2.112242e-05            Thrill
## 337 1951        4 1.597720e-05            Thrill
## 338 1952        4 1.498283e-05            Thrill
```

```
## 339 1953      4 1.075382e-05          Thrill
## 340 1954      4 1.708625e-05          Thrill
## 341 1955      4 1.673386e-05          Thrill
## 342 1956      4 1.298471e-05          Thrill
## 343 1957      4 1.650690e-05          Thrill
## 344 1958      4 2.223734e-05          Thrill
## 345 1959      4 1.650690e-05          Thrill
## 346 1960      4 1.732953e-05          Thrill
## 347 1961      4 5.189710e-01          Thrill
## 348 1962      4 2.118370e-05          Thrill
## 349 1963      4 2.350170e-05          Thrill
## 350 1964      4 5.437200e-01          Thrill
## 351 1965      4 6.522058e-01          Thrill
## 352 1966      4 1.419638e-05          Thrill
## 353 1967      4 1.443016e-05          Thrill
## 354 1968      4 7.977932e-02          Thrill
## 355 1969      4 1.748165e-05          Thrill
## 356 1970      4 1.503424e-05          Thrill
## 357 1971      4 1.308553e-05          Thrill
## 358 1972      4 1.540424e-05          Thrill
## 359 1973      4 1.253879e-05          Thrill
## 360 1974      4 1.248875e-05          Thrill
## 361 1975      4 7.860967e-01          Thrill
## 362 1976      4 8.057647e-01          Thrill
## 363 1977      4 1.565746e-05          Thrill
## 364 1978      4 7.020039e-01          Thrill
## 365 1979      4 1.512767e-05          Thrill
## 366 1980      4 1.567987e-05          Thrill
## 367 1981      4 1.283258e-05          Thrill
## 368 1982      4 1.002547e-05          Thrill
## 369 1983      4 9.916554e-06          Thrill
## 370 1984      4 1.090369e-05          Thrill
## 371 1985      4 1.153524e-05          Thrill
## 372 1986      4 9.578365e-06          Thrill
## 373 1987      4 9.671394e-06          Thrill
## 374 1988      4 1.006231e-05          Thrill
## 375 1989      4 7.925461e-06          Thrill
## 376 1990      4 1.020290e-05          Thrill
## 377 1991      4 1.095823e-05          Thrill
## 378 1992      4 1.195707e-05          Thrill
## 379 1993      4 1.339764e-05          Thrill
## 380 1994      4 8.988843e-06          Thrill
## 381 1995      4 8.341931e-06          Thrill
## 382 1996      4 7.390707e-06          Thrill
## 383 1997      4 6.137923e-06          Thrill
## 384 1998      4 5.638694e-06          Thrill
## 385 1999      4 5.488937e-06          Thrill
## 386 2000      4 4.711068e-06          Thrill
## 387 2001      4 3.724982e-06          Thrill
## 388 2002      4 3.364564e-06          Thrill
## 389 2003      4 2.840974e-06          Thrill
## 390 2004      4 2.350014e-06          Thrill
## 391 2005      4 1.935238e-06          Thrill
## 392 2006      4 1.548742e-06          Thrill
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## 393 2007     4 1.570954e-06          Thrill
## 394 2008     4 1.342340e-06          Thrill
## 395 2009     4 7.358467e-01          Thrill
## 396 2010     4 7.889184e-01          Thrill
## 397 2011     4 1.641953e-06          Thrill
## 398 2012     4 1.596949e-06          Thrill
## 399 2013     4 2.731858e-06          Thrill
## 400 2014     4 2.130732e-05          Thrill
## 401 1915     5 2.044471e-04            Life
## 402 1916     5 1.645260e-04            Life
## 403 1917     5 3.311577e-04            Life
## 404 1918     5 4.639846e-05            Life
## 405 1919     5 6.220923e-05            Life
## 406 1920     5 2.007010e-04            Life
## 407 1921     5 1.196112e-04            Life
## 408 1922     5 1.152080e-04            Life
## 409 1923     5 1.094520e-04            Life
## 410 1924     5 5.572174e-05            Life
## 411 1925     5 8.020106e-05            Life
## 412 1926     5 7.629091e-05            Life
## 413 1927     5 1.883431e-05            Life
## 414 1928     5 9.507696e-06            Life
## 415 1929     5 5.177128e-05            Life
## 416 1930     5 1.573619e-05            Life
## 417 1931     5 5.447472e-05            Life
## 418 1932     5 5.171421e-01            Life
## 419 1933     5 3.313481e-05            Life
## 420 1934     5 3.111139e-05            Life
## 421 1935     5 1.757985e-05            Life
## 422 1936     5 2.011396e-05            Life
## 423 1937     5 1.387274e-05            Life
## 424 1938     5 1.253879e-05            Life
## 425 1939     5 8.098317e-06            Life
## 426 1940     5 1.355514e-05            Life
## 427 1941     5 1.078028e-05            Life
## 428 1942     5 9.748863e-06            Life
## 429 1943     5 9.337493e-06            Life
## 430 1944     5 1.071700e-05            Life
## 431 1945     5 2.186012e-05            Life
## 432 1946     5 1.765067e-05            Life
## 433 1947     5 1.692958e-01            Life
## 434 1948     5 1.489117e-05            Life
## 435 1949     5 4.675837e-01            Life
## 436 1950     5 2.112242e-05            Life
## 437 1951     5 1.412260e-01            Life
## 438 1952     5 2.690911e-01            Life
## 439 1953     5 6.610002e-01            Life
## 440 1954     5 8.437388e-01            Life
## 441 1955     5 9.366614e-01            Life
## 442 1956     5 8.379593e-01            Life
## 443 1957     5 9.318788e-01            Life
## 444 1958     5 8.632005e-01            Life
## 445 1959     5 9.999010e-01            Life
## 446 1960     5 4.034341e-01            Life
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## 447 1961      5 3.560926e-01          Life
## 448 1962      5 9.998729e-01          Life
## 449 1963      5 9.998590e-01          Life
## 450 1964      5 4.561973e-01          Life
## 451 1965      5 3.477116e-01          Life
## 452 1966      5 9.999148e-01          Life
## 453 1967      5 1.790936e-01          Life
## 454 1968      5 9.201501e-01          Life
## 455 1969      5 8.446262e-01          Life
## 456 1970      5 9.109830e-01          Life
## 457 1971      5 8.615447e-02          Life
## 458 1972      5 1.256296e-01          Life
## 459 1973      5 7.333530e-01          Life
## 460 1974      5 6.516676e-01          Life
## 461 1975      5 2.138348e-01          Life
## 462 1976      5 5.037001e-02          Life
## 463 1977      5 6.898898e-01          Life
## 464 1978      5 6.530697e-02          Life
## 465 1979      5 1.512767e-05          Life
## 466 1980      5 1.567987e-05          Life
## 467 1981      5 1.283258e-05          Life
## 468 1982      5 1.002547e-05          Life
## 469 1983      5 3.908740e-02          Life
## 470 1984      5 1.090369e-05          Life
## 471 1985      5 3.864827e-01          Life
## 472 1986      5 9.578365e-06          Life
## 473 1987      5 3.835481e-01          Life
## 474 1988      5 1.006231e-05          Life
## 475 1989      5 7.925461e-06          Life
## 476 1990      5 2.875225e-01          Life
## 477 1991      5 1.095823e-05          Life
## 478 1992      5 1.195707e-05          Life
## 479 1993      5 3.697210e-01          Life
## 480 1994      5 8.988843e-06          Life
## 481 1995      5 8.341931e-06          Life
## 482 1996      5 7.390707e-06          Life
## 483 1997      5 6.137923e-06          Life
## 484 1998      5 5.638694e-06          Life
## 485 1999      5 5.488937e-06          Life
## 486 2000      5 4.711068e-06          Life
## 487 2001      5 3.724982e-06          Life
## 488 2002      5 3.364564e-06          Life
## 489 2003      5 2.840974e-06          Life
## 490 2004      5 2.350014e-06          Life
## 491 2005      5 1.935238e-06          Life
## 492 2006      5 1.548742e-06          Life
## 493 2007      5 1.570954e-06          Life
## 494 2008      5 1.342340e-06          Life
## 495 2009      5 1.252759e-06          Life
## 496 2010      5 1.701773e-06          Life
## 497 2011      5 1.641953e-06          Life
## 498 2012      5 1.596949e-06          Life
## 499 2013      5 2.731858e-06          Life
## 500 2014      5 2.130732e-05          Life
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## 501 1915      6 1.951574e-01            World
## 502 1916      6 1.405618e-01            World
## 503 1917      6 3.311577e-04            World
## 504 1918      6 4.639846e-05            World
## 505 1919      6 3.591907e-02            World
## 506 1920      6 2.007010e-04            World
## 507 1921      6 1.196112e-04            World
## 508 1922      6 1.152080e-04            World
## 509 1923      6 1.094520e-04            World
## 510 1924      6 5.572174e-05            World
## 511 1925      6 8.020106e-05            World
## 512 1926      6 7.629091e-05            World
## 513 1927      6 1.883431e-05            World
## 514 1928      6 9.507696e-06            World
## 515 1929      6 5.177128e-05            World
## 516 1930      6 1.573619e-05            World
## 517 1931      6 5.447472e-05            World
## 518 1932      6 2.558793e-05            World
## 519 1933      6 3.313481e-05            World
## 520 1934      6 3.111139e-05            World
## 521 1935      6 1.757985e-05            World
## 522 1936      6 2.011396e-05            World
## 523 1937      6 1.387274e-05            World
## 524 1938      6 1.253879e-05            World
## 525 1939      6 8.098317e-06            World
## 526 1940      6 1.355514e-05            World
## 527 1941      6 1.078028e-05            World
## 528 1942      6 9.748863e-06            World
## 529 1943      6 9.337493e-06            World
## 530 1944      6 1.071700e-05            World
## 531 1945      6 2.186012e-05            World
## 532 1946      6 1.765067e-05            World
## 533 1947      6 1.993097e-05            World
## 534 1948      6 1.489117e-05            World
## 535 1949      6 1.426107e-05            World
## 536 1950      6 2.112242e-05            World
## 537 1951      6 1.597720e-05            World
## 538 1952      6 1.498283e-05            World
## 539 1953      6 1.075382e-05            World
## 540 1954      6 1.708625e-05            World
## 541 1955      6 1.673386e-05            World
## 542 1956      6 1.298471e-05            World
## 543 1957      6 1.650690e-05            World
## 544 1958      6 2.223734e-05            World
## 545 1959      6 1.650690e-05            World
## 546 1960      6 1.732953e-05            World
## 547 1961      6 1.451621e-05            World
## 548 1962      6 2.118370e-05            World
## 549 1963      6 2.350170e-05            World
## 550 1964      6 1.653181e-05            World
## 551 1965      6 1.650690e-05            World
## 552 1966      6 1.419638e-05            World
## 553 1967      6 1.443016e-05            World
## 554 1968      6 1.411406e-05            World
```

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## 555 1969       6 1.748165e-05          World
## 556 1970       6 1.503424e-05          World
## 557 1971       6 1.308553e-05          World
## 558 1972       6 1.540424e-05          World
## 559 1973       6 1.253879e-05          World
## 560 1974       6 1.248875e-05          World
## 561 1975       6 1.371640e-05          World
## 562 1976       6 1.332430e-05          World
## 563 1977       6 1.565746e-05          World
## 564 1978       6 1.340583e-05          World
## 565 1979       6 1.512767e-05          World
## 566 1980       6 1.567987e-05          World
## 567 1981       6 1.283258e-05          World
## 568 1982       6 1.002547e-05          World
## 569 1983       6 9.916554e-06          World
## 570 1984       6 1.090369e-05          World
## 571 1985       6 1.153524e-05          World
## 572 1986       6 9.578365e-06          World
## 573 1987       6 9.671394e-06          World
## 574 1988       6 1.006231e-05          World
## 575 1989       6 7.925461e-06          World
## 576 1990       6 1.020290e-05          World
## 577 1991       6 1.095823e-05          World
## 578 1992       6 1.195707e-05          World
## 579 1993       6 1.339764e-05          World
## 580 1994       6 8.988843e-06          World
## 581 1995       6 8.341931e-06          World
## 582 1996       6 7.390707e-06          World
## 583 1997       6 6.137923e-06          World
## 584 1998       6 5.638694e-06          World
## 585 1999       6 5.488937e-06          World
## 586 2000       6 4.711068e-06          World
## 587 2001       6 3.724982e-06          World
## 588 2002       6 8.808295e-01          World
## 589 2003       6 2.840974e-06          World
## 590 2004       6 2.350014e-06          World
## 591 2005       6 1.935238e-06          World
## 592 2006       6 1.548742e-06          World
## 593 2007       6 1.570954e-06          World
## 594 2008       6 9.999919e-01          World
## 595 2009       6 1.155187e-03          World
## 596 2010       6 1.701773e-06          World
## 597 2011       6 9.597612e-01          World
## 598 2012       6 9.999904e-01          World
## 599 2013       6 9.999836e-01          World
## 600 2014       6 9.998722e-01          World
## 601 1915       7 2.044471e-04 Insipirational
## 602 1916       7 1.645260e-04 Insipirational
## 603 1917       7 3.311577e-04 Insipirational
## 604 1918       7 4.639846e-05 Insipirational
## 605 1919       7 6.220923e-05 Insipirational
## 606 1920       7 2.007010e-04 Insipirational
## 607 1921       7 1.196112e-04 Insipirational
## 608 1922       7 1.500194e-01 Insipirational
```

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## 609 1923     7 1.094520e-04 Insipirational
## 610 1924     7 9.337719e-02 Insipirational
## 611 1925     7 8.020106e-05 Insipirational
## 612 1926     7 7.629091e-05 Insipirational
## 613 1927     7 1.883431e-05 Insipirational
## 614 1928     7 9.507696e-06 Insipirational
## 615 1929     7 5.177128e-05 Insipirational
## 616 1930     7 1.573619e-05 Insipirational
## 617 1931     7 5.447472e-05 Insipirational
## 618 1932     7 2.558793e-05 Insipirational
## 619 1933     7 3.313481e-05 Insipirational
## 620 1934     7 3.111139e-05 Insipirational
## 621 1935     7 1.757985e-05 Insipirational
## 622 1936     7 2.011396e-05 Insipirational
## 623 1937     7 1.387274e-05 Insipirational
## 624 1938     7 1.253879e-05 Insipirational
## 625 1939     7 8.098317e-06 Insipirational
## 626 1940     7 1.355514e-05 Insipirational
## 627 1941     7 1.078028e-05 Insipirational
## 628 1942     7 9.748863e-06 Insipirational
## 629 1943     7 9.337493e-06 Insipirational
## 630 1944     7 1.071700e-05 Insipirational
## 631 1945     7 2.186012e-05 Insipirational
## 632 1946     7 1.765067e-05 Insipirational
## 633 1947     7 1.993097e-05 Insipirational
## 634 1948     7 1.489117e-05 Insipirational
## 635 1949     7 1.426107e-05 Insipirational
## 636 1950     7 2.112242e-05 Insipirational
## 637 1951     7 1.597720e-05 Insipirational
## 638 1952     7 1.498283e-05 Insipirational
## 639 1953     7 1.075382e-05 Insipirational
## 640 1954     7 1.708625e-05 Insipirational
## 641 1955     7 1.673386e-05 Insipirational
## 642 1956     7 1.298471e-05 Insipirational
## 643 1957     7 1.650690e-05 Insipirational
## 644 1958     7 2.223734e-05 Insipirational
## 645 1959     7 1.650690e-05 Insipirational
## 646 1960     7 1.732953e-05 Insipirational
## 647 1961     7 1.451621e-05 Insipirational
## 648 1962     7 2.118370e-05 Insipirational
## 649 1963     7 2.350170e-05 Insipirational
## 650 1964     7 1.653181e-05 Insipirational
## 651 1965     7 1.650690e-05 Insipirational
## 652 1966     7 1.419638e-05 Insipirational
## 653 1967     7 1.443016e-05 Insipirational
## 654 1968     7 1.411406e-05 Insipirational
## 655 1969     7 1.552864e-01 Insipirational
## 656 1970     7 8.894185e-02 Insipirational
## 657 1971     7 1.308553e-05 Insipirational
## 658 1972     7 1.540424e-05 Insipirational
## 659 1973     7 1.721063e-01 Insipirational
## 660 1974     7 1.248875e-05 Insipirational
## 661 1975     7 1.371640e-05 Insipirational
## 662 1976     7 1.332430e-05 Insipirational
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## 663 1977     7 1.650833e-02 Insipirational
## 664 1978     7 1.340583e-05 Insipirational
## 665 1979     7 1.512767e-05 Insipirational
## 666 1980     7 1.567987e-05 Insipirational
## 667 1981     7 1.283258e-05 Insipirational
## 668 1982     7 1.002547e-05 Insipirational
## 669 1983     7 9.916554e-06 Insipirational
## 670 1984     7 1.090369e-05 Insipirational
## 671 1985     7 1.360127e-01 Insipirational
## 672 1986     7 9.578365e-06 Insipirational
## 673 1987     7 3.179475e-01 Insipirational
## 674 1988     7 1.006231e-05 Insipirational
## 675 1989     7 7.925461e-06 Insipirational
## 676 1990     7 4.378629e-01 Insipirational
## 677 1991     7 7.238447e-01 Insipirational
## 678 1992     7 1.881071e-01 Insipirational
## 679 1993     7 6.302120e-01 Insipirational
## 680 1994     7 1.392719e-01 Insipirational
## 681 1995     7 3.195340e-02 Insipirational
## 682 1996     7 2.457355e-01 Insipirational
## 683 1997     7 9.999632e-01 Insipirational
## 684 1998     7 9.999662e-01 Insipirational
## 685 1999     7 2.354827e-01 Insipirational
## 686 2000     7 9.999717e-01 Insipirational
## 687 2001     7 3.724982e-06 Insipirational
## 688 2002     7 1.191537e-01 Insipirational
## 689 2003     7 5.041612e-03 Insipirational
## 690 2004     7 2.350014e-06 Insipirational
## 691 2005     7 1.935238e-06 Insipirational
## 692 2006     7 1.399250e-03 Insipirational
## 693 2007     7 9.999906e-01 Insipirational
## 694 2008     7 1.342340e-06 Insipirational
## 695 2009     7 2.629931e-01 Insipirational
## 696 2010     7 2.110731e-01 Insipirational
## 697 2011     7 4.023061e-02 Insipirational
## 698 2012     7 1.596949e-06 Insipirational
## 699 2013     7 2.731858e-06 Insipirational
## 700 2014     7 2.130732e-05 Insipirational
```

```r
#Here is the stacked bar plot
library(ggplot2)
ggplot(control1, aes(x = year, y = proportion, fill = topicname)) +
  geom_bar(stat = "identity")  +labs(title="Movie Genres Across each year using VEM (LDA) - No clear top
```

e Genres Across each year using VEM (LDA) – No clear topics (not advised)
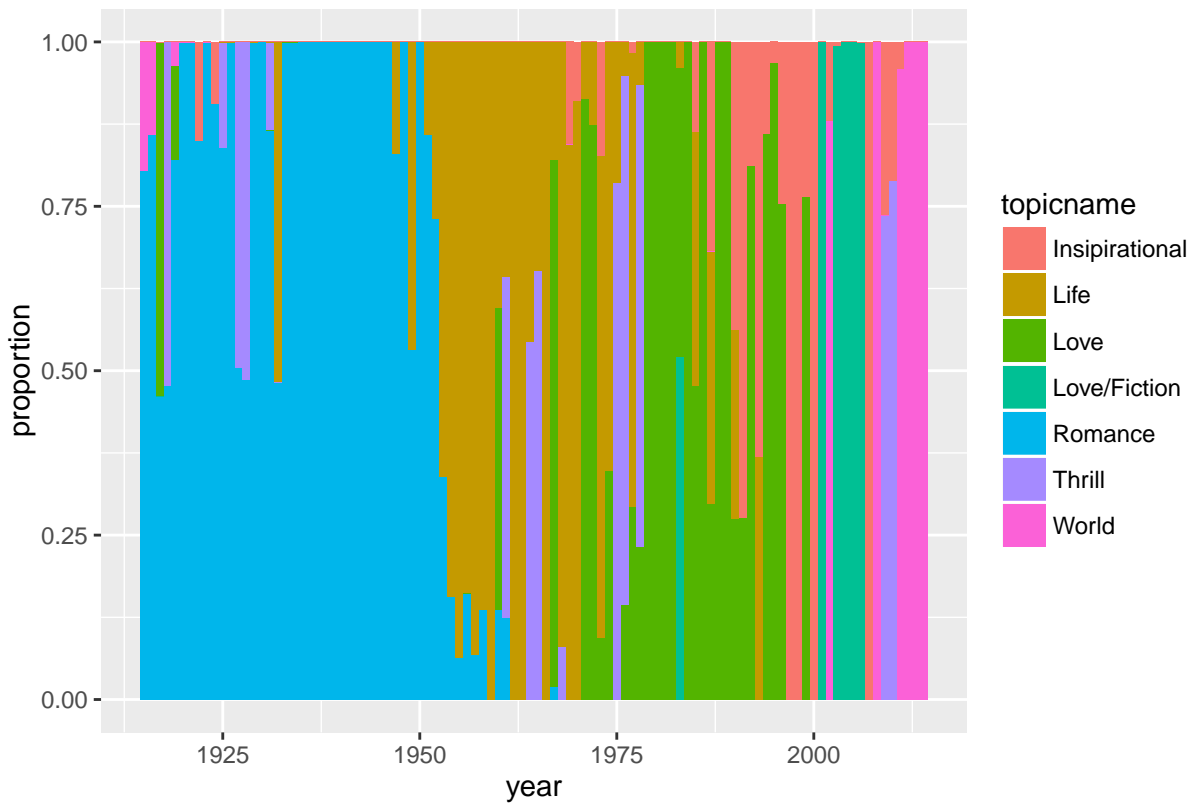

```
# Even here we see that VEM (variational expectation maximization) is not able to split the genres clea
#as we see the 0.99 proportions in the stacked bar chart.
#Hence, I would suggest using Gibbs LDA for the year level analysis as well.
```