Final-Project-Draft

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Introduction

What

What this project covers is a text analysis of Lana Del Rey song lyrics in her most critically acclaimed album *Norman Fucking Rockwell!* (*NFR!*). The goal of this project will uncover a sentiment analysis of Lana's lyrics to paint a picture of her album's artistry.

Why

I chose this project scope for a few reasons:

1) In the field of marketing, understanding the consumer's emotional psychology is important in constructing user journeys that help guide and inform sales and marketing campaign. I want to explore that subject but with a personal muse I find interesting. Doing a text to sentiment analysis will help me accomplish this.
2) It is also in my interest to apply a statistical lens to something that is more categorical in nature. That will stretch my statistics understanding while keeping it within a relatively comfortable understanding of the topic.

How

First off, I used a lyric website (lyricfind.com) to generate the lyrics. Then I manually collected data, with each lyric line being an observation. Next, I used R and GitHub to organize, explore, and summarize the data. Finally, this project incorporated concepts on data summary, graphical representation, and regression to analyze the data.

Body

Why is it important?

Text analysis is important because it is useful method for turning large amounts of unstructured data into something that can be understood and analyzed. This method helps to find meaning out of written communications, like song lyrics or a series of tweets from consumers. Analyzing that text data and uncovering sentiment can help businesses better understand the user journey and design an experience for customer conversion.

Each row of text will be associated with a one or more of the six main sentiments from The Sentiment Wheel (see Figure 1). The main six are at the inner center of the circle: Sad, Mad, Scared, Peaceful, Powerful, and Joyful.

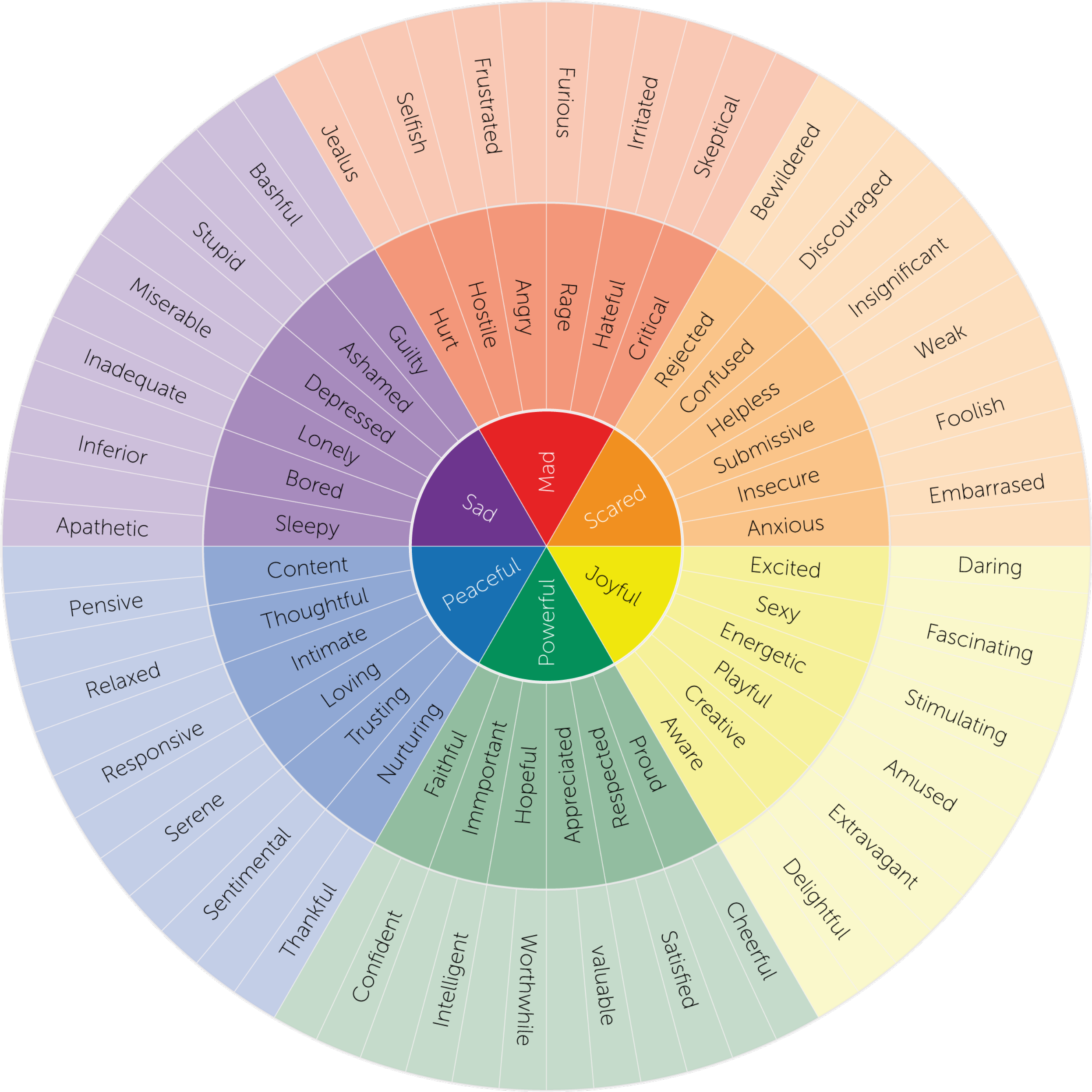


Figure 1: The Sentiment Wheel

Problems, Challenges, and Resolutions

I've encountered a few challenges in exploring this project:

1) How to structure the unstructured text data?

I initially attempted to structure the data with tidytext, using the 'janeaustinr' tutorial package as a guide. However, that file already exists in a package that can be brought over to R easily. My challenge was with figuring out how to "package" the album lyrics. My original intent was to use tidytext and diplyr to structure and clean the text. However, upon more research and discussion with peers, the method to do text analysis will require technical skills and time commitment outside the scope of this project. As such, this project will use Excel and its .csv file to organize the text data.

2) How to assign sentiment to the text?

Another challenge was figuring out how to assign the sentiment to the lines of text. At the moment, I am unsure of the approach. However, the project instead conducted a manual qualitative assessment of the lyrics and assigned sentiment based on word association. For example, if the lyric mentioned words like "happy", "love" or "party", that lyric would be assigned a "Joyful" sentiment. Thus, this project recognizes doing so adds a layer of personal bias. While I would like to avoid my own personal bias when assigning/inferring sentiment to the lyrics, but that is be a limitation in this project. In an ideal approach, a script or software would be able to scrub the lyrics.

3) Open issue:

The project had to scale back and focus on one album only. Initially, I did not realize the technical learning curve that comes with text analysis and the methodology needed for it. However, through this project I am learning that method and taking the time to be methodical with my project. The project's output may not be as polished as I had initially hoped, but regardless of the outcome, I do feel it will advance my knowledge and interest in text/sentiment analysis.

Topics from Class

Topics 1 and 2: R Markdown to summarize data, and GitHub to develop repository.

R Markdown is used to import the data and summarize it. With GitHub, this project is available for others to view. Because this is a topic that touches pop culture, it may also be of interest to those outside of statistics. GitHub's public settings will allow for me to share these findings and final opinion with other individuals who have an interest in Lana Del Rey.

```
library(readr)
lanadelrey<-read.csv("lanadelrey.csv")
```

```
dim(lanadelrey)
```

```
## [1] 643  10
```

```
names(table(lanadelrey$Song))
```

```
##  [1] "Bartender"
##  [2] "California"
##  [3] "Cinnamon Girl"
##  [4] "Doin Time"
##  [5] "Fuck It I Love You"
##  [6] "Happiness Is A Butterfly"
##  [7] "Hope Is A Dangerous Thing For A Woman Like Me To Have But I have It"
##  [8] "How to Disappear"
##  [9] "Love Song"
## [10] "Mariners Apartment Complex"
## [11] "Norman Fucking Rockwell"
## [12] "The Greatest"
## [13] "The Next Best American Record"
## [14] "Venice Bitch"
```

```
names(lanadelrey)
```

```
##  [1] "Lyric"        "Song"         "Track.Number" "Album"        "Sad"
##  [6] "Mad"          "Scared"       "Peaceful"     "Powerful"     "Joyful"
```

As show, there are 643 observations - these will represent each line of lyric spanning across the 14 songs in *Norman Fucking Rockwell!*. There are 10 variables in this data set; however, since this is a sentiment analysis, the applicable variables the project will analyze are the six emotions: Sad, Mad, Scared, Peaceful, Powerful, and Joyful. According to The Sentiment Wheel, while these are the main emotions, they contain a multitude of other more complex emotions. For example, feelings of "rage" or "jealousy" can be classified as "Mad."

```
typeof(lanadelrey$Sad)
```

```
## [1] "integer"
```

Topic 3: Cleaning and Loading Data

These are also categorical, non-ordinal variables. Binary code will represent whether any of the sentiments exist in a line of lyric. It is also possible a line of lyric may contain more than one sentiment. "1" will represent the presence of the sentiment, and "0" will represent the absence. Now, we will look at the numerical frequency of each sentiment.

```
sum(lanadelrey$Sad)
```

```
## [1] 123
```

```
sum(lanadelrey$Mad)
```

```
## [1] 33
```

```
sum(lanadelrey$Scared)
```

```
## [1] 68
```

```
sum(lanadelrey$Peaceful)
```

```
## [1] 78
```

```
sum(lanadelrey$Powerful)
```

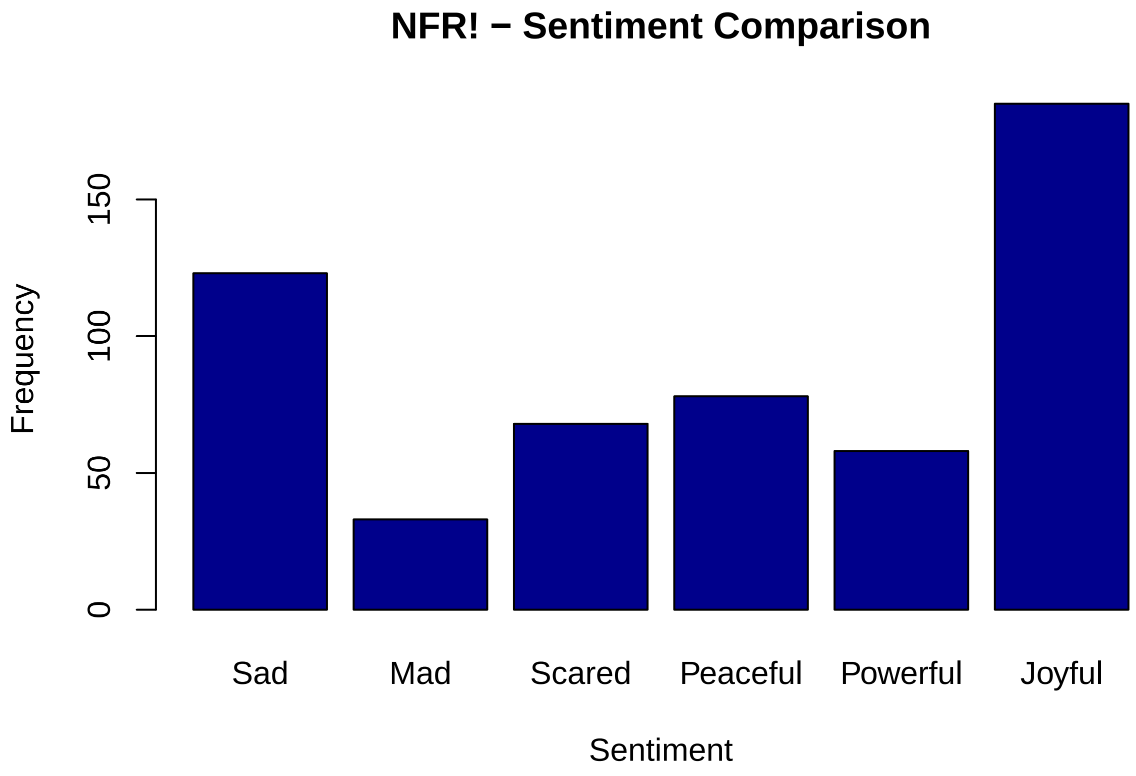
```
## [1] 58
```

```
sum(lanadelrey$Joyful)
```

```
## [1] 185
```

```
Sentiments<-c(123, 33, 68, 78, 58, 185)
```

```
barplot(Sentiments,
       main = "NFR! - Sentiment Comparison",
       xlab = "Sentiment",
       ylab = "Frequency",
      names.arg = c("Sad", "Mad", "Scared", "Peaceful", "Powerful", "Joyful"),
     col = "darkblue",
        horiz = FALSE)
```



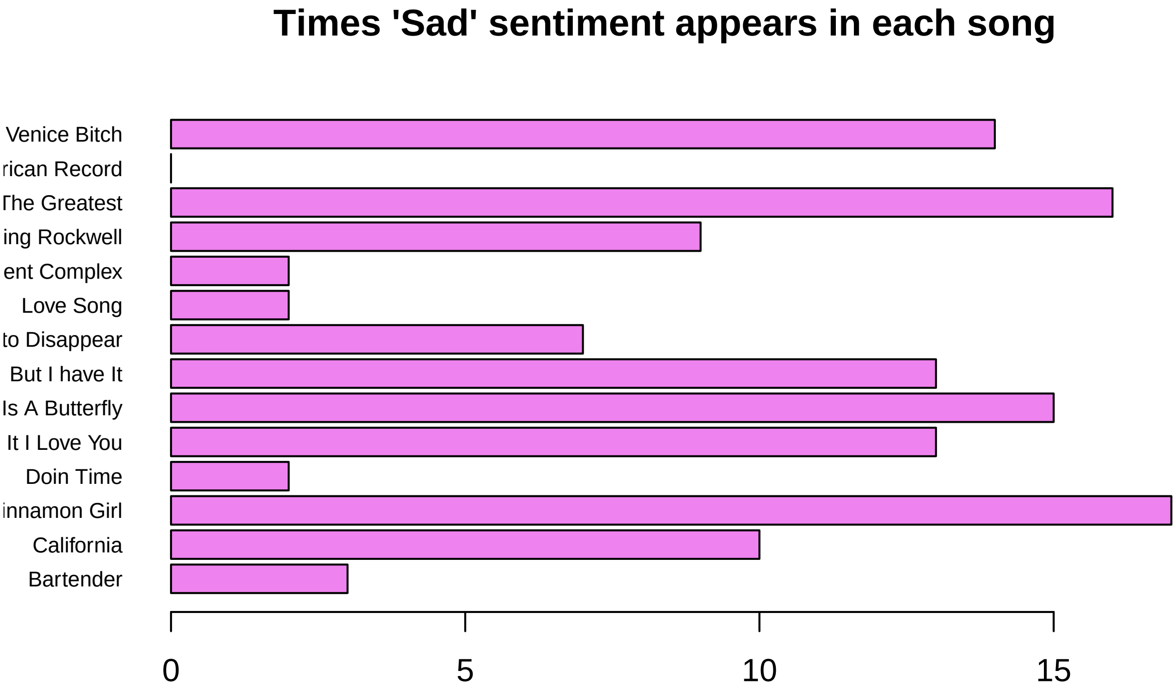
The frequency of sentiment on *NFR!* is as follows: Sad (123), Mad (33), Scared (68), Peaceful (78), Powerful (58), and Joyful (185). The album is largely Joyful, followed by Sad.

Topic 4 and 5: Analysis of Data with Barplots and Distribution Charts

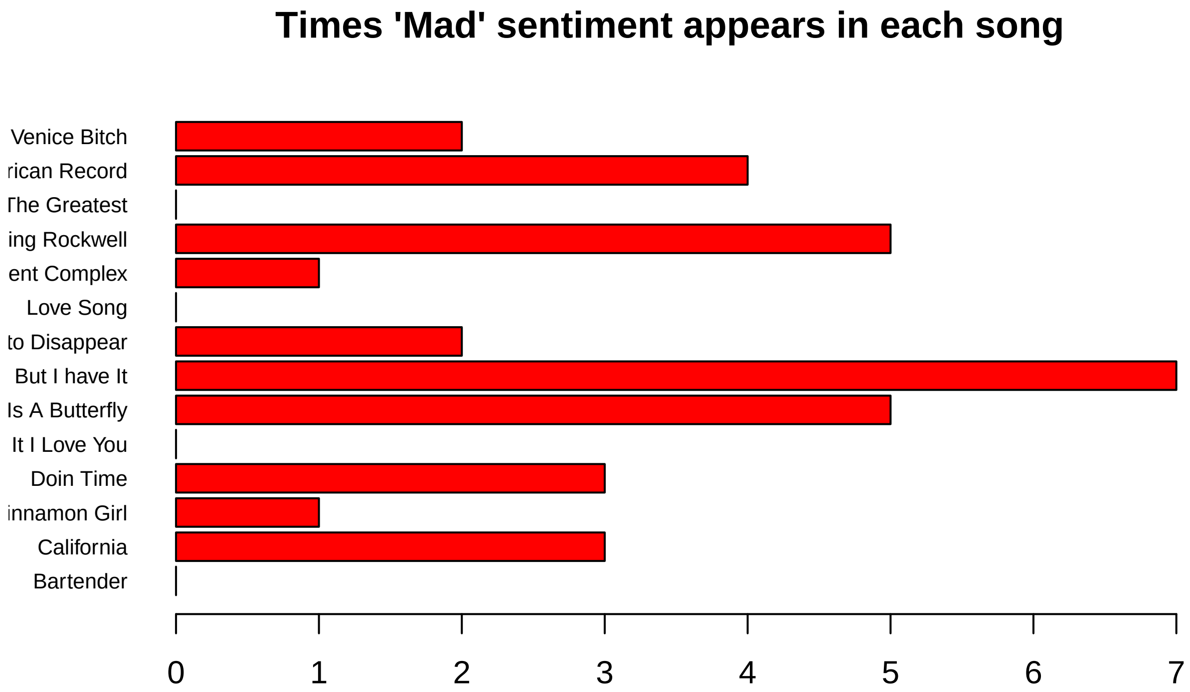
The text analysis relates to Chapter 2 from the class textbook on Summarizing Data, specifically categorical data. Although the data is not numerical, the project will still look at the "distribution" of sentiment by looking at sentiment frequency.The bar plots will allow comparison between sentiment by song, and the distribution charts will dive into how often sentiments show up by lines of lyric.

```
sadtable<-table(lanadelrey$Song, lanadelrey$Sad)
madtable<-table(lanadelrey$Song, lanadelrey$Mad)
scaredtable<-table(lanadelrey$Song, lanadelrey$Scared)
peacefultable<-table(lanadelrey$Song, lanadelrey$Peaceful)
powerfultable<-table(lanadelrey$Song, lanadelrey$Powerful)
joyfultable<-table(lanadelrey$Song, lanadelrey$Joyful)
```

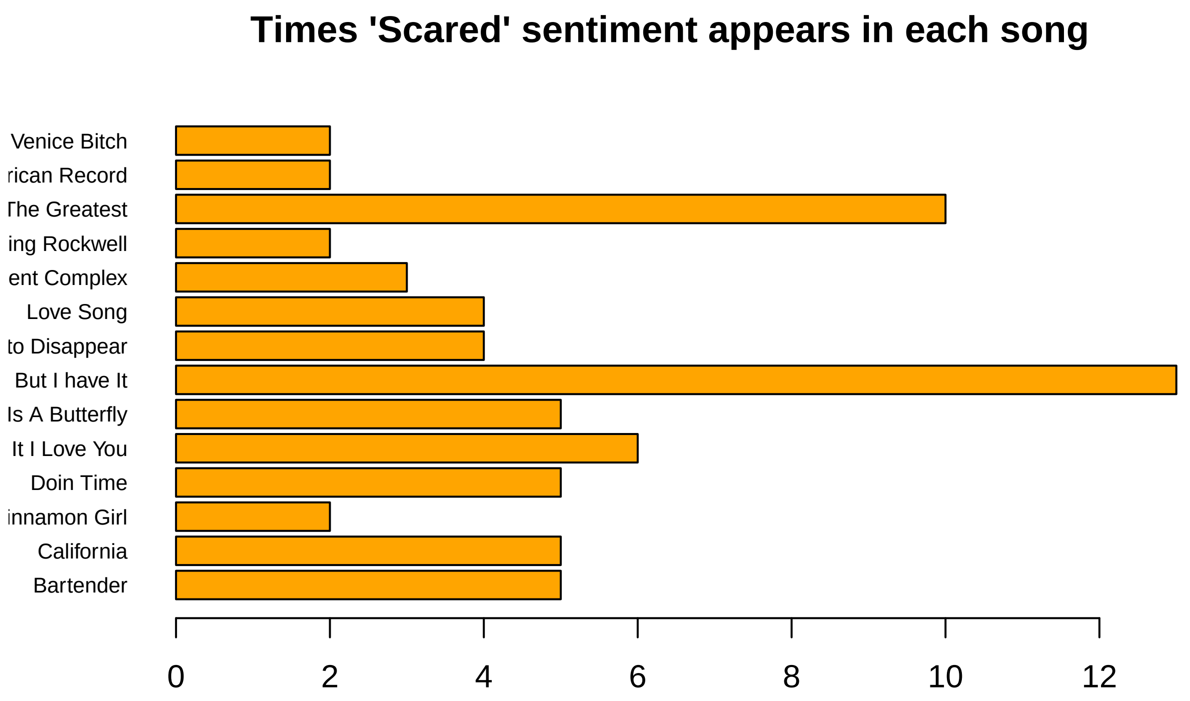
```
barplot(sadtable[,2],
        main = "Times 'Sad' sentiment appears in each song",
        horiz = TRUE,
        col = "violet",
        las = 1,
        cex.names = .7)
```



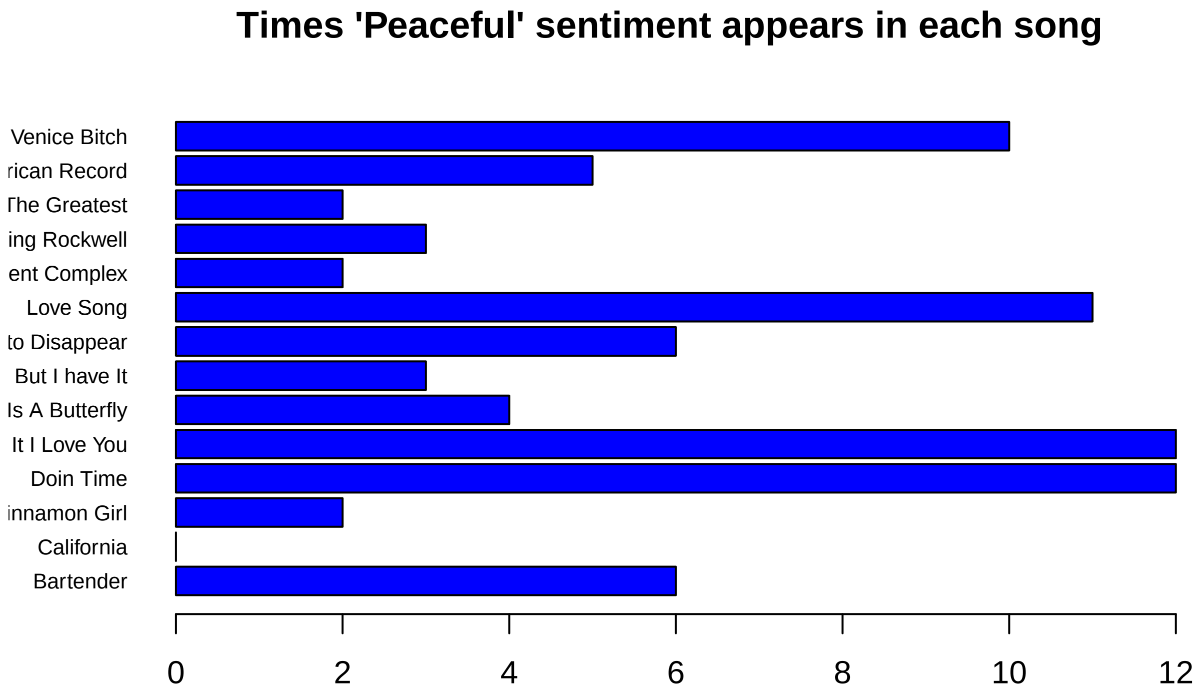
```
barplot(madtable[,2],
        main = "Times 'Mad' sentiment appears in each song",
        horiz = TRUE,
        col = "red",
        las = 1,
        cex.names = .7)
```



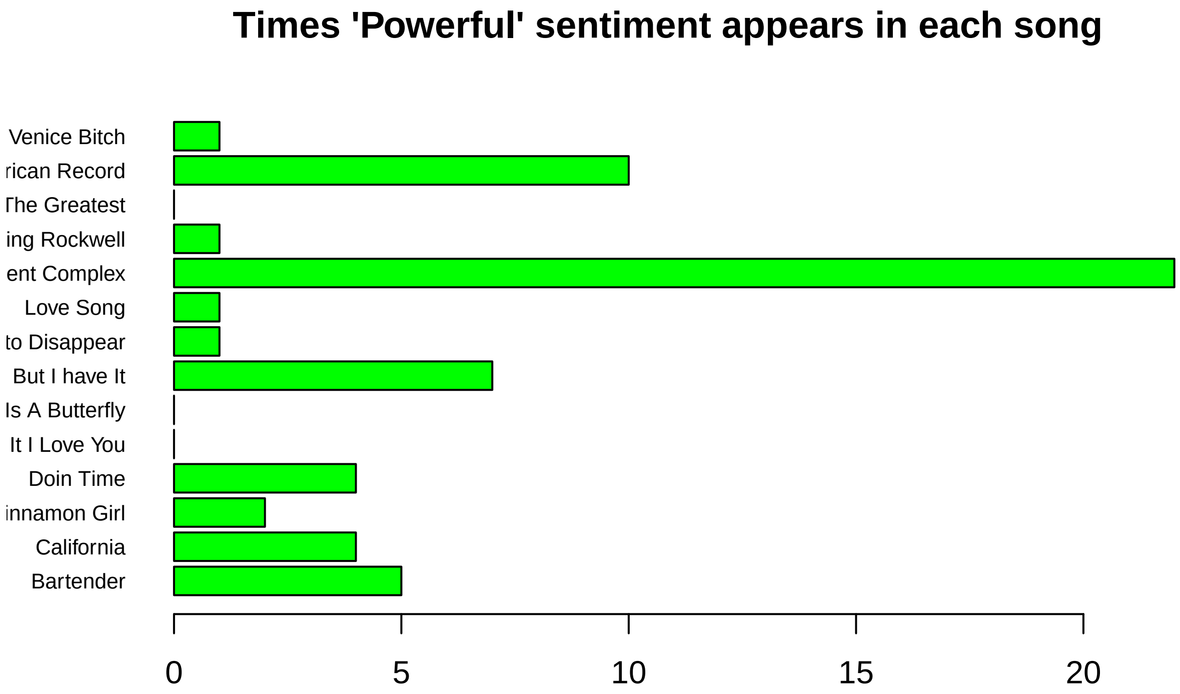
```
barplot(scaredtable[,2],
        main = "Times 'Scared' sentiment appears in each song",
        horiz = TRUE,
        col = "orange",
        las = 1,
        cex.names = .7)
```



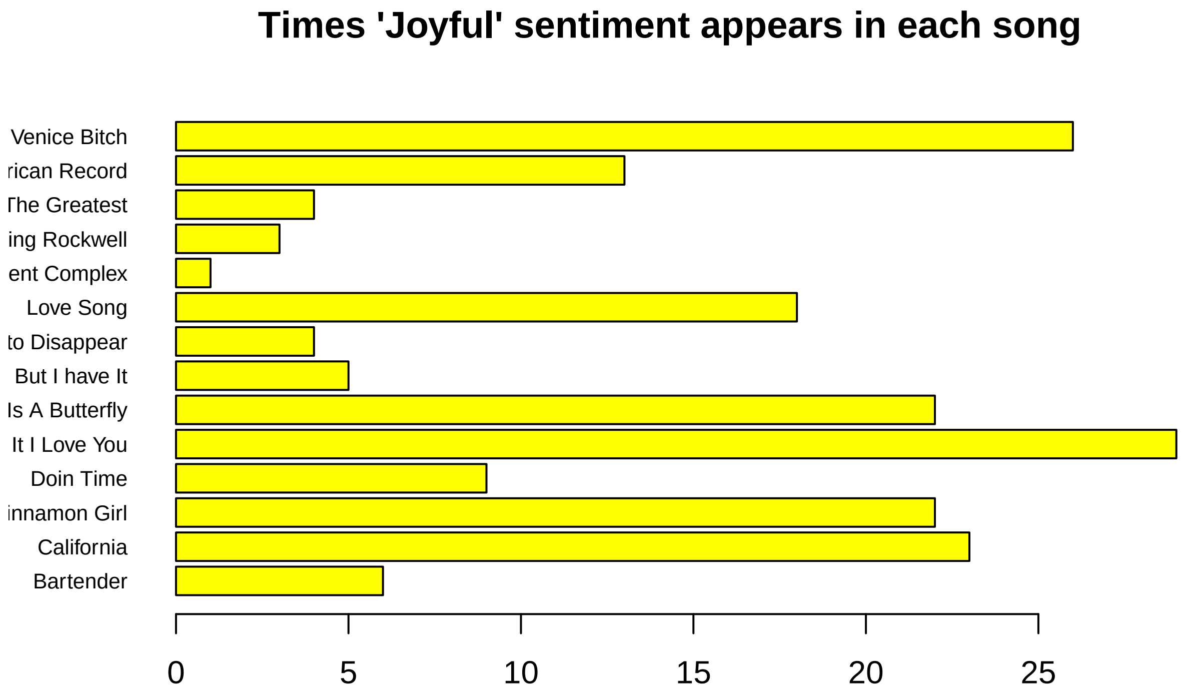
```
barplot(peacefultable[,2],
        main = "Times 'Peaceful' sentiment appears in each song",
        horiz = TRUE,
        col = "blue",
        las = 1,
        cex.names = .7)
```



```
barplot(powerfultable[,2],
        main = "Times 'Powerful' sentiment appears in each song",
        horiz = TRUE,
        col = "green",
        las = 1,
        cex.names = .7)
```



```
barplot(joyfultable[,2],
        main = "Times 'Joyful' sentiment appears in each song",
        horiz = TRUE,
        col = "yellow",
        las = 1,
        cex.names = .7)
```

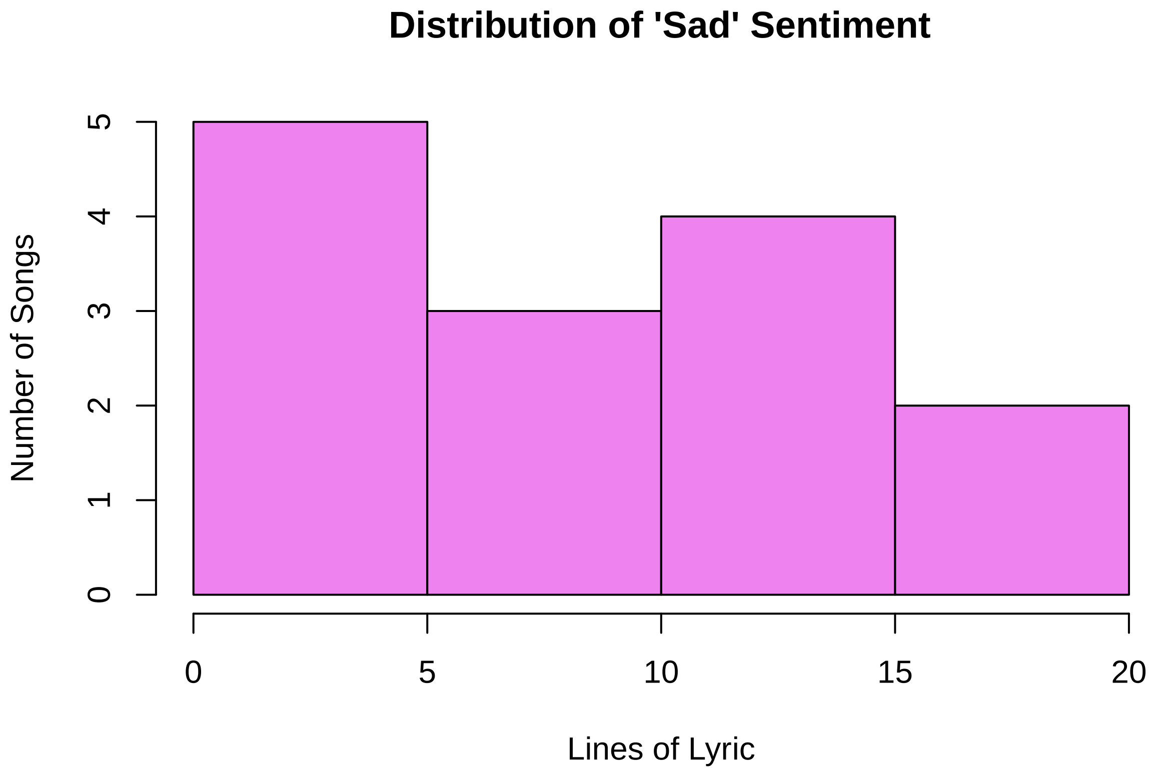


How often does a sentiment appear by songs?

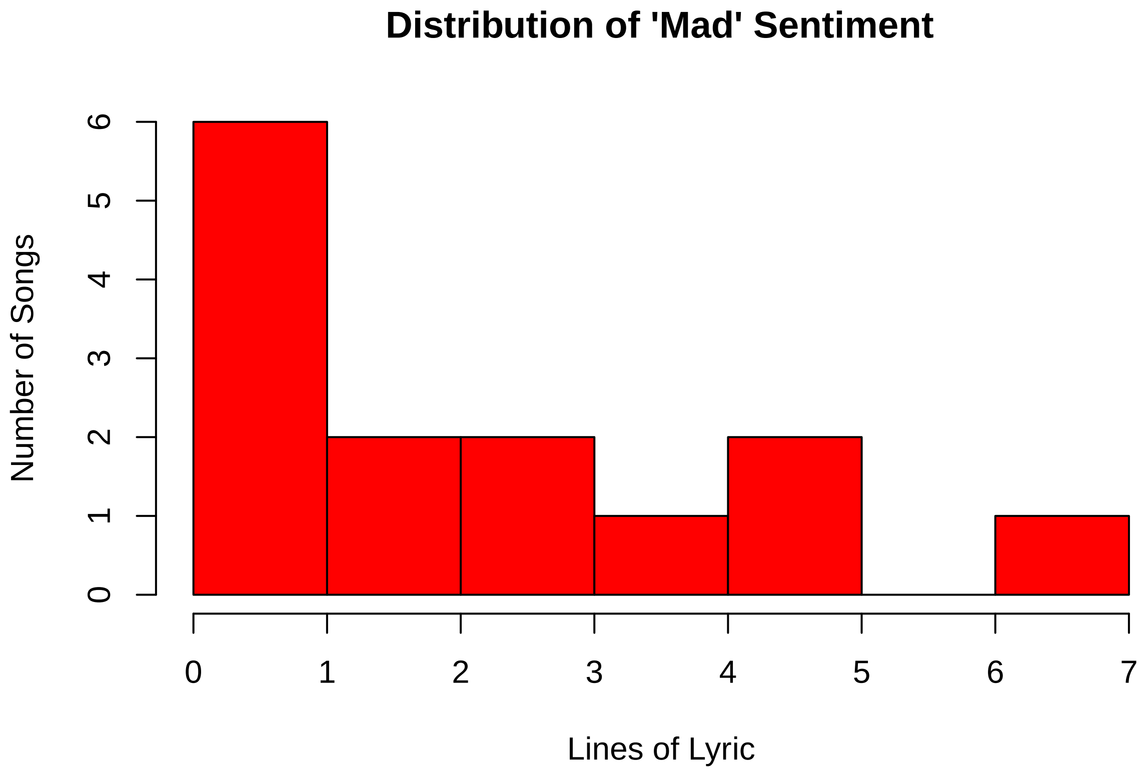
According to the analysis:

-Sad: this emotion appears the most in the song ‘Cinnamon Girl’ -Mad: this emotion appears the most in the song ‘Fuck It, I Love You’ -Scared: this emotion appears the most the song ‘Hope is a Dangerous Thing for a Woman Like Me to Have But I Have it’ -Peaceful: this emotion appears equally the most in the songs ‘Fuck It, I Love You’ and ‘Doin Time’ -Powerful: this emotion appears the most in the song ‘Mariners Apartment Complex’ -Joyful: this emotion appears the most in the song ‘Fuck It, I Love You’

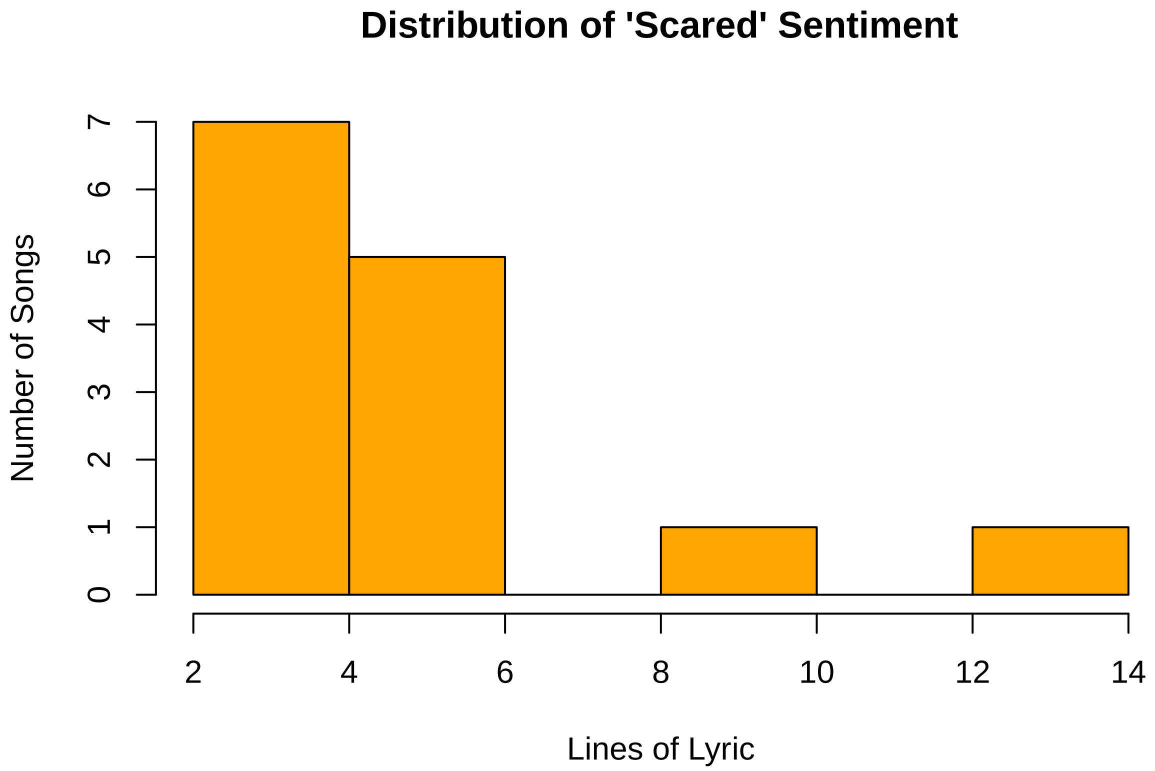
```
hist(sadtable[,2],
     main = "Distribution of 'Sad' Sentiment",
     xlab = "Lines of Lyric",
     ylab = "Number of Songs",
     col = "violet")
```



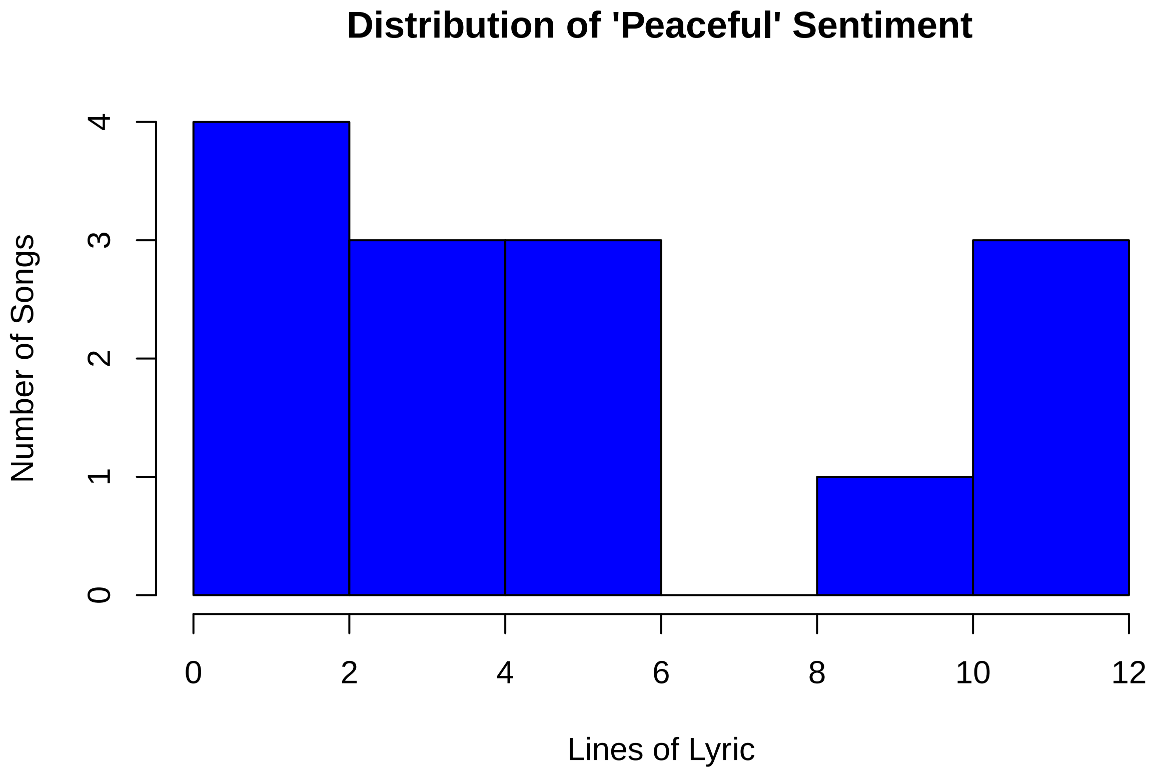
```
hist(madtable[,2],
     main = "Distribution of 'Mad' Sentiment",
     xlab = "Lines of Lyric",
     ylab = "Number of Songs",
     col = "red")
```



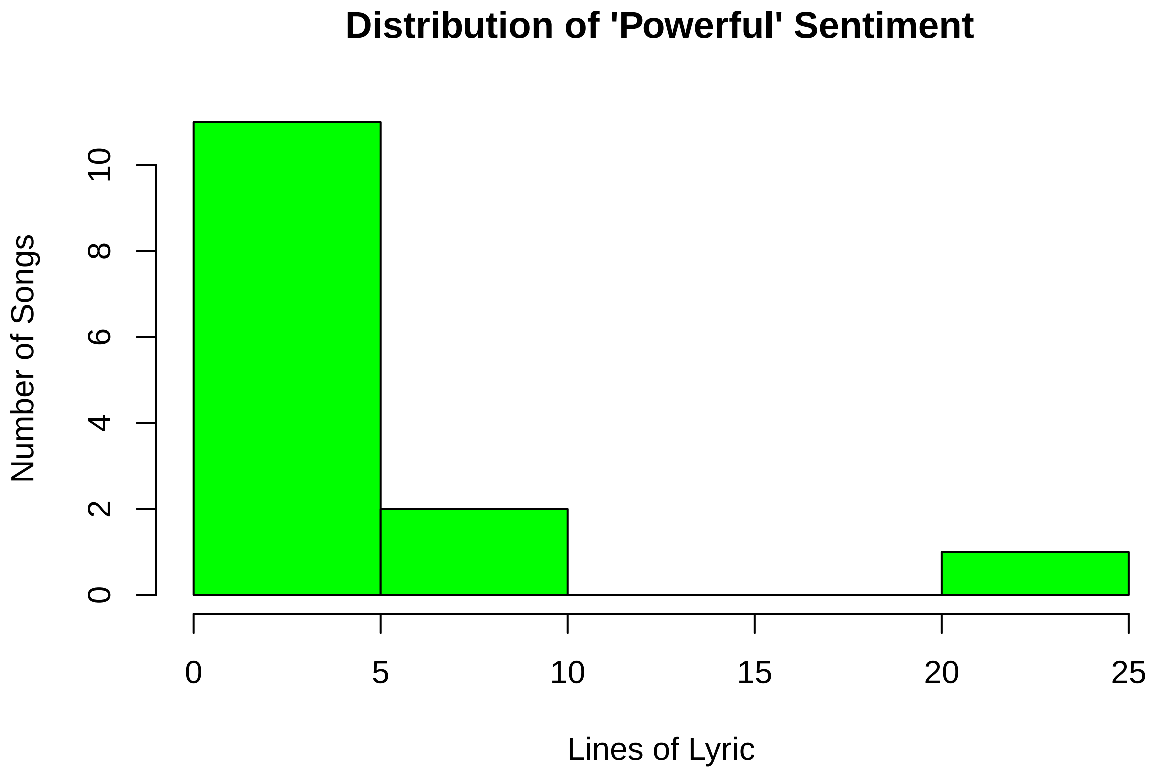
```
hist(scaredtable[,2],
     main = "Distribution of 'Scared' Sentiment",
     xlab = "Lines of Lyric",
     ylab = "Number of Songs",
     col = "orange")
```



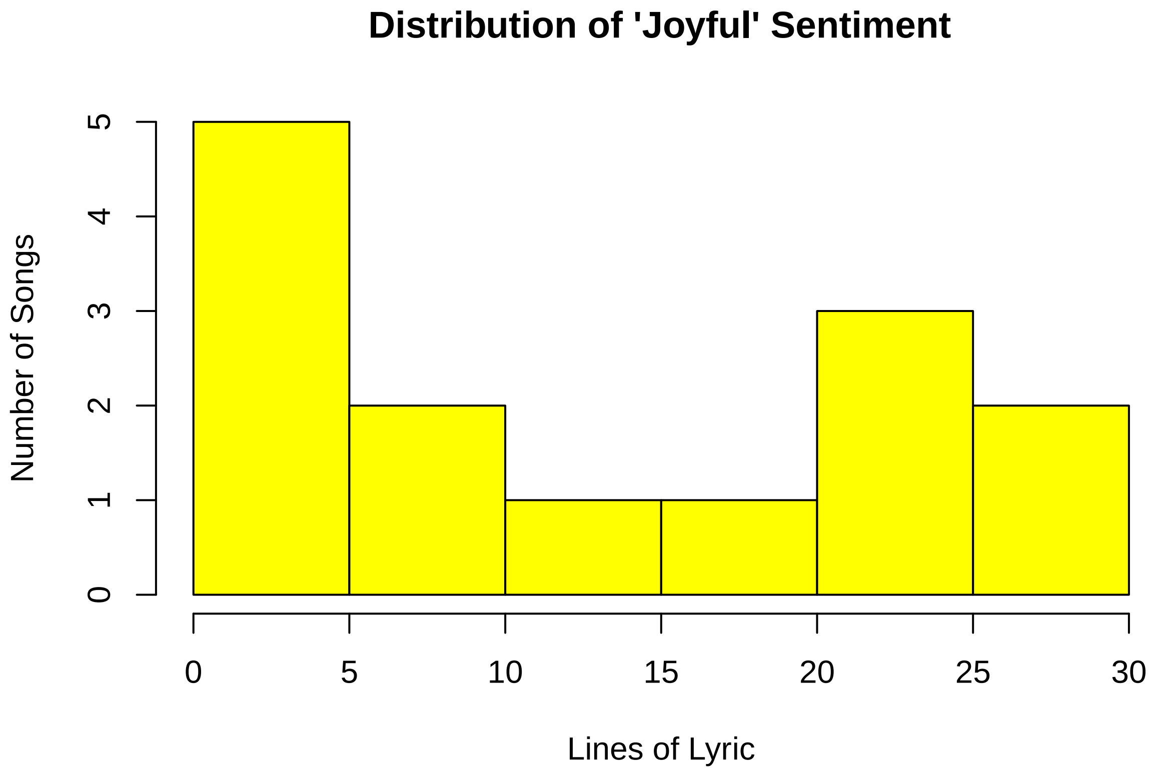
```
hist(peacefultable[,2],
     main = "Distribution of 'Peaceful' Sentiment",
     xlab = "Lines of Lyric",
     ylab = "Number of Songs",
     col = "blue")
```



```
hist(powerfultable[,2],
     main = "Distribution of 'Powerful' Sentiment",
     xlab = "Lines of Lyric",
     ylab = "Number of Songs",
     col = "green")
```



```
hist(joyfultable[,2],
     main = "Distribution of 'Joyful' Sentiment",
     xlab = "Lines of Lyric",
     ylab = "Number of Songs",
     col = "yellow")
```



How often do songs feature a sentiment?

According to the analysis, all the Sentiment distribution charts are right skewed, with the majority of songs with fewer lines of lyrics containing the sentiment. Only a few number of songs contain many lines of lyrics pertaining to a particular sentiment.

Conclusion

This project advanced my knowledge and curiosity around text analysis. First, it was a realization that there is a lot more that goes into the data scraping and framing when it comes to a text analysis. I even learned from a classmate that you could potentially write an R Script to automate that process. Additionally, I picked up some more reading with the book "Text Mining with R" by David Robinson and Julia Silge. Although I was not able to apply it, I did pick up conceptual understanding to the frame work that is needed to conduct this type of analysis, such as "stop words" and "stemming" - which is the process of eliminating redundant words and trimming text strings to its most concise valuable text.

I also wanted to conduct a regression on the data to determine whether certain variables in the data set had any type of relationship. I was not able to get to that because I realized the data file was not structured in a way that could allow for that type of analysis. At that point, it was too late to modify the data file and reload. With more time, I would redo the data scraping to ensure the file had the data points needed for that.

With more time as well, I would employ Shiny to visualize this data set on a web app directly from R. Doing so would make this analysis more accessible and consumable for other fans of Lana Del Rey. My biggest takeaway from the final project is that there are many tools available to carry out a successful text analysis. Tidytext and diplyr to scrape and frame the data, R to conduct the statistical analysis, and a visualization tool like Shiny to convert that to an interactive platform. At the end of this project, I have a better idea of the ecosystem and will likely explore these together in the near future.