

Comparing Taylor Swift’s and Beyonce’s Lyrics

Anusha Bhat

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1 Introduction

Taylor Swift and Beyonce are currently two of the most prominent and influential female pop artists in the US entertainment industry. Both women have recently released widely acclaimed and well-received full-length studio albums and have embarked on sold-out world tours within the past year. Naturally, these two are often pitted against each other by fans trying to determine which singer is better—but what truly distinguishes their artistry?

In this report, we aim to investigate and elucidate potential similarities and differences between Taylor Swift’s and Beyonce’s discographies. Specifically, we will explore which topics comprise each artist’s discography and the context in which common topics are used. Additionally, we want to identify differences in emotional valence across each artist’s discography. Understanding what topics and emotional sentiments are used in well-received lyrics can help highlight what content is being publicized to impressionable audiences.

We hypothesize that both of the artists will have similar topics throughout their discographies, however, the context in which these topics are discussed may differ since Beyonce sings about more mature stories than Taylor Swift does. We also hypothesize that Beyonce’s songs may be more negative than Taylor Swift due to the explicit nature of her lyrics.

2 Data

To aide our analysis, we created two corpora of song lyrics with one corpora for each artist’s discography. These corpora only include English songs where either Taylor Swift or Beyonce were the primary singers from their full length albums (not featured artists or collaborative albums). Explicit versions were used wherever applicable, however, no remixes or instrumental versions were included. Additionally, we included the number of Spotify plays each songgarnered up until July 2022 for Beyonce’s songs and July 2023 for Taylor Swift’s songs.

For Taylor Swift’s corpus, if an album has a re-recorded version, then we only included the Taylor’s Version songs and vault tracks for that album. This prevents us from double-counting lyrics and having the most up to date versions of the albums included.

After creating our corpora, we tokenized the lyrics and removed all numbers, punctuations, symbols, and filler lyrics (e.g. "like", "ooh", "oh", "yeah", "mm", "mhm", etc...) from each corpus since these lyrics do not carry any meaning and would skew our analysis if they

were not removed.

2.1 Beyonce's Songs Corpus

This corpus consists of 113 songs from 7 albums, with a total of 53,823 tokens. In table 1 we can see the top 5 songs with the most tokens in this corpus.

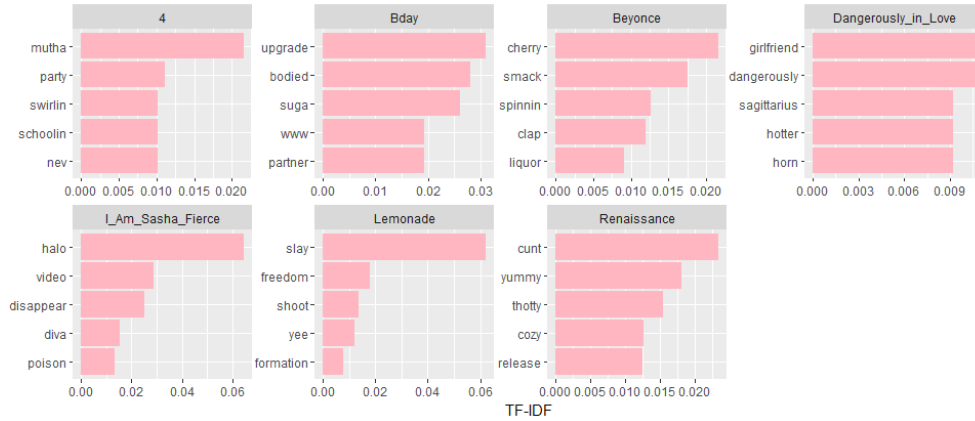
Top 5 Most Frequent Songs: Beyonce's Corpus

	Tokens	Percent
ring_off.txt	1033	1.919254
mine.txt	934	1.735318
upgrade_u.txt	888	1.649852
video_phone.txt	838	1.556955
baby_boy.txt	795	1.477064

Table 1

"Ring off", "Mine", and "Upgrade U" are the three longest songs Beyonce has written, with 1,033, 934, and 888 tokens respectively. In figure 1, we can examine the most relevant lyrics from each of her albums. The most relevant words are related to partying and confidence.

Figure 1: Most Relevant Lyrics From Beyonce's Albums



2.2 Taylor Swift's Songs Corpus

This corpus consists of 198 songs from 10 albums, with a total of 74,174 tokens. In table 3 we can see the top 5 songs with the most tokens in this corpus.

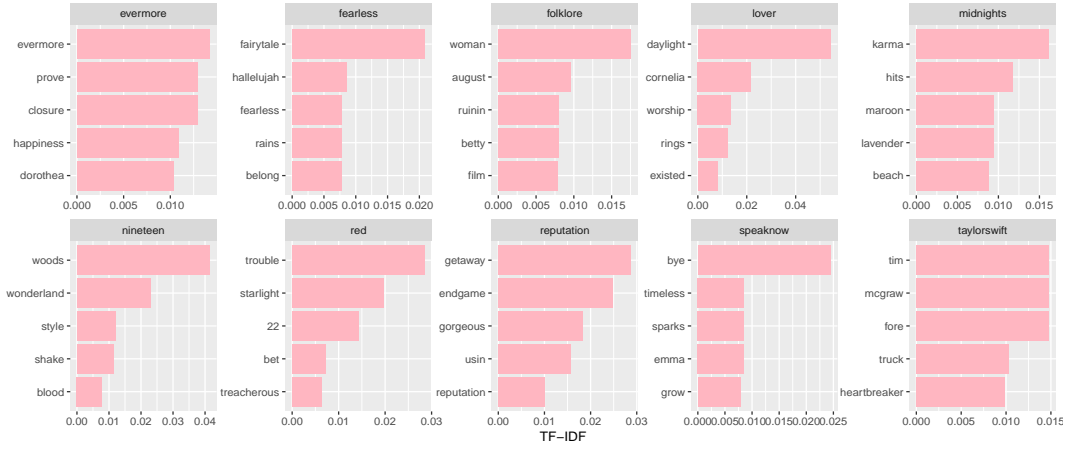
Top 5 Most Frequent Songs: Taylor Swift's Corpus

	Tokens	Percent
All_Too_Well_10_Minute_Version.txt	979	1.3287729
I_Wish_You_Would.txt	730	0.9908112
End_Game.txt	655	0.8890156
Out_Of_The_Woods.txt	642	0.8713710
Getaway_Car.txt	565	0.7668608

Table 2

"All Too Well (10 Minute Version)", "Out of the Woods", and "Endgame" are the three longest songs in the corpus, with 981, 733, and 692 tokens respectively. In figure 2, we can examine the most relevant lyrics from each of her albums. The most relevant words seem to relate to scenery and are descriptive.

Figure 2: Most Relevant Lyrics From Taylor Swift's Albums



3 Methods

3.1 Research Question 1: Comparing and Contrasting Topics

To investigate what topics are in common and what topics differ between Taylor Swift and Beyonce, we can conduct Structural Topic Modelling (STM) with 4 topics, after performing stemming on both corpora (Roberts, Stewart, Tingley, 2019). Using the topics that are in common between the two artists, for each artist, we can create key word in context tables (KWIC) to examine the usage of these topics in each discography. Lastly, we can analyze the presence of these topics vary by performing regression analysis using the number of Spotify Plays per song as the predictor variable (Bail, C. 2020).

3.2 Research Question 2: Analyzing Emotional Valence Over Time

To compare and contrast the emotional valence over time of each artist, we can perform sentiment analysis using both corpora (Jin, Y., Cheng, K., Wang, X., Cai, L., 2023). We can

first analyze the proportion of positive versus negative terms for each album in both corpora then we can compare these proportions overall for both artists.

4 Results

4.1 Question 1

We begin this subsection by analyzing the results of STM for every album in both corpora.

Top 4 Topics in Taylor Swift's Albums

Album	Topic 1	Topic 2	Topic 3	Topic 4
Taylor Swift	Heartbreak	Songs	Beauty	Hope
Fearless	Love	Time	Feelings	Fearless
Speak Now	Goodbye	Love	Growing Up	Time
Red	Running	Time	Trouble	Love
1989	Haters	Anxiety	Lust	Love
Reputation	Heartbreak	Delicate	Nostalgia	Fun
Lover	Crushes	Sadness	Nostalgia	Love
Folklore	Hope	Time	Peace	Women
Evermore	Closure	Sadness	Happiness	Heartbreak
Midnights	Love	Time	Scheming	Revenge

Table 3

In table 3, we can see that Taylor Swift often sings about love, time, heartbreak, various feelings, and relationships.

Top 4 Topics in Beyonce's Albums

Album	Topic 1	Topic 2	Topic 3	Topic 4
Dangerously In Love	Relationships	Sex	Love	Crazy
Bday	Jealousy	Moving On	Love	Female Empowerment
I am Sasha Fierce	Safety	Disappearing	Heartbreak	Love
4	Caring	Love	Female Empowerment	Partying
Beyonce	Relationships	Sex	Women	Love
Lemonade	Confidence	Relationships	Love	Heartbreak
Renaissance	Love	Heartbreak	Relationships	Confidence

Table 4

In table 4, we can see that Beyonce often sings about female empowerment, confidence, relationships, heartbreak, and love. Overall, the topics she sings about appear to be more mature in nature (e.g. sex and partying) than the topics sung by Taylor Swift. The topics of heartbreak, relationships, and love are in common between the two artists.

Of the three common topics mentioned, we can create KWIC tables for love and heart-

break to see how these two topics are used by the two artists. We note that the songs shown in each table are a random sample of the songs from the entire discography, but we checked all of the songs to support our conclusions.

KWIC of Love: Taylor Swift's Songs

docname	pre	keyword	post
London_Boy.txt	with you you know i	love	a london boy i enjoy
Labyrinth.txt	last i m falling in	love	no i m falling in
22.txt	at midnight to fall in	love	with strangers we re happy
Better_Man.txt	we might still be in	love	if you were a better
Sad_Beautiful_Tragic.txt	we had a beautiful magic	love	there what a sad beautiful

Table 5

KWIC of Love: Beyonce's Songs

docname	pre	keyword	post
drunk_in_love.txt	love we be all night	love	love we be all night
dangerously_in_love.txt	you i love you i	love	you yes i love you
dangerously_in_love.txt	i love you i honestly	love	you i love i love
virgos_groove.txt	touch me to love somebody	love	me to trust somebody will
end_of_time.txt	i be the one to	love	you baby let s go

Table 6

By comparing tables 5 and 6, we can see that Taylor Swift sings about what love feels like and describes the act of falling in love, whereas, Beyonce sings about the physical act of loving someone else.

KWIC of Heartbreak: Taylor Swift's Songs

docname	pre	keyword	post
A_Perfectly_Good_Heart.txt	you break a perfectly good	heart	why would you take our
King_Of_My_Heart.txt	waiting for king of my	heart	body and soul and all
Hits_Different.txt	now the sun burns my	heart	and the sand hurts my
Afterglow.txt	even when i break your	heart	i need to say hey
A_Place_In_The_World.txt	and i m wearing my	heart	on my sleeve feeling lucky

Table 7

KWIC of Heartbreak: Beyonce's Songs

docname	pre	keyword	post
ring_off.txt	the one who had his	heart	until you had enough and
broken_hearted_girl.txt	to be afraid my broken	heart	is free to spread my
radio.txt	got a place in my	heart	i think i m in
daddy.txt	if my man broke my	heart	today no matter how much
broken_hearted_girl.txt	do n't want a broken	heart	do n't take a breath

¹ Table 8

By comparing tables 7 and 8, we can see that both Taylor Swift and Beyonce sing about heartbreak in context of the aftermath of a failed relationship. Overall, the two artists sing about love in different contexts but not about heartbreak.

For the regression models below, each plot displays a line and a confidence interval for the 4 topics found by performing STM on the artist's entire discography.

Figure 3: Expected Proportion of Taylor Swift's Topics v.s. Number of Plays

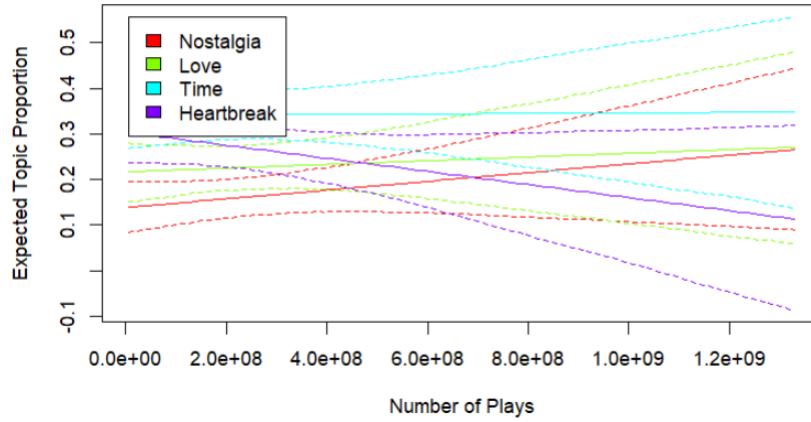
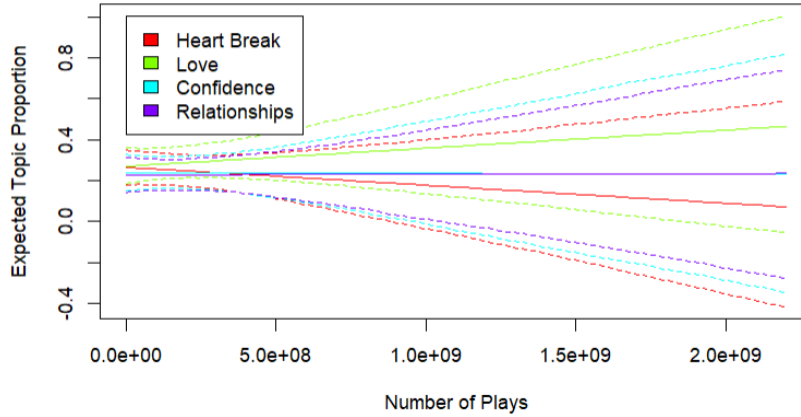


Figure 4: Expected Proportion of Taylor Swift's Topics v.s. Number of Plays

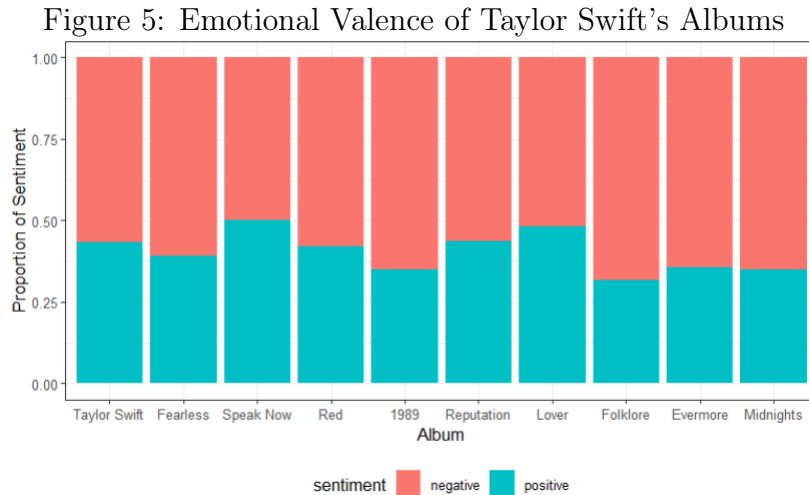


For their entire discographies, both artists have the topics of heartbreak and love in common. For both artists, we can observe from the plots that the expected proportion of heartbreak has a negative linear association with number of plays while love has a positive

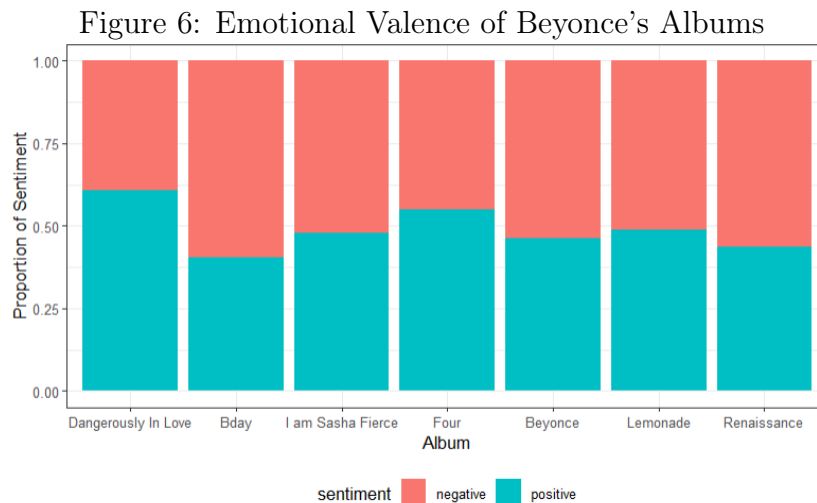
linear association. However, we can note that the expected proportion decreases at a faster rate as the number of plays increases for heartbreak and increases at a faster rate for love for Taylor Swift's songs compared to Beyonce's songs.

4.2 Question 2

We begin this subsection by analyzing the emotional valence of each artist's individual discography.

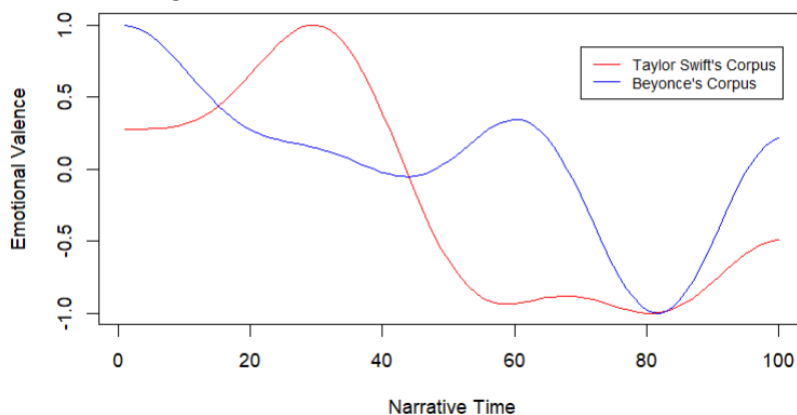


In Figure 5, we can observe that Taylor Swift's lyrics are more negative than they are positive for all albums. Her lyrics were the most positive in the "Speak Now" and "Lover" albums but the most negative in "Folklore".



In Figure 6, we can observe that Beyonce's lyrics are slightly more negative than positive. However, the proportion of negative sentiment in Beyonce's albums is less than the proportion of negative sentiment in Taylor Swift's albums. Her debut album, "Dangerously in Love" is her most positive work, while "Bday" is her most negative album.

Figure 7: Emotional Valence Over Time



In figure 7, we can observe that in the beginning Taylor Swift’s lyrics become increasingly positive, then drastically become more negative. Her newer songs have more negative emotional valence scores than her older songs, however, her sentiment scores increased in recent narrative time. Similarly, Beyonce’s lyrics start off with incredibly positive scores, which continuously decrease, and end with an increase in emotional valence scores. Although both artists seem to have decreasing emotional valence scores throughout their discography, Beyonce maintains a positive score for a majority of her songs, whereas, a majority of Taylor Swift’s songs received a negative score.

5 Discussion

We find that the most common topics in Taylor Swift’s albums are love, time, heartbreak, various feelings, and relationships. In contrast, the most common topics in Beyonce’s albums are female empowerment, confidence, relationships, and heartbreak. Of these topics, heartbreak, relationships, and love were in common for both artists. An examination of how love and heartbreak are used found that both artists discuss heartbreak in the same context for both corpora, however, Beyonce discusses the physical aspects of love, whereas, Taylor Swift discusses the feeling of falling in love. The topics regarding female empowerment and confidence and the context in which the topic of love is used, highlights that Beyonce often does sing about more mature content than Taylor Swift. Moreover, we find that Taylor Swift’s songs are more negative in sentiment than Beyonce’s.

Since we did not remove repeating lyrics in choruses, our analysis is limited in scope. Removing these recurring phrases would improve our topic modelling, however, for the consistency of our corpora, we did not remove these lyrics. Future analysis could also explore the usage of various parts-of-speech types and perform regression analysis to determine how parts-of-speech relate to n-grams in each artist’s lyrics. This would allow for a more substantial investigation of the differences between the two artist’s lyrics beyond what we can find with topic modeling and sentiment analysis.

6 References

- Bail, C. (2020). Topic Modeling. Topic modeling. https://sicss.io/2020/materials/day3-text-analysis/topic-modeling/rmarkdown/Topic_Modeling.html
- “Beyonce.” Genius, ML Genius Holdings , genius.com/artists/Beyonce. Accessed 19 Nov. 2023.
- Jin, Y., Cheng, K., Wang, X., Cai, L. (2023, July). A review of text sentiment analysis methods and applications - researchgate. Research Gate. https://www.researchgate.net/publication/372425679_A_Review_of_Text_Sentiment_Analysis_Methods_and_Applications
- MJD. (2023, July 11). Streaming masters – Taylor Swift. ChartMasters. <https://chartmasters.org/streaming-masters-taylor-swift/>
- MJD. (2022, July 19). Streaming masters – Beyoncé. ChartMasters. <https://chartmasters.org/streaming-masters-beyonce/>
- “Taylor Swift.” Genius, ML Genius Holdings , genius.com/artists/Taylor-swift. Accessed 19 Nov. 2023.
- Roberts, M. E., Stewart, B. M., Tingley, D. (2019, October). "STM: An R package for structural Topic Models". Journal of Statistical Software. <https://scholar.harvard.edu/files/dtingley/files/jss-stm.pdf>