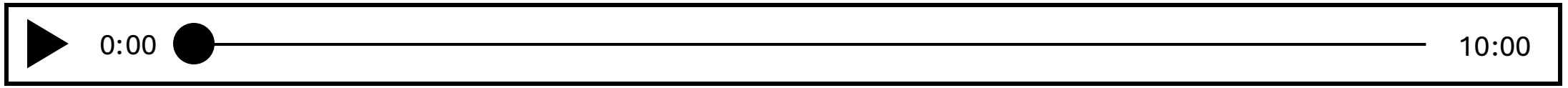
Text Analysis Group Project: Lyric Analysis

A. Karanja, B. Cheong, C. Lembono, C. Marathe, L.Koay



Introduction

Introduction

Overview of Data

Common Words

Curse Words

Topics

Transfer Learning

Popularity Over Time

Limitations

Conclusion

Time?

Topics?

Genres?

What Makes the Lyrics of a Popular Song?

Curse Words?

Common Words?

Research Scope

[Intro]

In a world so wide,

Population of interest, clear in our sight.

Lookin’ for the change, or maybe the mean,

Quantity of interest—know what I mean?

Population of Interest:

Lyrics in English to a

Western audience

Quantity of Interest:

Popularity

Research Purpose

[Verse 1]

Starting a war, screaming "Peace" at the same time All the corruption, injustice, the same crimes Always a problem if we do or don't fight And we die, we don't have the same right

H.E.R. – I Can't Breathe

[Pre-Chorus: Logic]

I've been on the low, I been taking my time I feel like I'm out of my mind It feel like my life ain't mine (Who can relate? Woo) I've been on the low, I been taking my time I feel like I'm out of my mind It feel like my life ain't mine

Logic – 1-800-273-8255

Overview of Data

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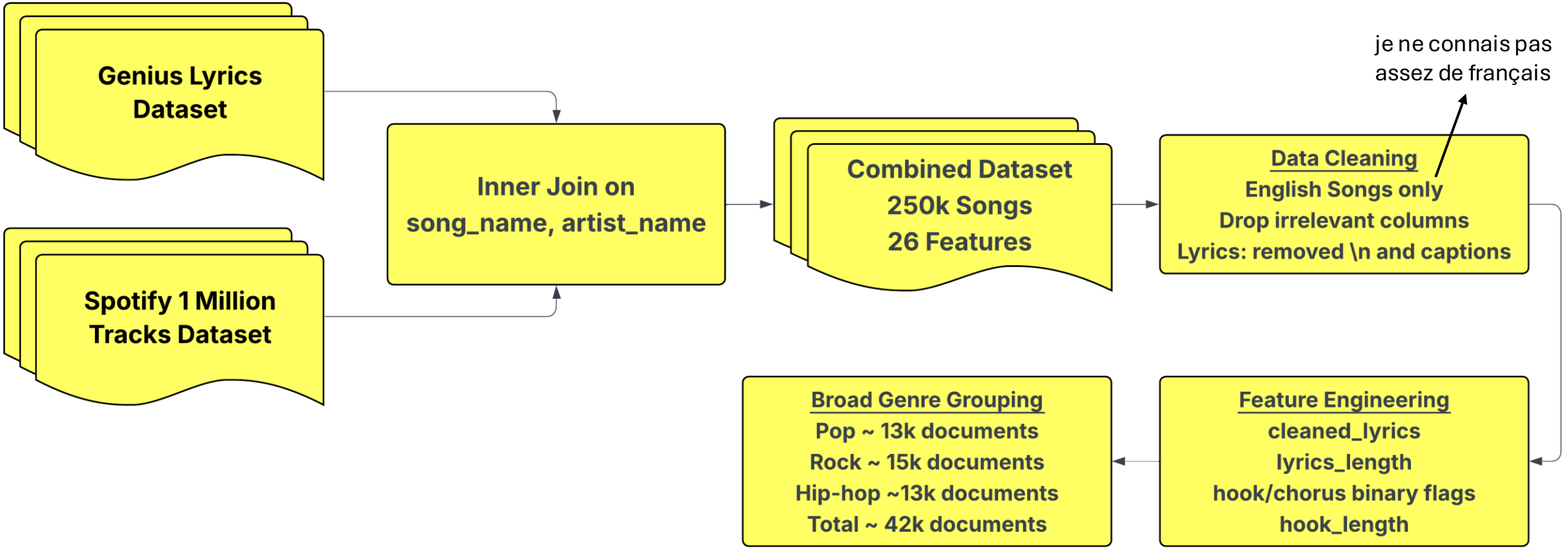
Data Overview and Preprocessing



Common Words

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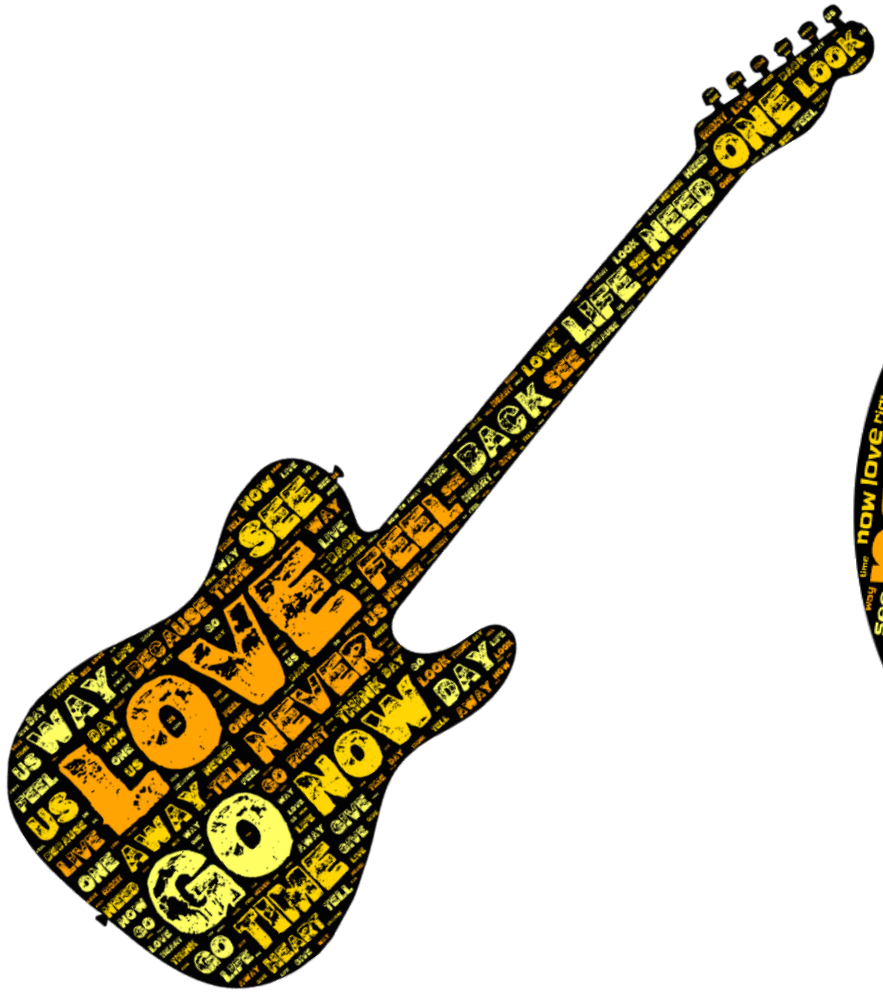
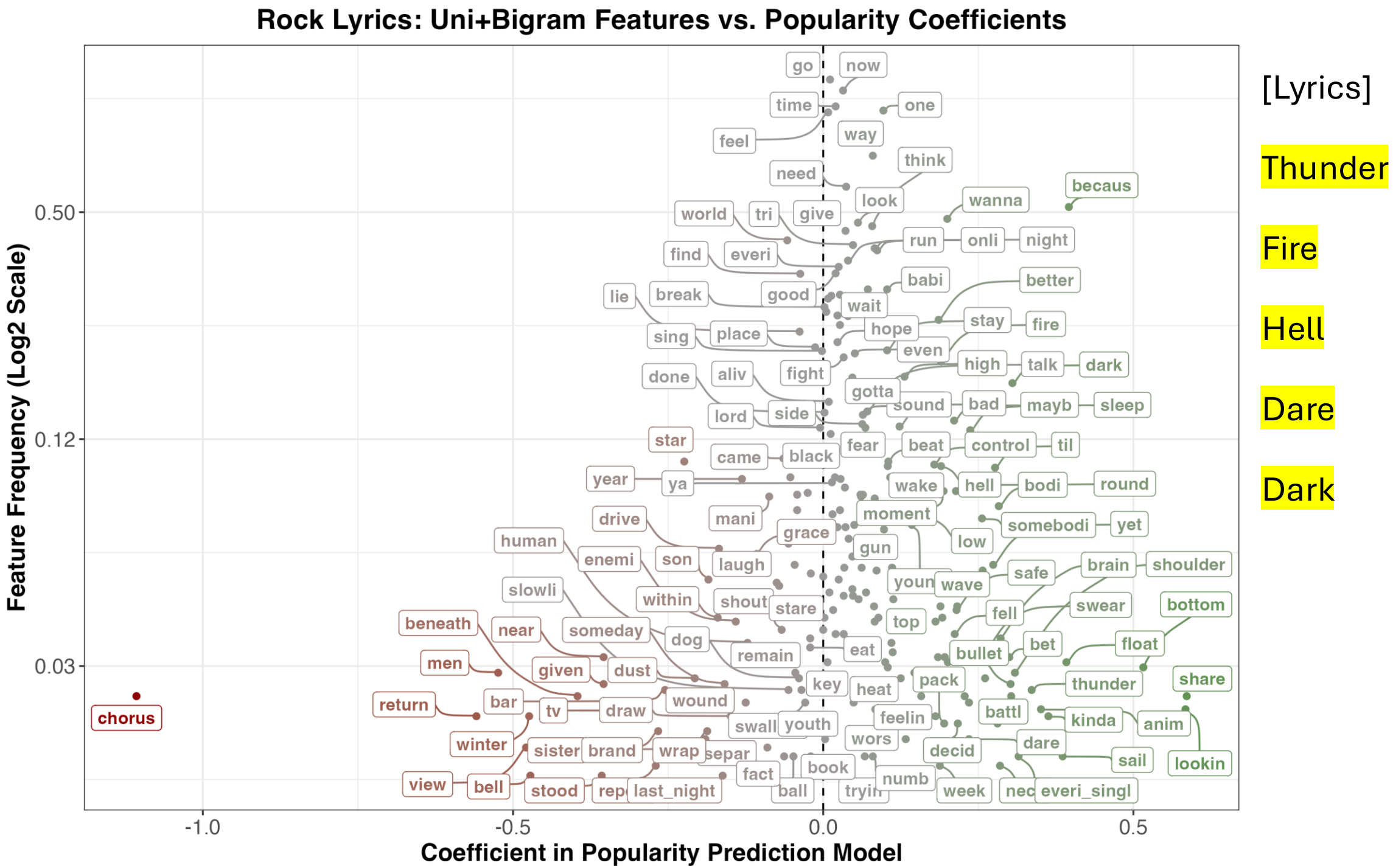
Custom Stop Words

Rock

HipHop

Pop





[Lyrics]

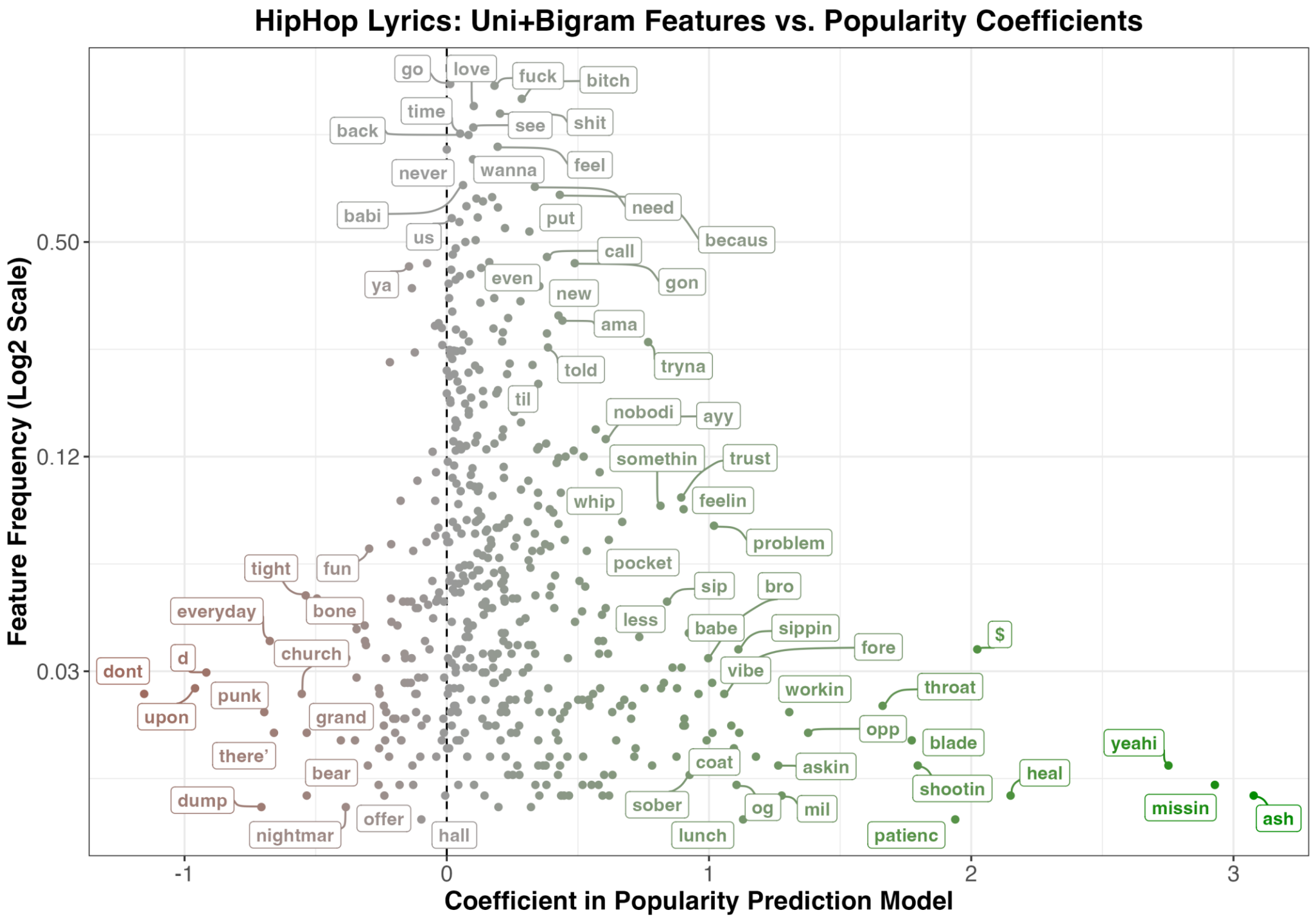
Thunder

Fire

Hell

Dare

Dark



[Lyrics]

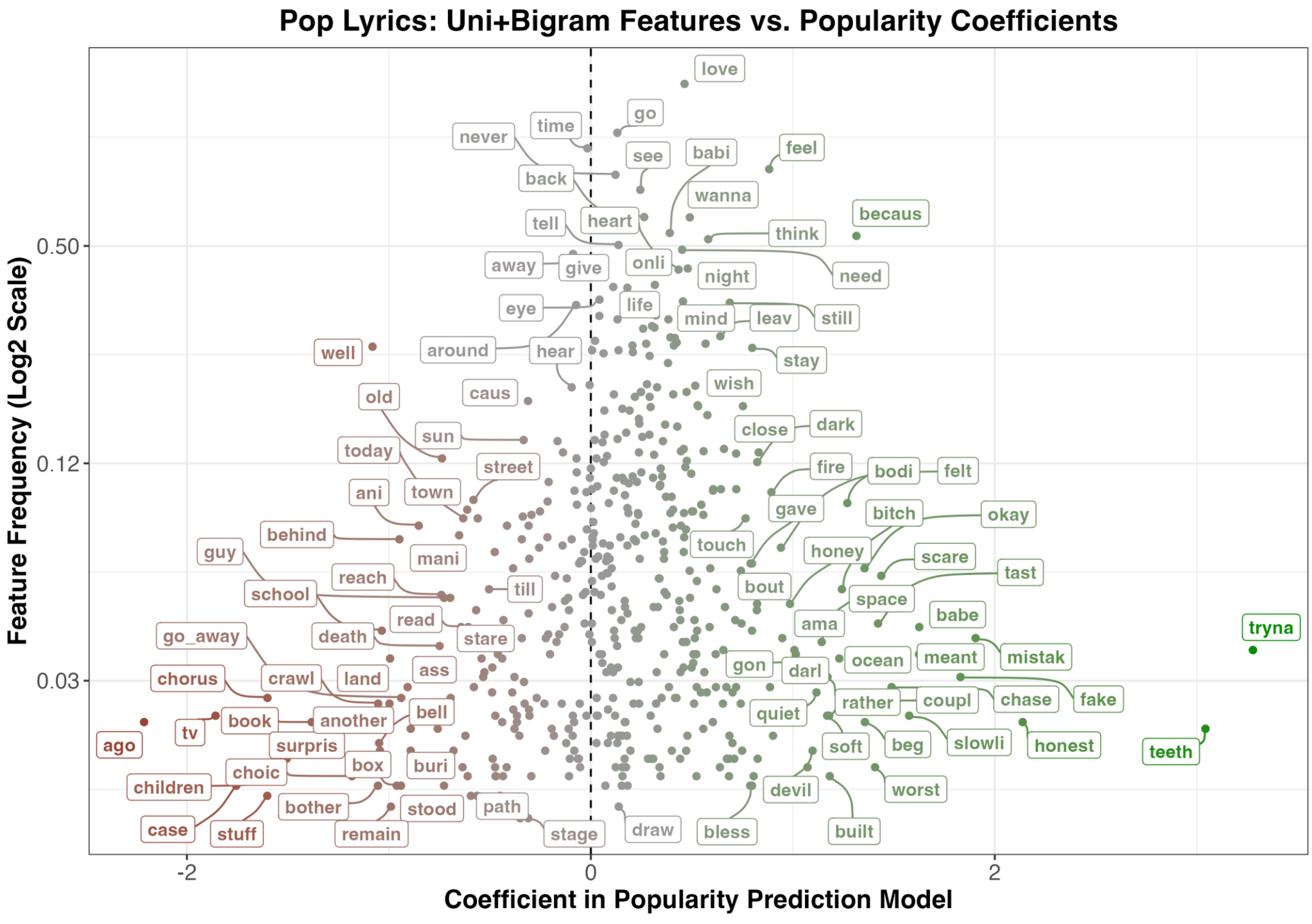
Shooting

Ayy

Opp

Vibe

Mil, $



[Lyrics]

Honey

Soft

Honest

Babe

bless

Curse Words

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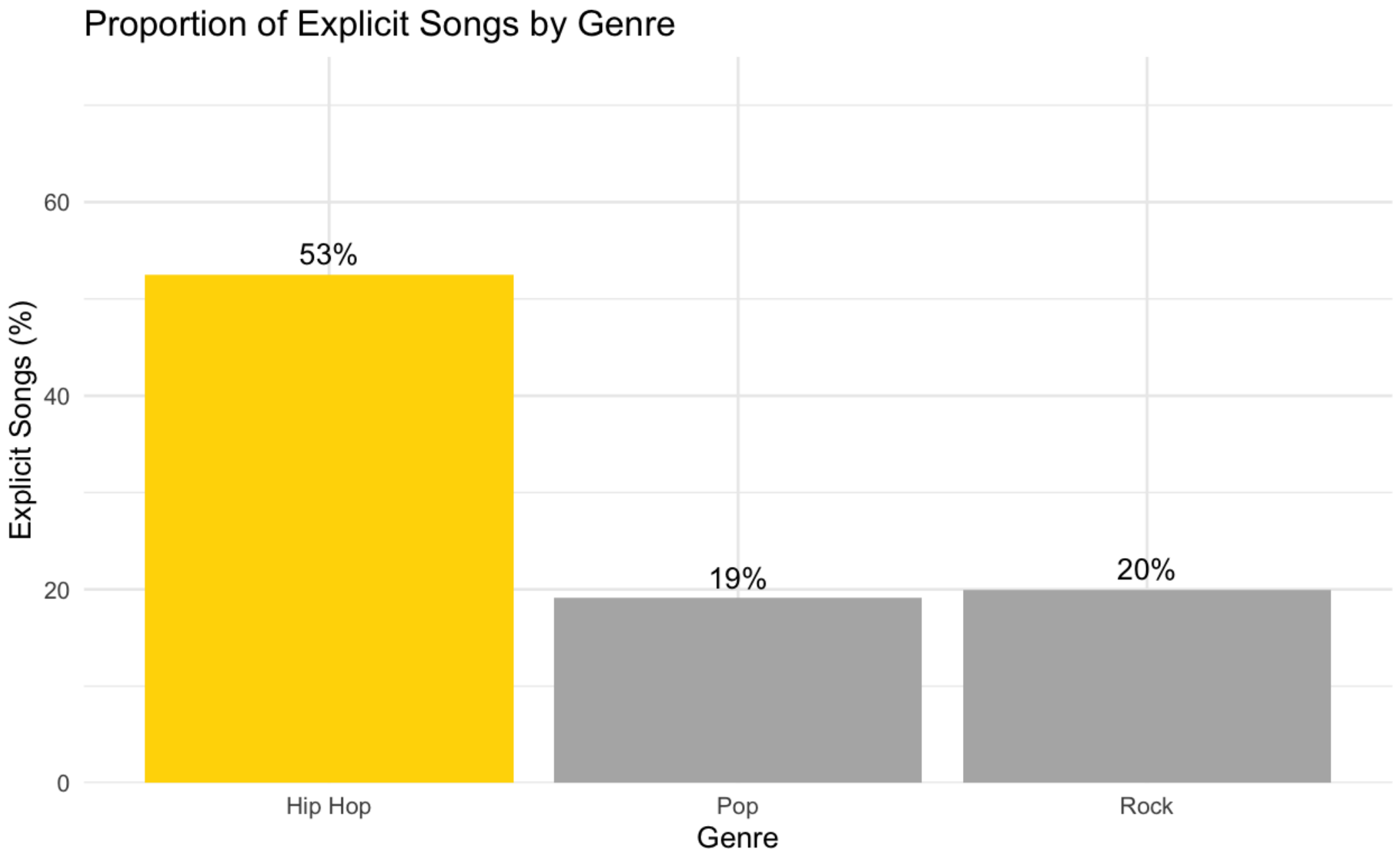
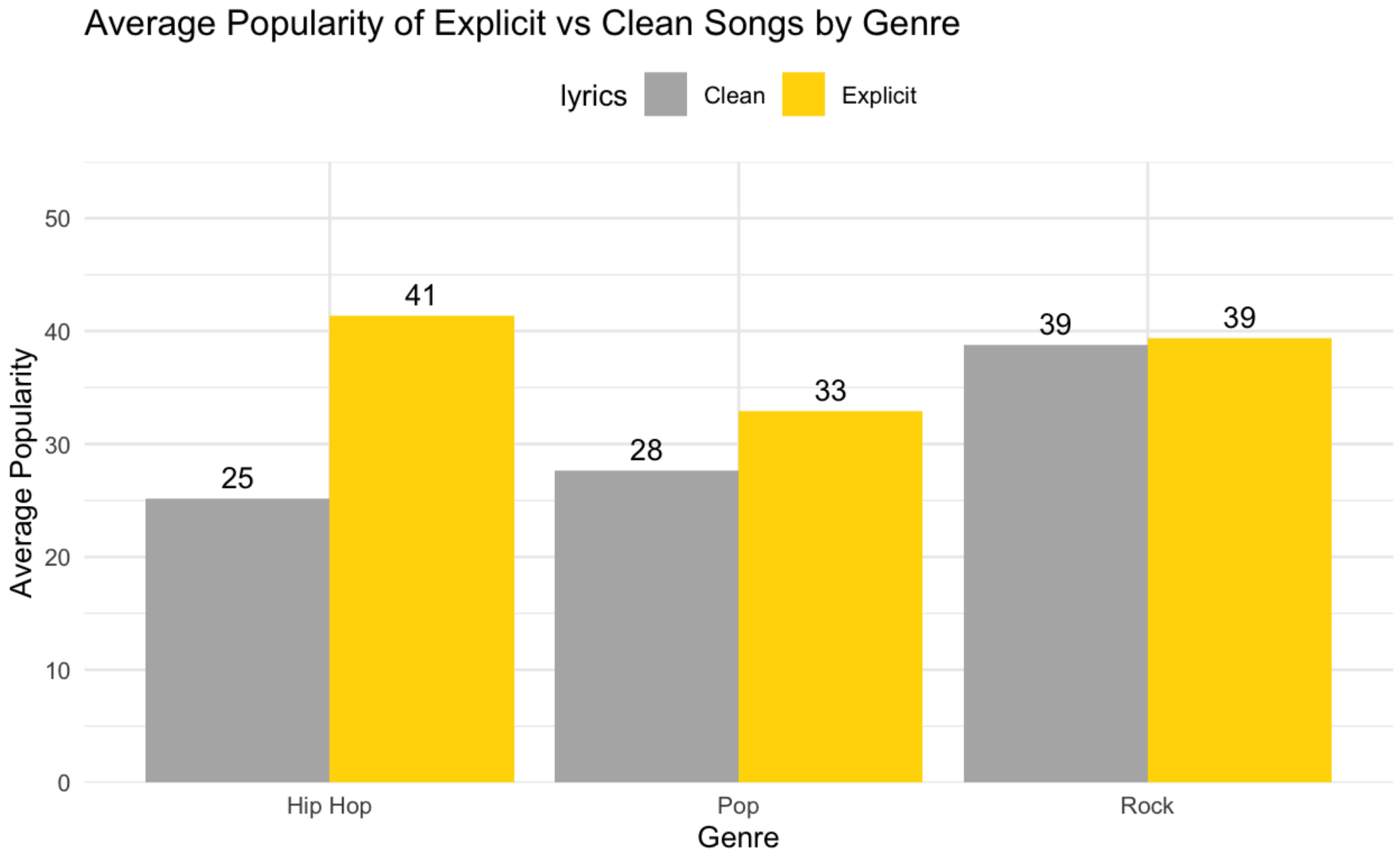
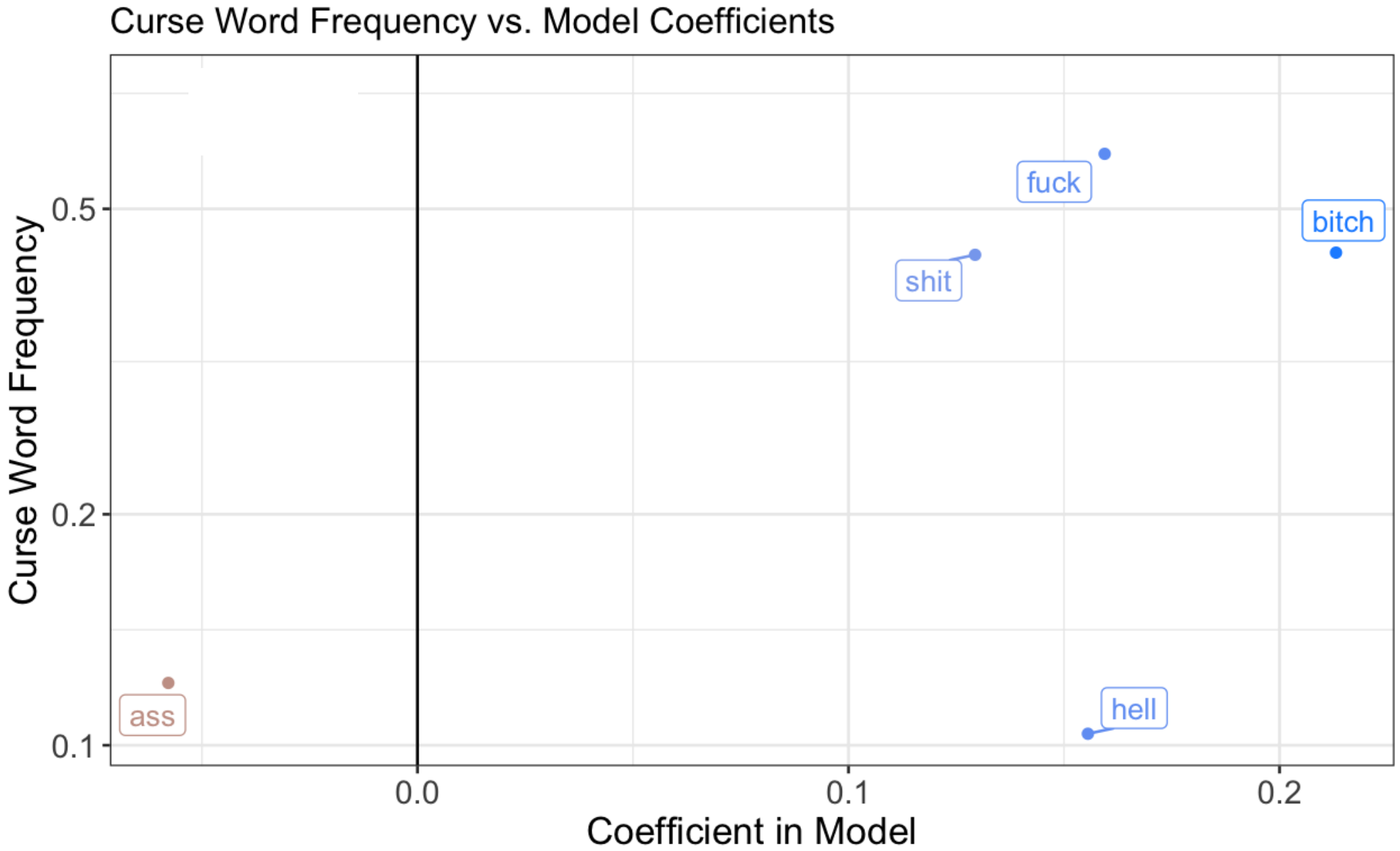

Proportion of Explicit Songs by Genre
Explicit Songs (%)
60
40
20
0
53%
19%
20%
Hip Hop
Pop
Rock
Genre


Average Popularity of Explicit vs Clean Songs by Genre
lyrics
Clean
Explicit
Average Popularity
50
40
30
20
10
0
41
25
33
28
39
39
Hip Hop
Pop
Rock
Genre


Curse Word Frequency vs. Model Coefficients
Curse Word Frequency
0.5
0.2
0.1
fuck
bitch
shit
hell
ass
0.0
0.1
0.2
Coefficient in Model

Topics

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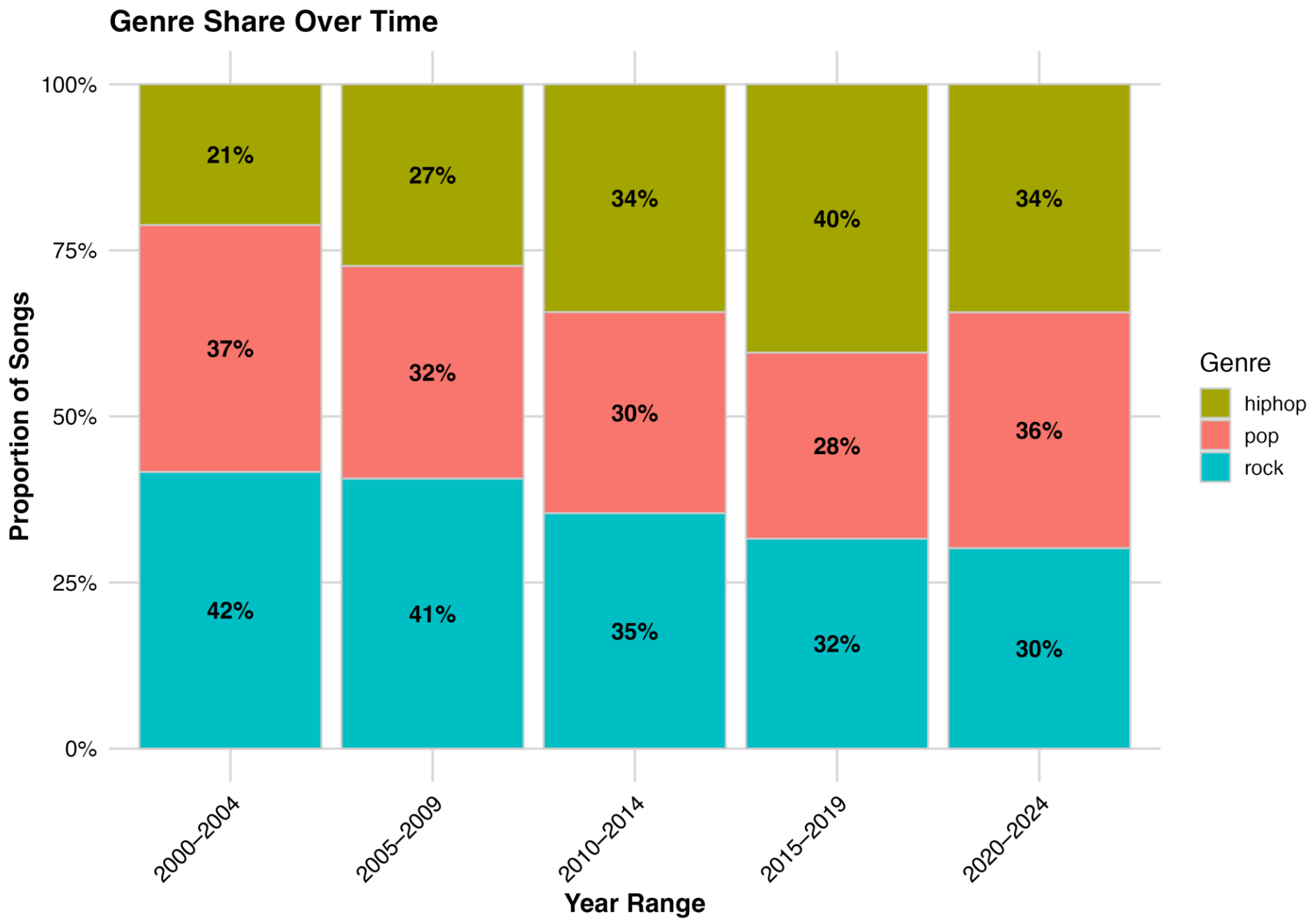
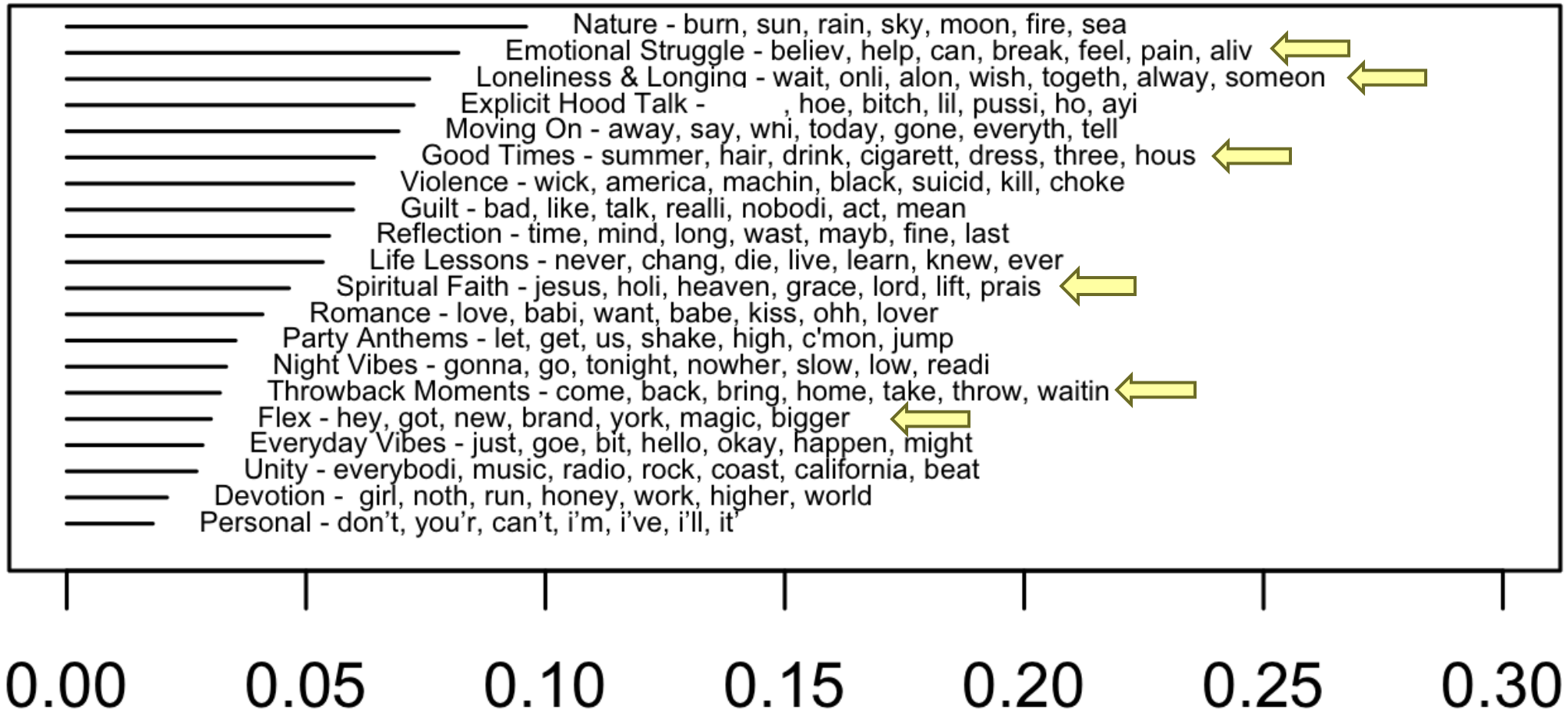
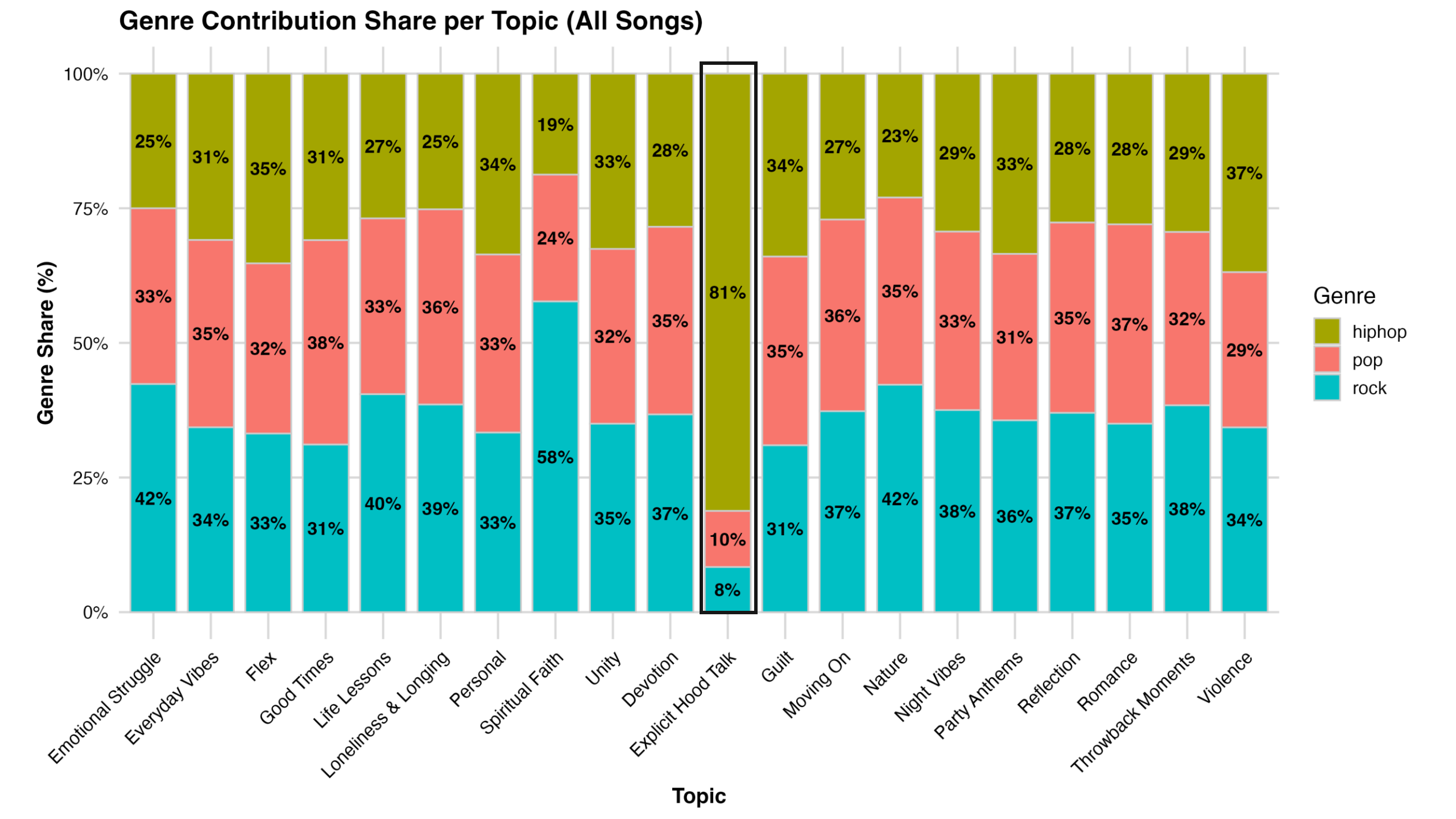
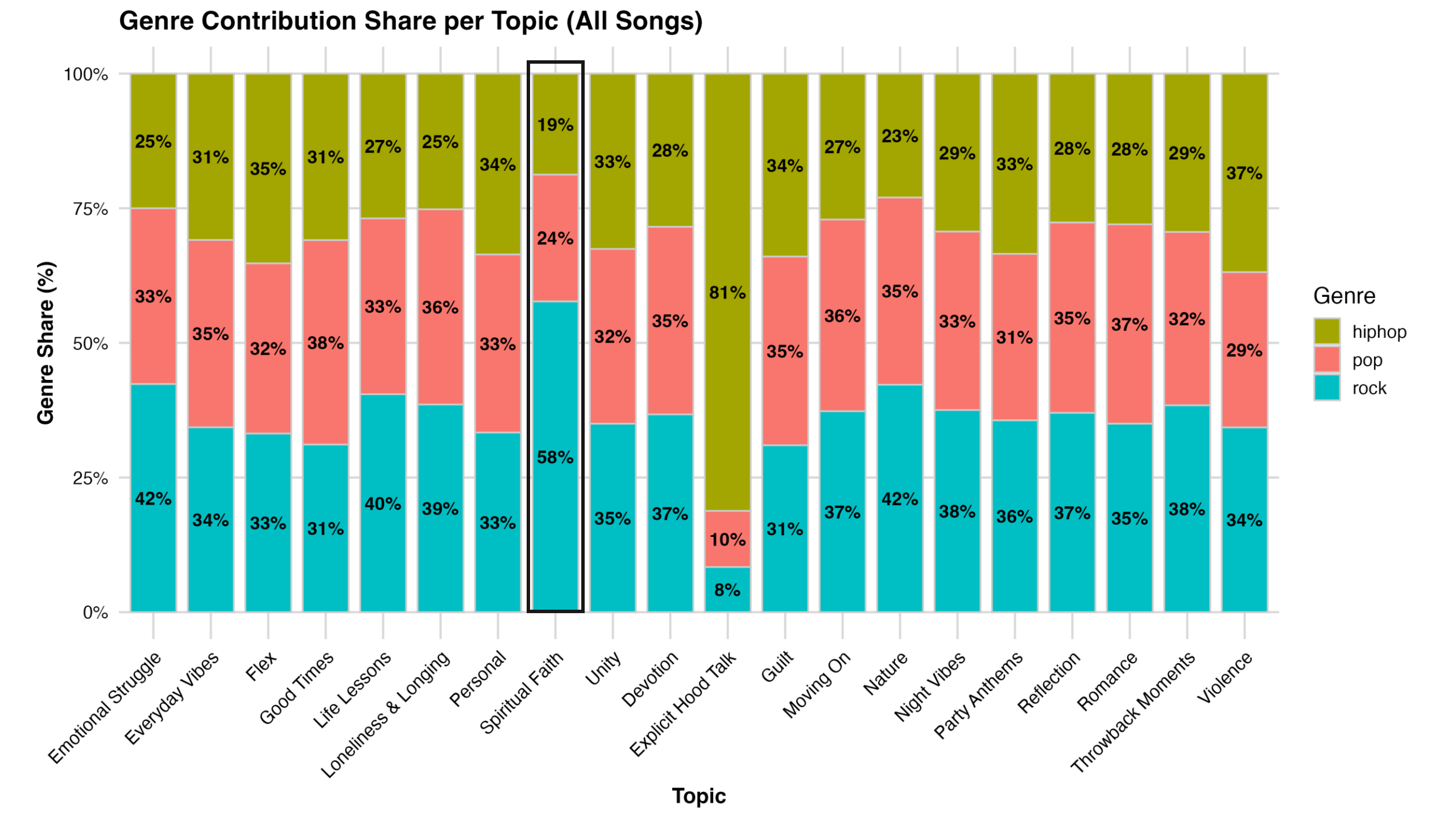

Genre Share Over Time
100%
75%
50%
25%
0%
Proportion of Songs
21%
37%
42%
27%
32%
41%
34%
30%
35%
40%
28%
32%
34%
36%
30%
2000–2004
2005–2009
2010–2014
2015–2019
2020–2024
Year Range
Genre
hiphop
pop
rock

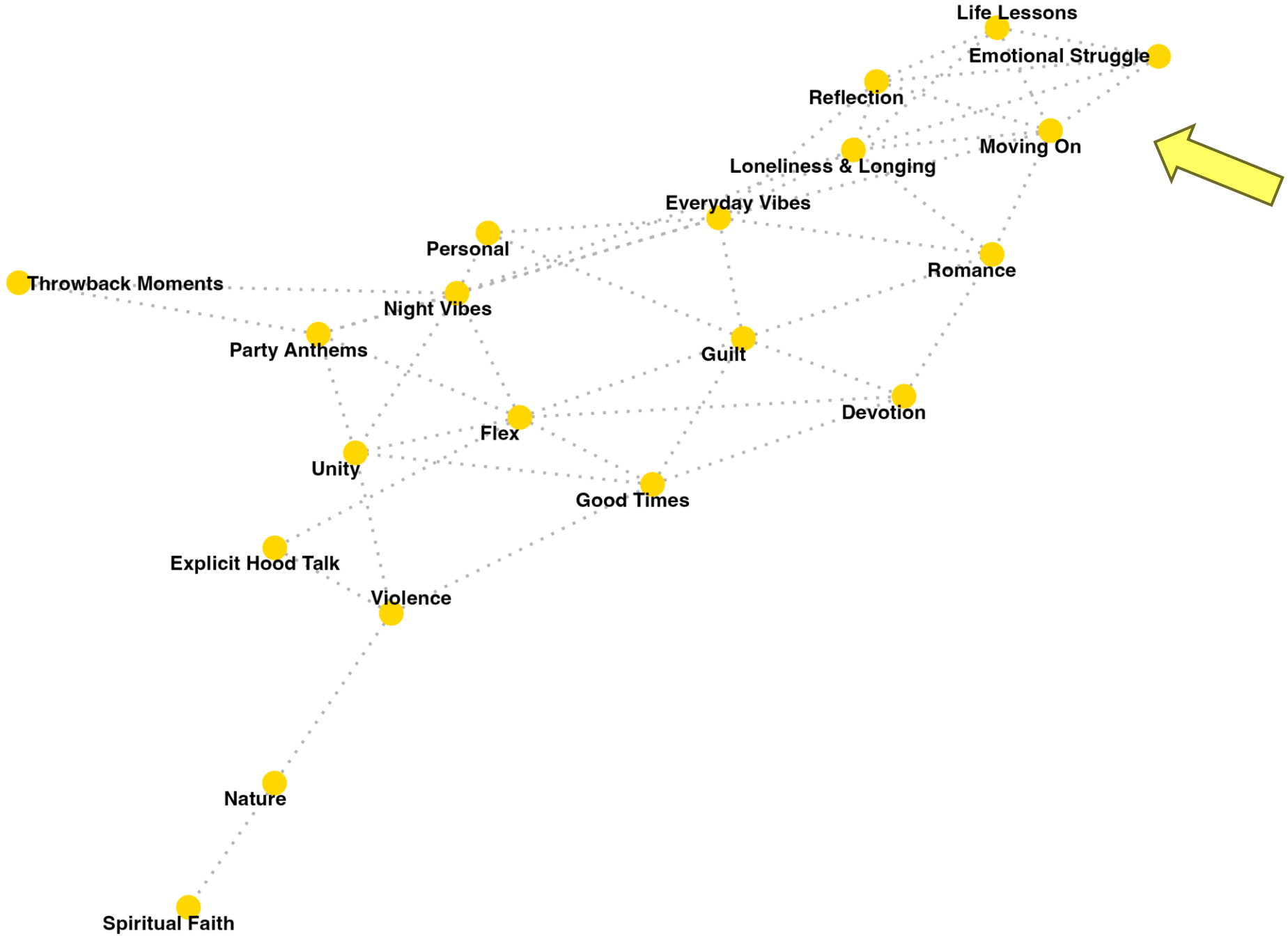
Top Topics


Nature - burn, sun, rain, sky, moon, fire, sea
Emotional Struggle - believ, help, can, break, feel, pain, aliv
Loneliness & Longing - wait, onli, alon, wish, togeth, alway, someon
Explicit Hood Talk - , hoe, bitch, lil, pussi, ho, ayi
Moving On - away, say, whi, today, gone, everyth, tell
Good Times - summer, hair, drink, cigarett, dress, three, hous
Violence - wick, america, machin, black, suicid, kill, choke
Guilt - bad, like, talk, realli, nobodi, act, mean
Reflection - time, mind, long, wast, mayb, fine, last
Life Lessons - never, chang, die, live, learn, knew, ever
Spiritual Faith - jesus, holi, heaven, grace, lord, lift, prais
Romance - love, babi, want, babe, kiss, ohh, lover
Party Anthems - let, get, us, shake, high, c'mon, jump
Night Vibes - gonna, go, tonight, nowher, slow, low, readi
Throwback Moments - come, back, bring, home, take, throw, waitin
Flex - hey, got, new, brand, york, magic, bigger
Everyday Vibes - just, goe, bit, hello, okay, happen, might
Unity - everybodi, music, radio, rock, coast, california, beat
Devotion - girl, noth, run, honey, work, higher, world
Personal - don't, you'r, can't, i'm, i've, i'll, it'
0.00
0.05
0.10
0.15
0.20
0.25
0.30
Expected Topic Proportions

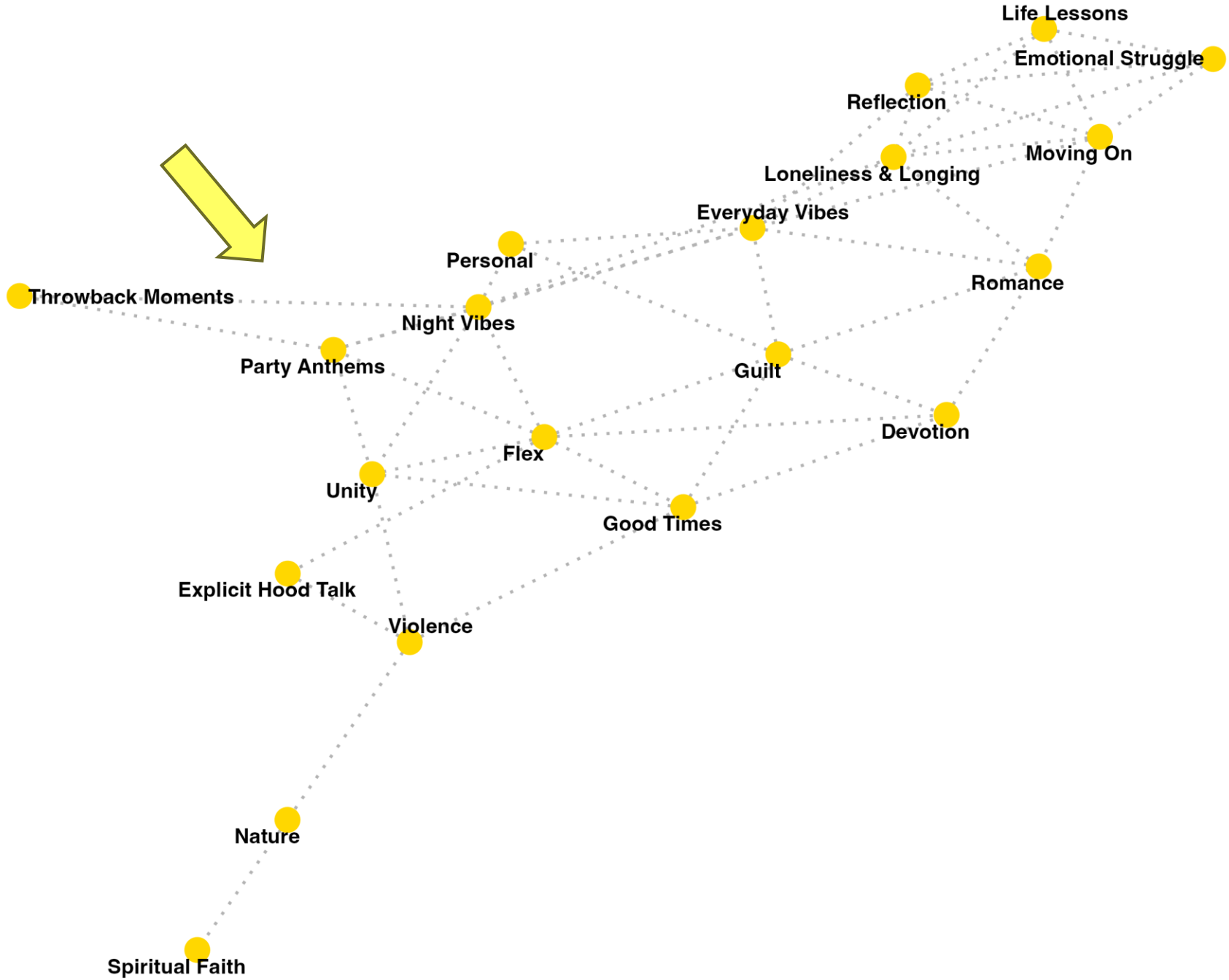

Genre Contribution Share per Topic (All Songs)
Genre Share (%)
100%
75%
50%
25%
0%
Topic
Genre
hiphop
pop
rock
Emotional Struggle
25%
33%
42%
Everyday Vibes
31%
35%
34%
Flex
35%
32%
33%
Good Times
31%
38%
31%
Life Lessons
27%
33%
40%
Loneliness & Longing
25%
36%
39%
Personal
34%
33%
33%
Spiritual Faith
19%
24%
58%
Unity
33%
32%
35%
Devotion
28%
35%
37%
Explicit Hood Talk
81%
10%
8%
Guilt
34%
35%
31%
Moving On
27%
36%
37%
Nature
23%
35%
42%
Night Vibes
29%
33%
38%
Party Anthems
33%
31%
36%
Reflection
28%
35%
37%
Romance
28%
37%
35%
Throwback Moments
29%
32%
38%
Violence
37%
29%
34%

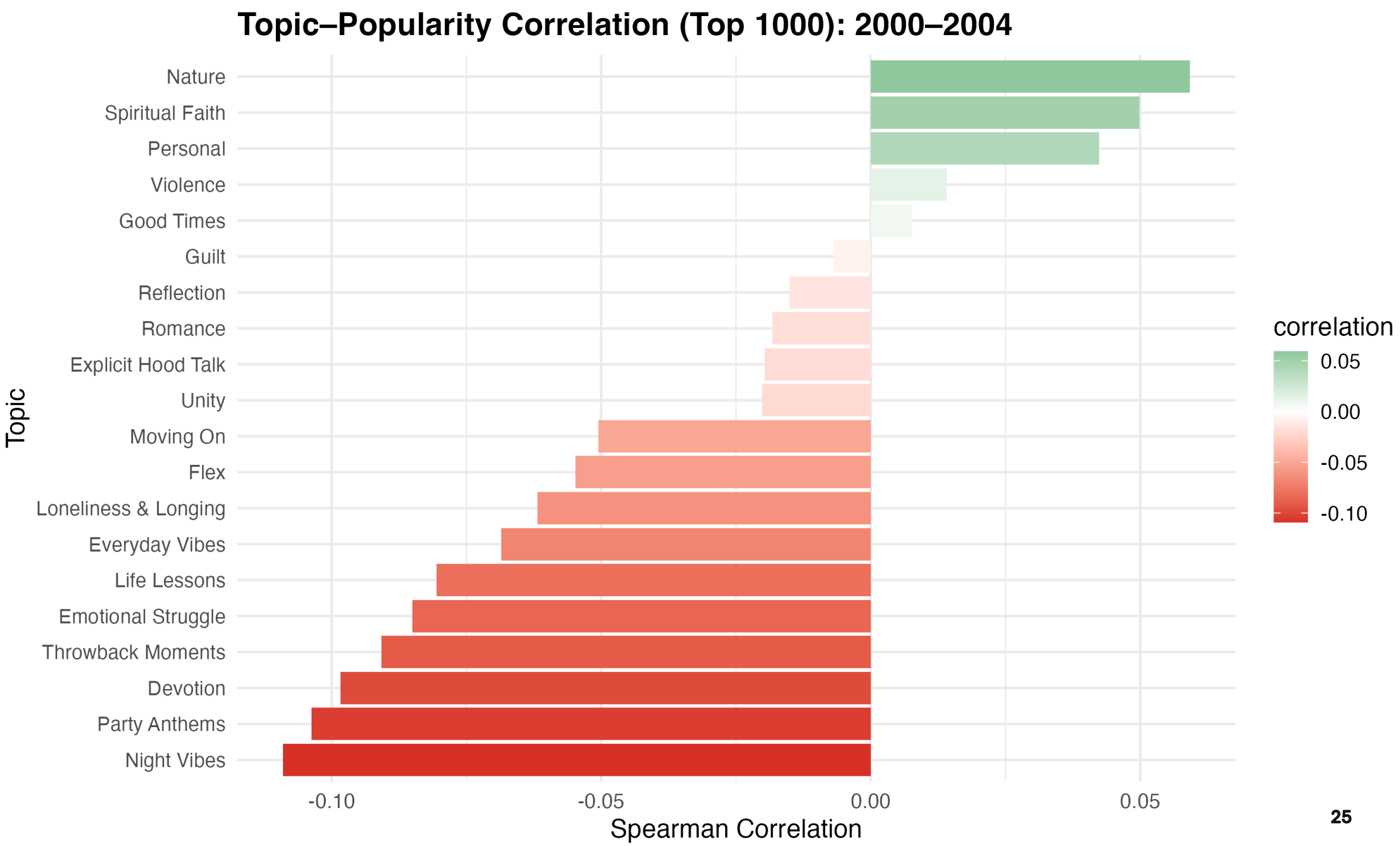

Genre Contribution Share per Topic (All Songs)
Genre Share (%)
100%
75%
50%
25%
0%
Topic
Genre
hiphop
pop
rock
Emotional Struggle
25%
33%
42%
Everyday Vibes
31%
35%
34%
Flex
35%
32%
33%
Good Times
31%
38%
31%
Life Lessons
27%
33%
40%
Loneliness & Longing
25%
36%
39%
Personal
34%
33%
33%
Spiritual Faith
19%
24%
58%
Unity
33%
32%
35%
Devotion
28%
35%
37%
Explicit Hood Talk
81%
10%
8%
Guilt
34%
35%
31%
Moving On
27%
36%
37%
Nature
23%
35%
42%
Night Vibes
29%
33%
38%
Party Anthems
33%
31%
36%
Reflection
28%
35%
37%
Romance
28%
37%
35%
Throwback Moments
29%
32%
38%
Violence
37%
29%
34%

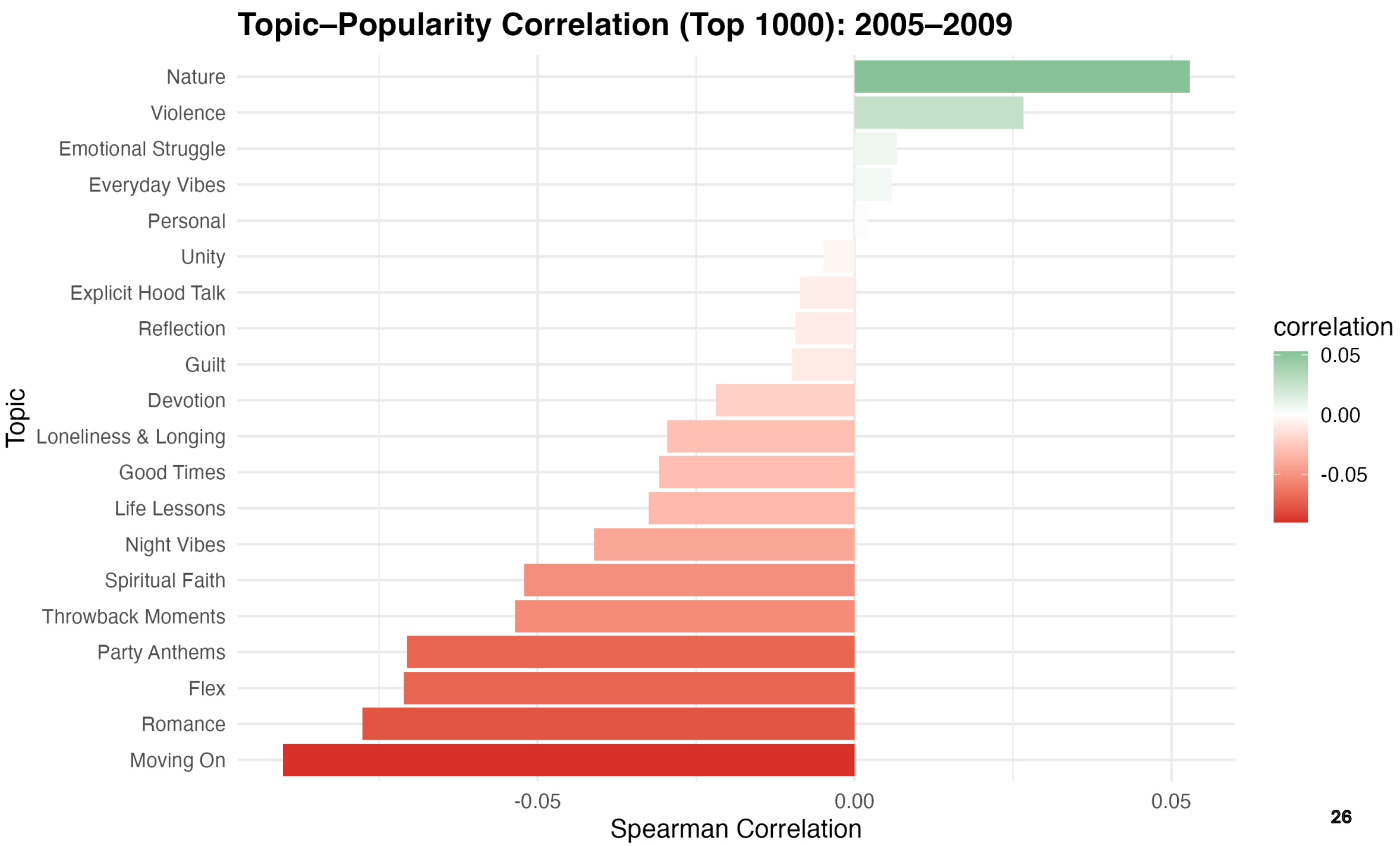
Topic Correlation Network in Songs

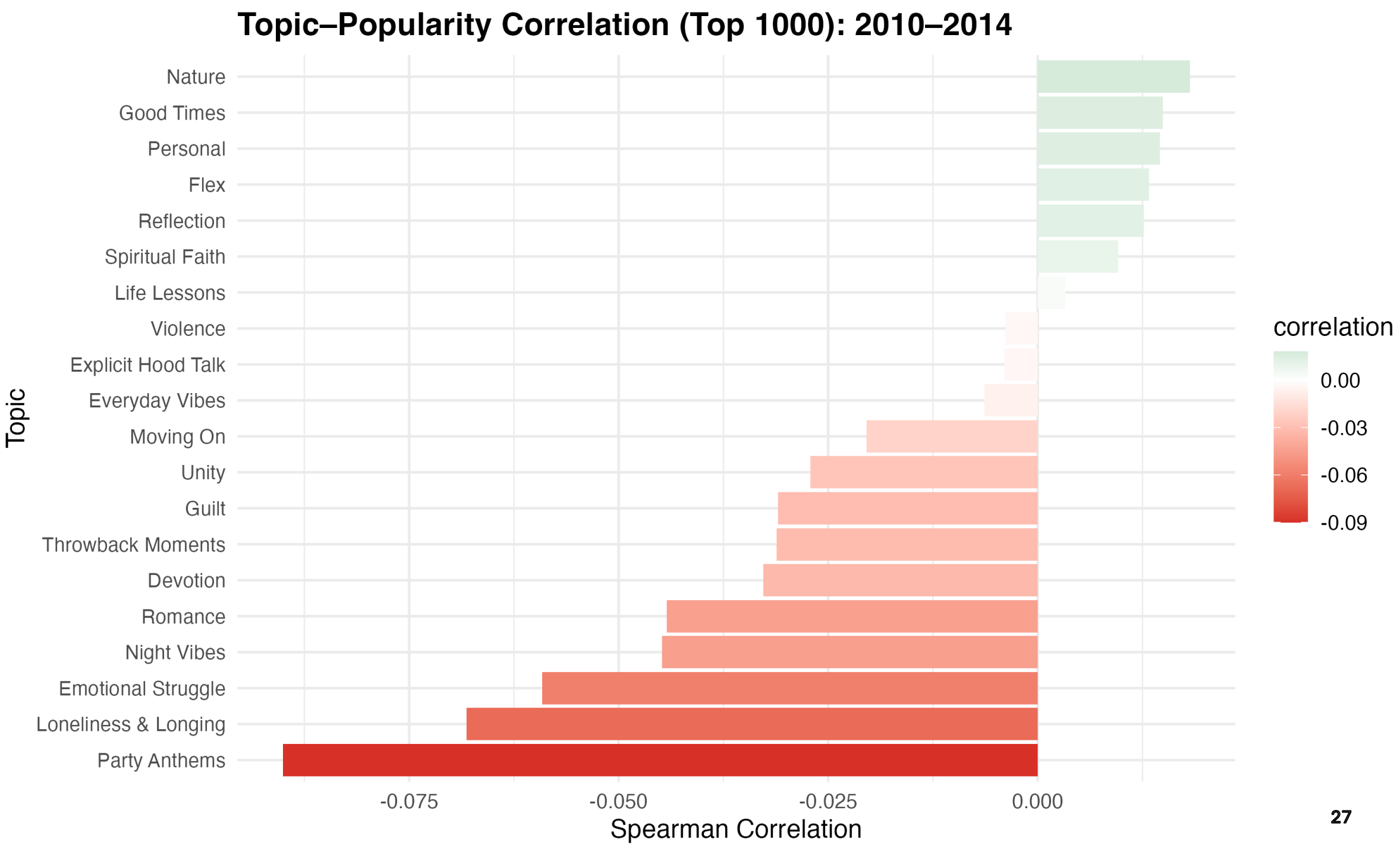


Topic Correlation Network in Songs




Topic–Popularity Correlation (Top 1000): 2000–2004
Nature
Spiritual Faith
Personal
Violence
Good Times
Guilt
Reflection
Romance
Explicit Hood Talk
Unity
Moving On
Flex
Loneliness & Longing
Everyday Vibes
Life Lessons
Emotional Struggle
Throwback Moments
Devotion
Party Anthems
Night Vibes
Topic
-0.10
-0.05
0.00
0.05
Spearman Correlation
correlation
0.05
0.00
-0.05
-0.10


Topic–Popularity Correlation (Top 1000): 2005–2009
Nature
Violence
Emotional Struggle
Everyday Vibes
Personal
Unity
Explicit Hood Talk
Reflection
Guilt
Devotion
Loneliness & Longing
Good Times
Life Lessons
Night Vibes
Spiritual Faith
Throwback Moments
Party Anthems
Flex
Romance
Moving On
Topic
-0.05
0.00
0.05
Spearman Correlation
correlation
0.05
0.00
-0.05


Topic–Popularity Correlation (Top 1000): 2010–2014
Nature
Good Times
Personal
Flex
Reflection
Spiritual Faith
Life Lessons
Violence
Explicit Hood Talk
Everyday Vibes
Moving On
Unity
Guilt
Throwback Moments
Devotion
Romance
Night Vibes
Emotional Struggle
Loneliness & Longing
Party Anthems
Topic
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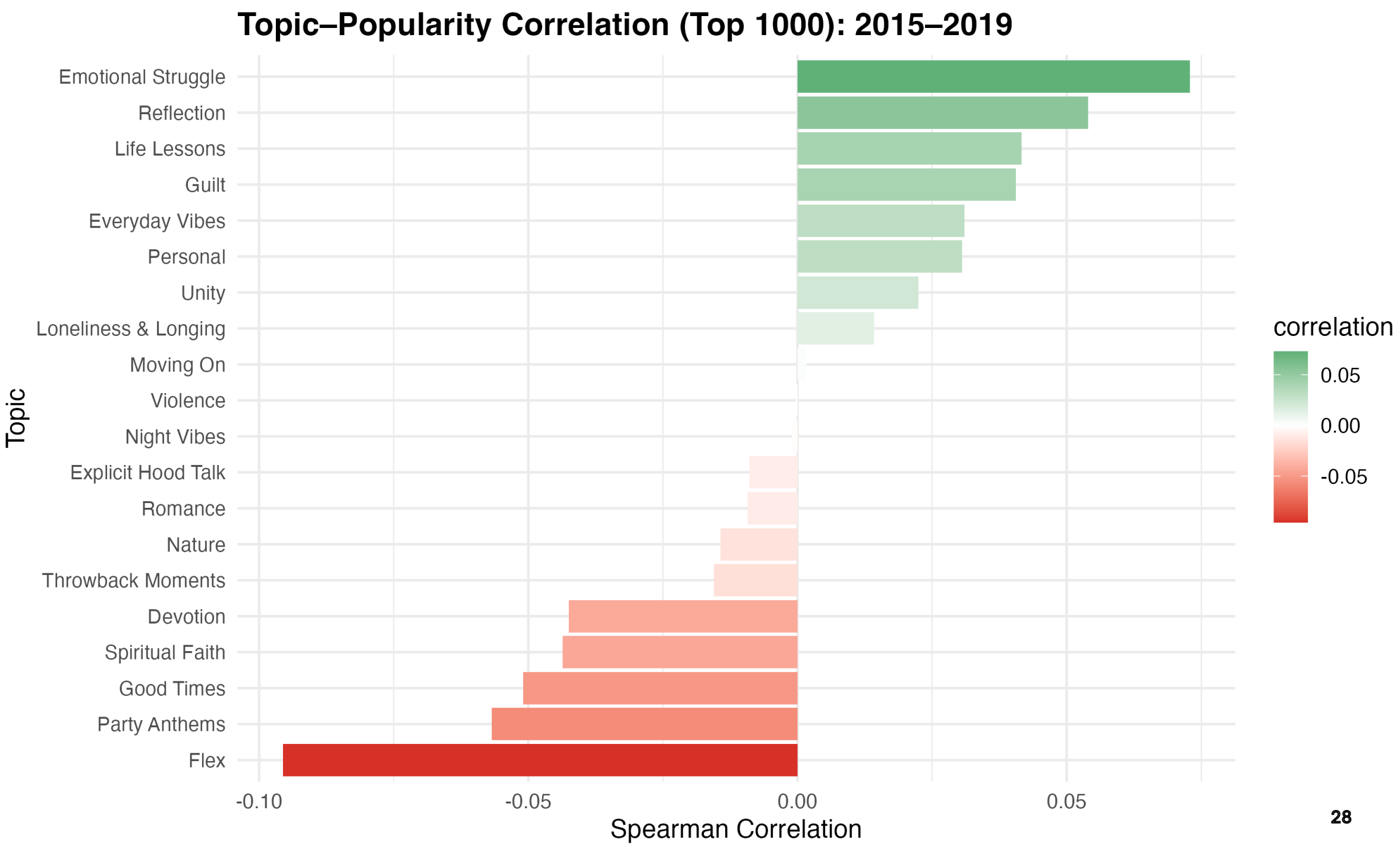
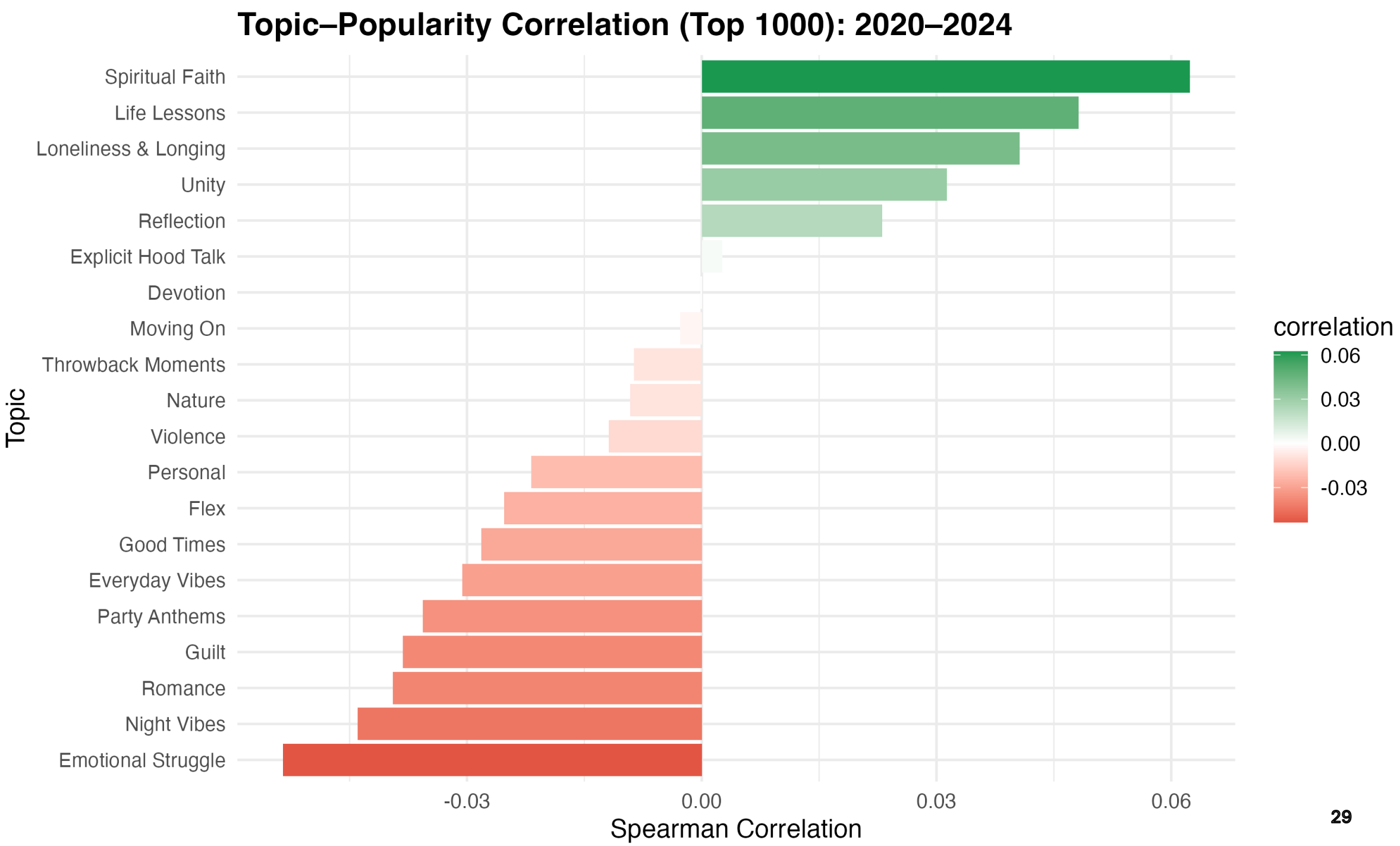
-0.050
-0.025
0.000
Spearman Correlation
correlation
0.00
-0.03
-0.06
-0.09


Topic–Popularity Correlation (Top 1000): 2015–2019
Emotional Struggle
Reflection
Life Lessons
Guilt
Everyday Vibes
Personal
Unity
Loneliness & Longing
Moving On
Violence
Night Vibes
Explicit Hood Talk
Romance
Nature
Throwback Moments
Devotion
Spiritual Faith
Good Times
Party Anthems
Flex
Topic
-0.10
-0.05
0.00
0.05
Spearman Correlation
correlation
0.05
0.00
-0.05


Topic–Popularity Correlation (Top 1000): 2020–2024
Spiritual Faith
Life Lessons
Loneliness & Longing
Unity
Reflection
Explicit Hood Talk
Devotion
Moving On
Throwback Moments
Nature
Violence
Personal
Flex
Good Times
Everyday Vibes
Party Anthems
Guilt
Romance
Night Vibes
Emotional Struggle
Topic
-0.03
0.00
0.03
0.06
Spearman Correlation
correlation
0.06
0.03
0.00
-0.03

Transfer Learning

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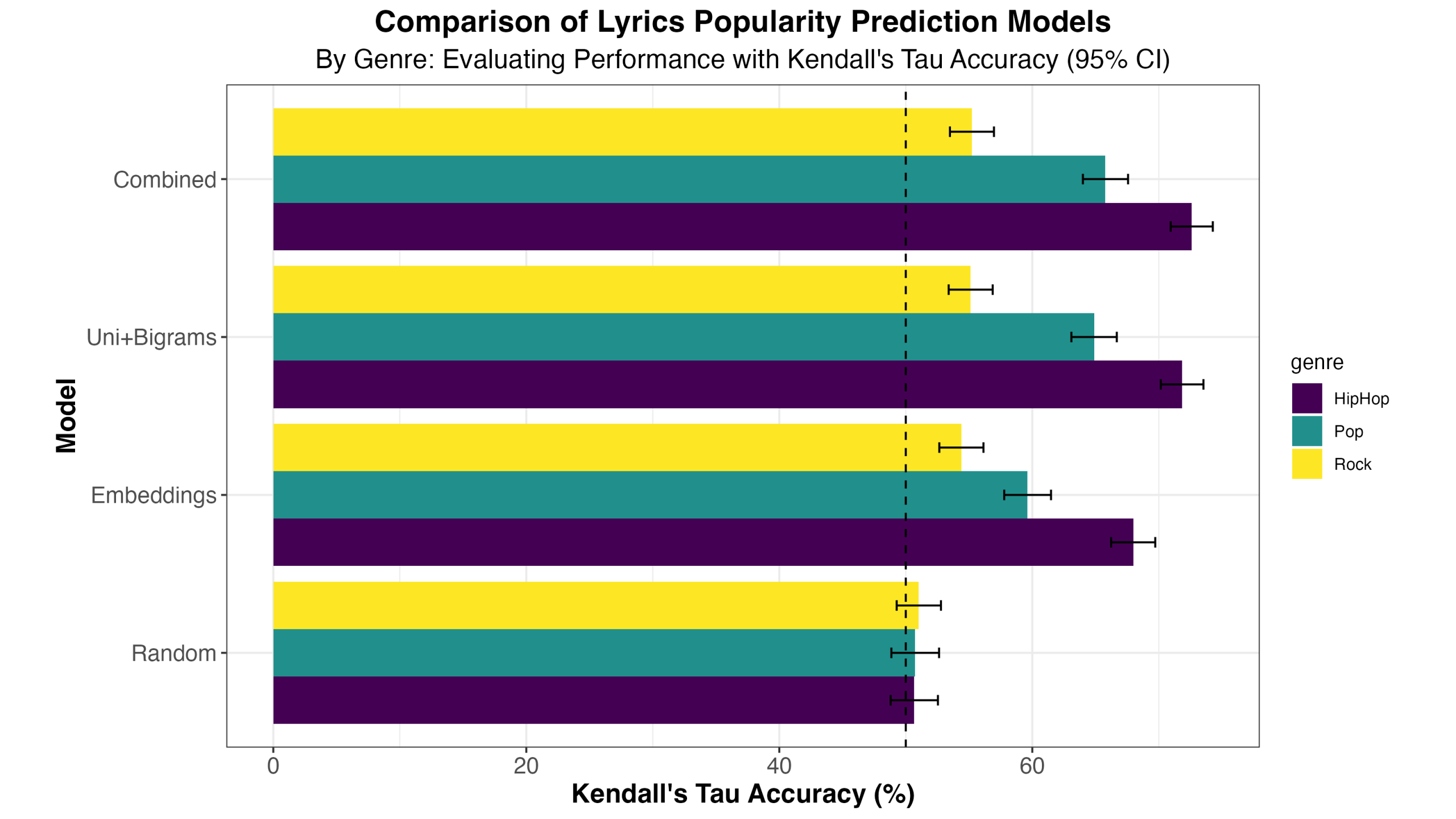
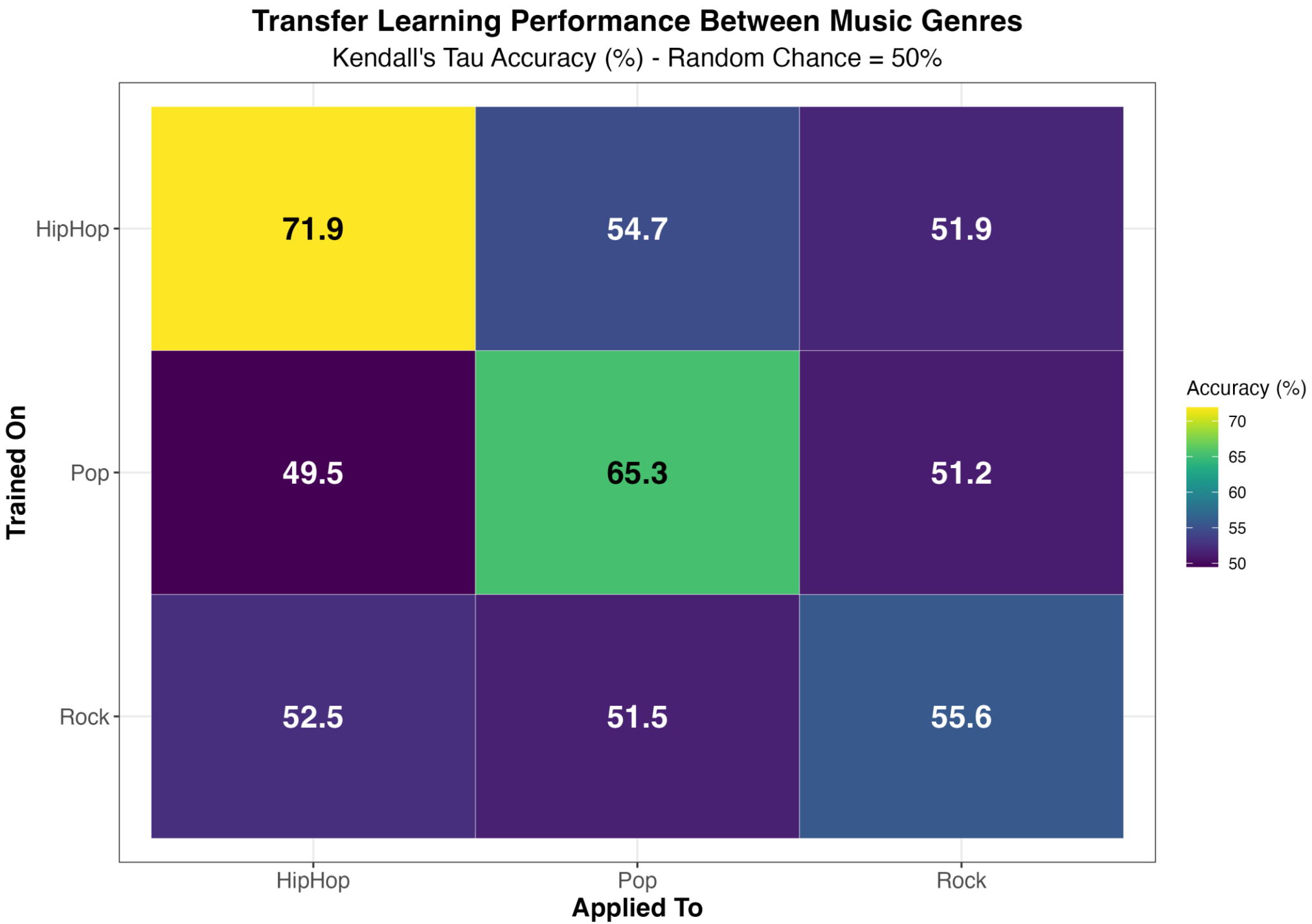

Comparison of Lyrics Popularity Prediction Models
By Genre: Evaluating Performance with Kendall's Tau Accuracy (95% CI)
Model
Combined
Uni+Bigrams
Embeddings
Random
0
20
40
60
Kendall's Tau Accuracy (%)
genre
HipHop
Pop
Rock


Transfer Learning Performance Between Music Genres
Kendall's Tau Accuracy (%) - Random Chance = 50%
HipHop
Pop
Rock
Trained On
71.9
54.7
51.9
49.5
65.3
51.2
52.5
51.5
55.6
HipHop
Pop
Rock
Applied To
Accuracy (%)
70
65
60
55
50

Similarity of Popular Songs Over Time

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Similarity for popular songs

>50 popularity score

>20 songs

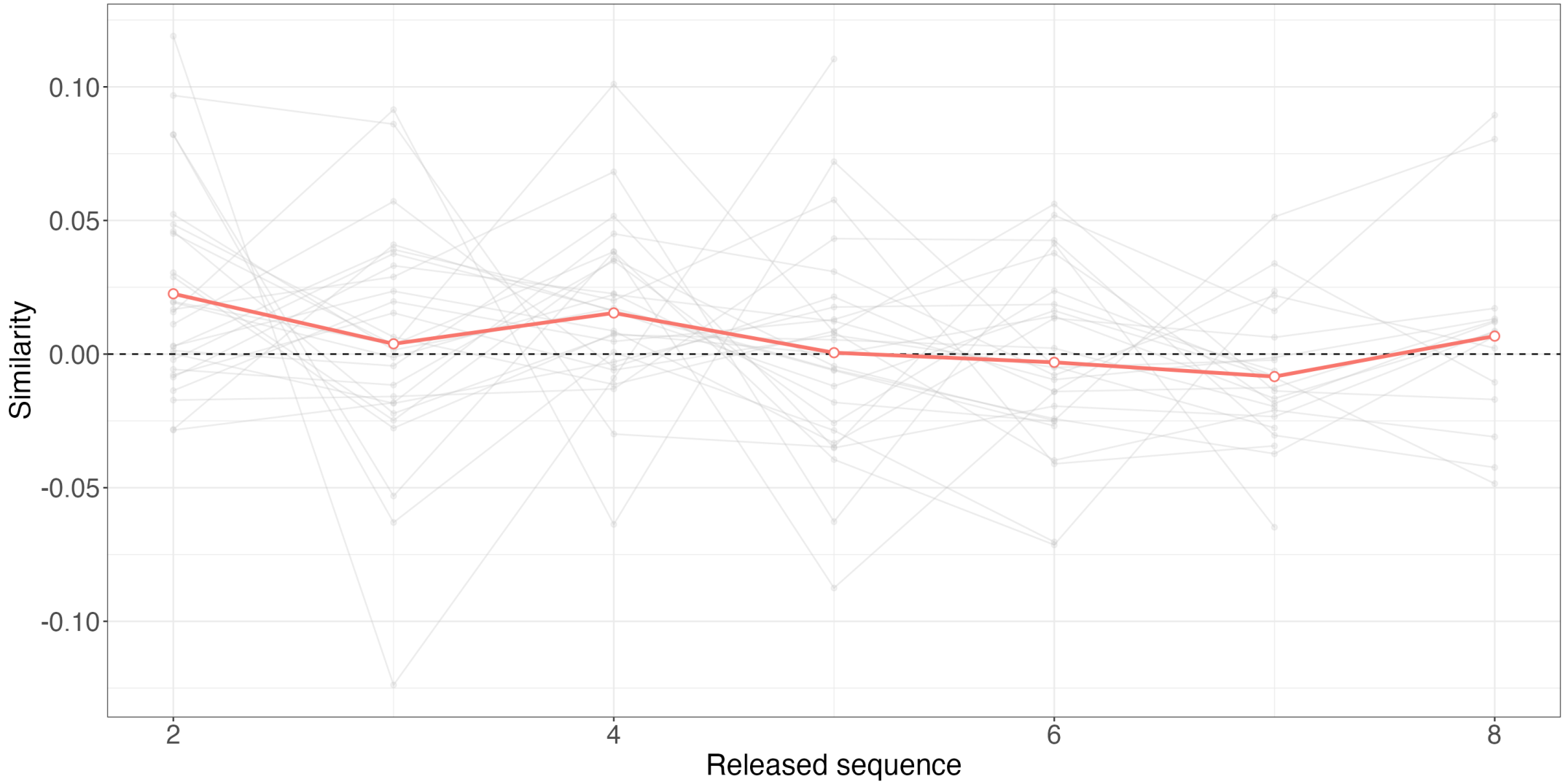
10+ years

Initial release year

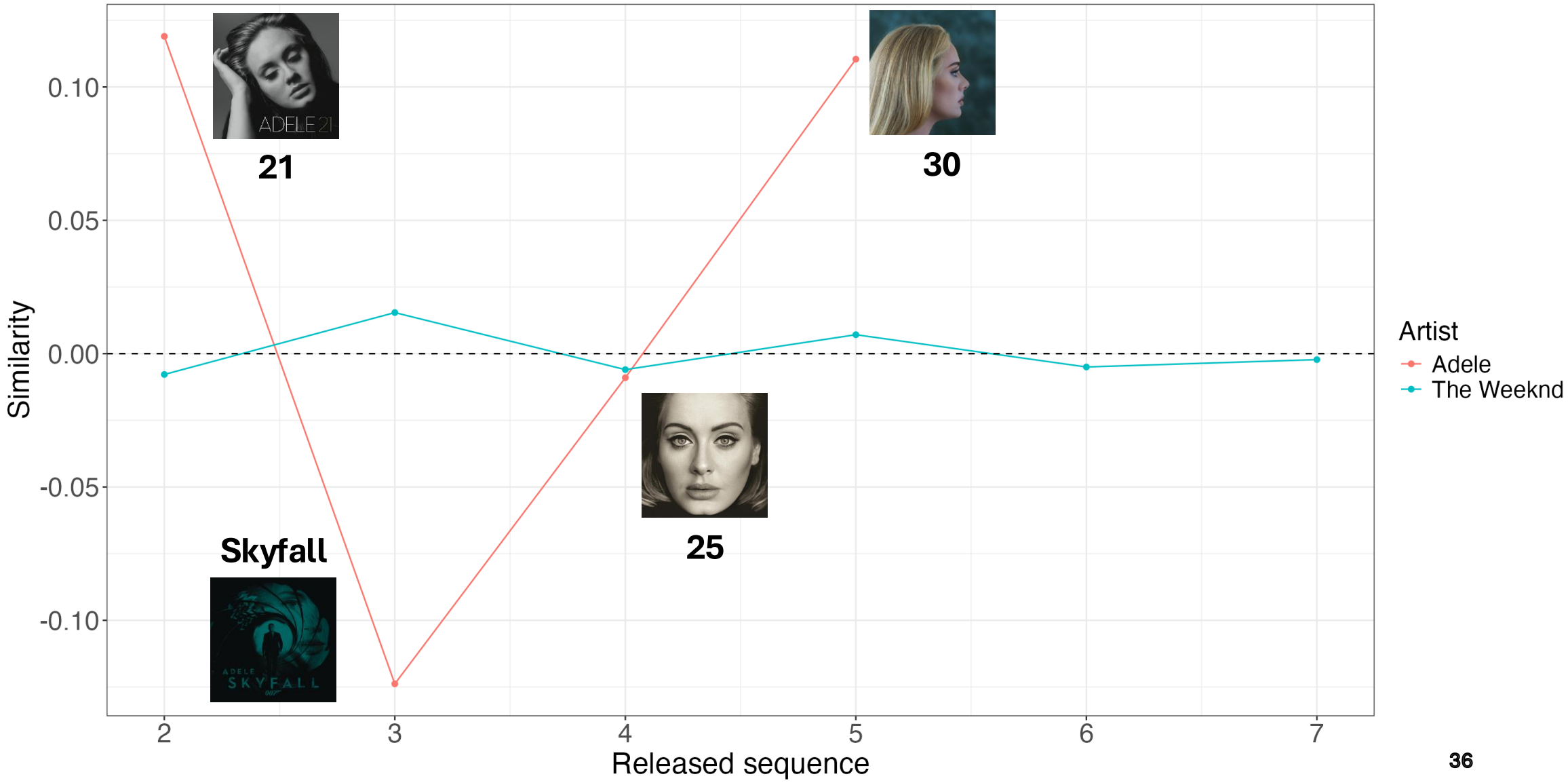
vs

Other releases

Similarity of songs changes over released time



Artist with high fluctuation: Adele



Initial Release

[Verse 1]

When the rain is blowing in your face

And the whole world is on your case

I could offer you a warm embrace

To make you feel my **love**

[Verse 2]

When the evening shadows and the stars appear

And there is no one there to dry your tears

I could hold you for a million years

To make you feel my **love**

Second Release

[Verse 1]

I let it fall, my **heart**

And as it fell, you rose to claim it

It was dark, and I was over

Until you **kissed** my lips and you saved me

My hands, they were strong

But my knees were far too weak

To stand in your arms

Without falling to your feet

Third Release

[Chorus]

Let the sky fall

When it crumbles

We will **stand tall**

Face it all **together**

Let the sky fall

When it crumbles

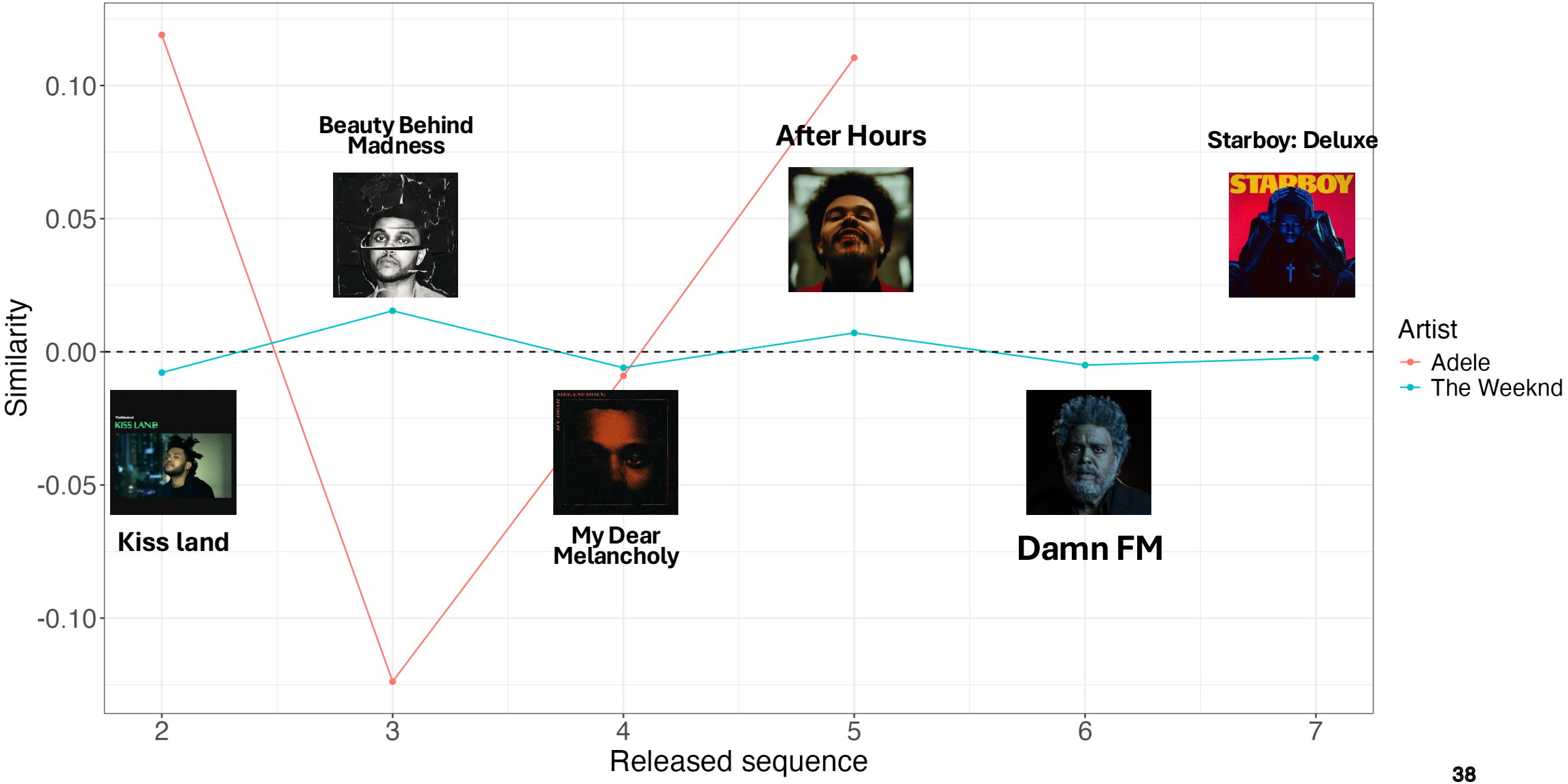
We will stand tall

Face it all together

At Skyfall

At Skyfall

Artist with low fluctuation: The Weeknd



Initial Release

“I left my **girl** back home. I don't love her no more …

Bring your love, **baby**, I could bring my shame”

Second Release

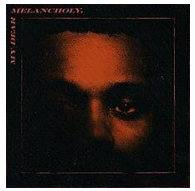
“And I'll admit, **baby**, I'm a little camera-shy

(Nothing is going to change my **love** for you)”

Third Release

“Hide your lies, **girl**, hide your lies (Hide your lies, oh, **baby**) …

The only time that I'll be by your side. I only **love** it when you touch me”



Fourth Release

“ … Call out my name when I **kiss** you so gently …

Girl, why can't you wait? (Why can't you wait, **baby**?)”

Fifth Release

“ … Maybe you can show me how to **love**, maybe …

You can turn me on with just a touch, **baby** ”

Sixth Release

“ … Say I love you, **girl**, but I'm out of time …

Give me one chance, just a little

Baby, I'll treat you right ”

Limitations

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Limitations

1		**Genres**	Pop, Rock, and Hip-hop
2		**Popularity measure**	Using Spotify metrics
3		**One artist at a time**	Consider similarities per artist

Conclusion

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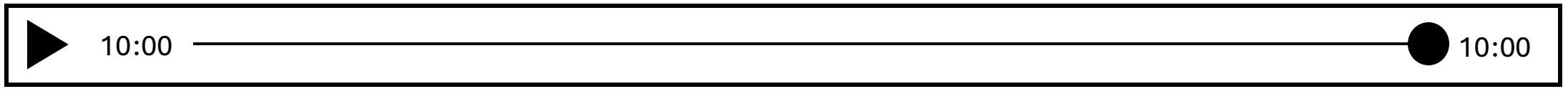
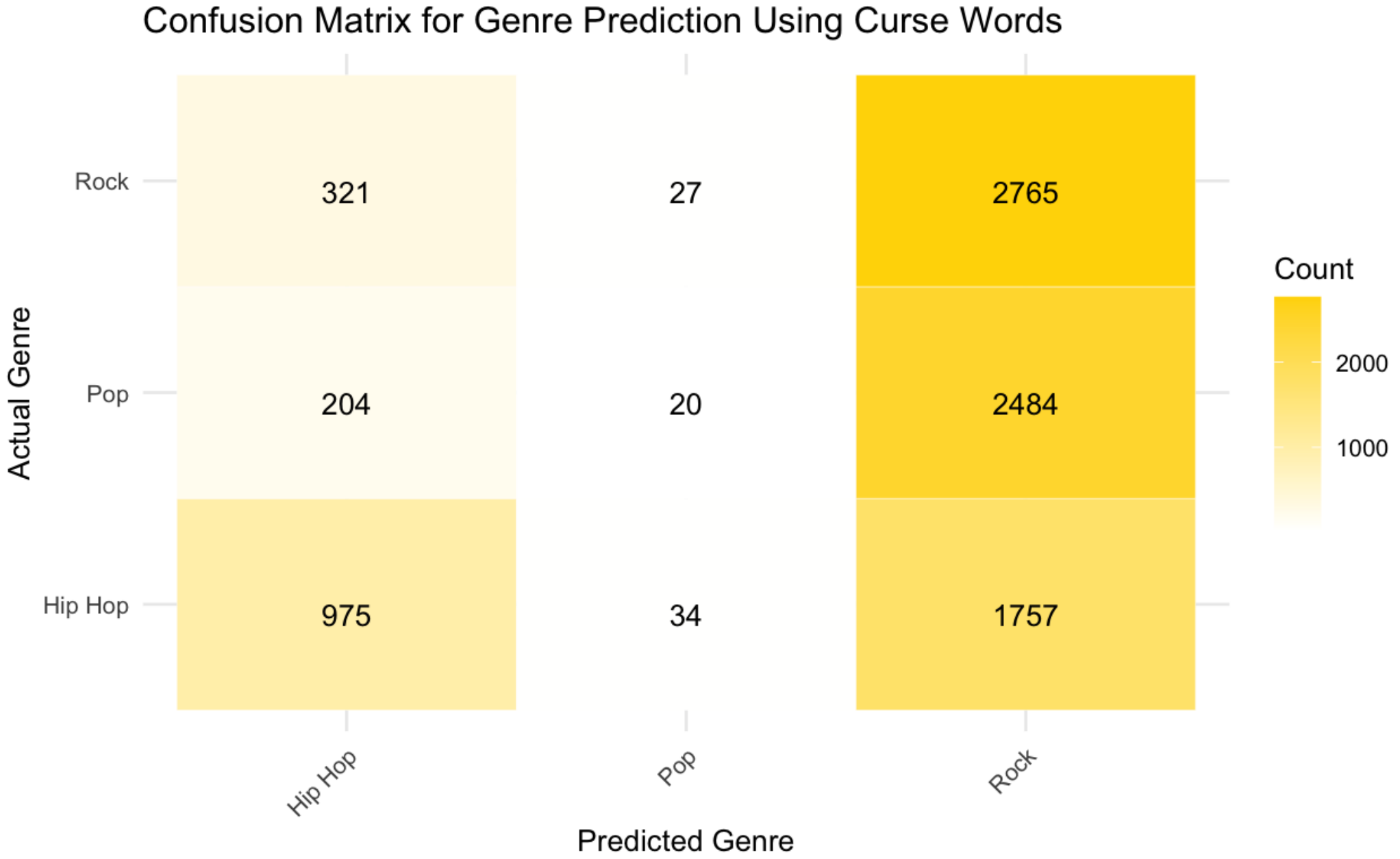
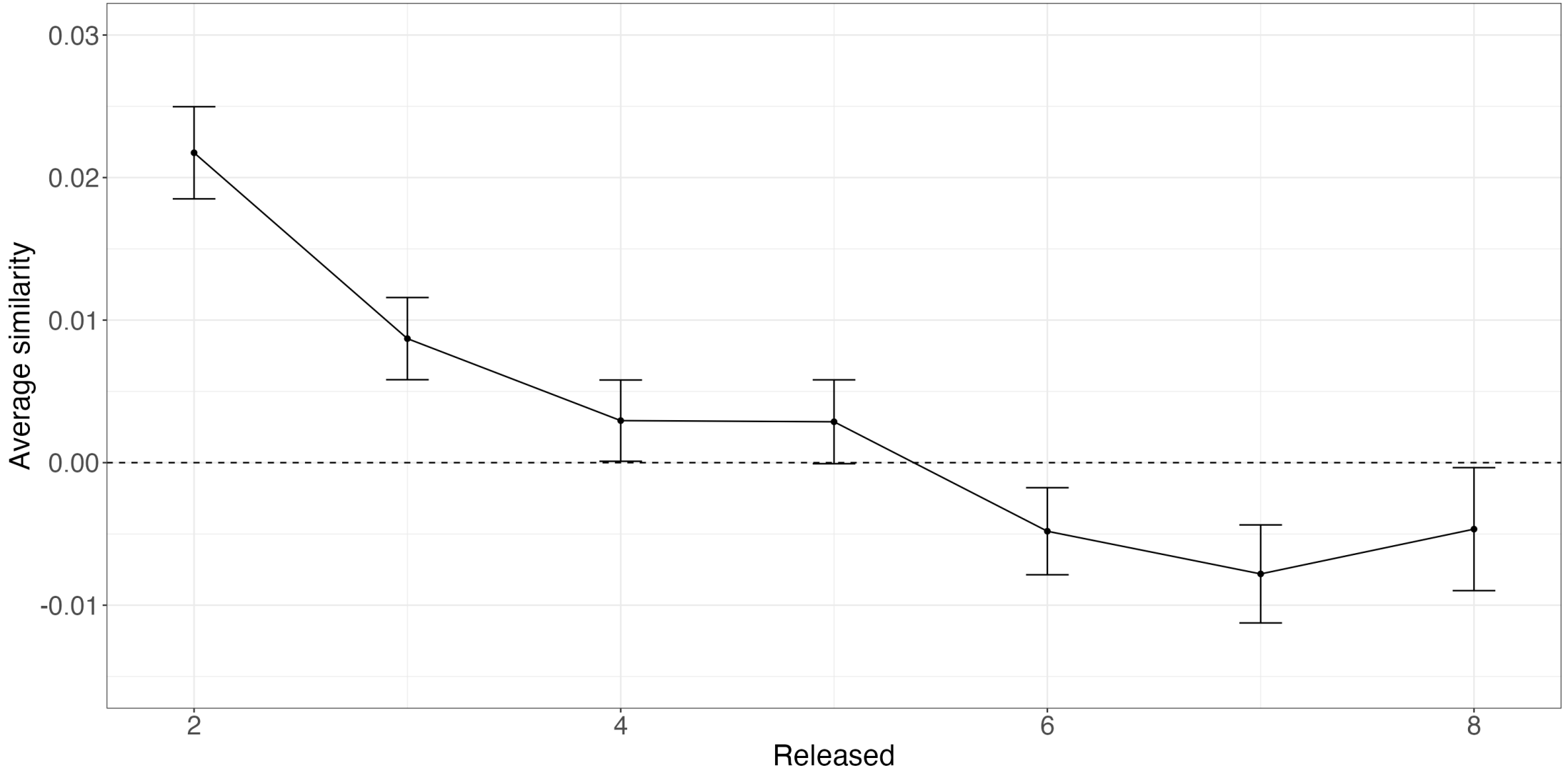
Thank You

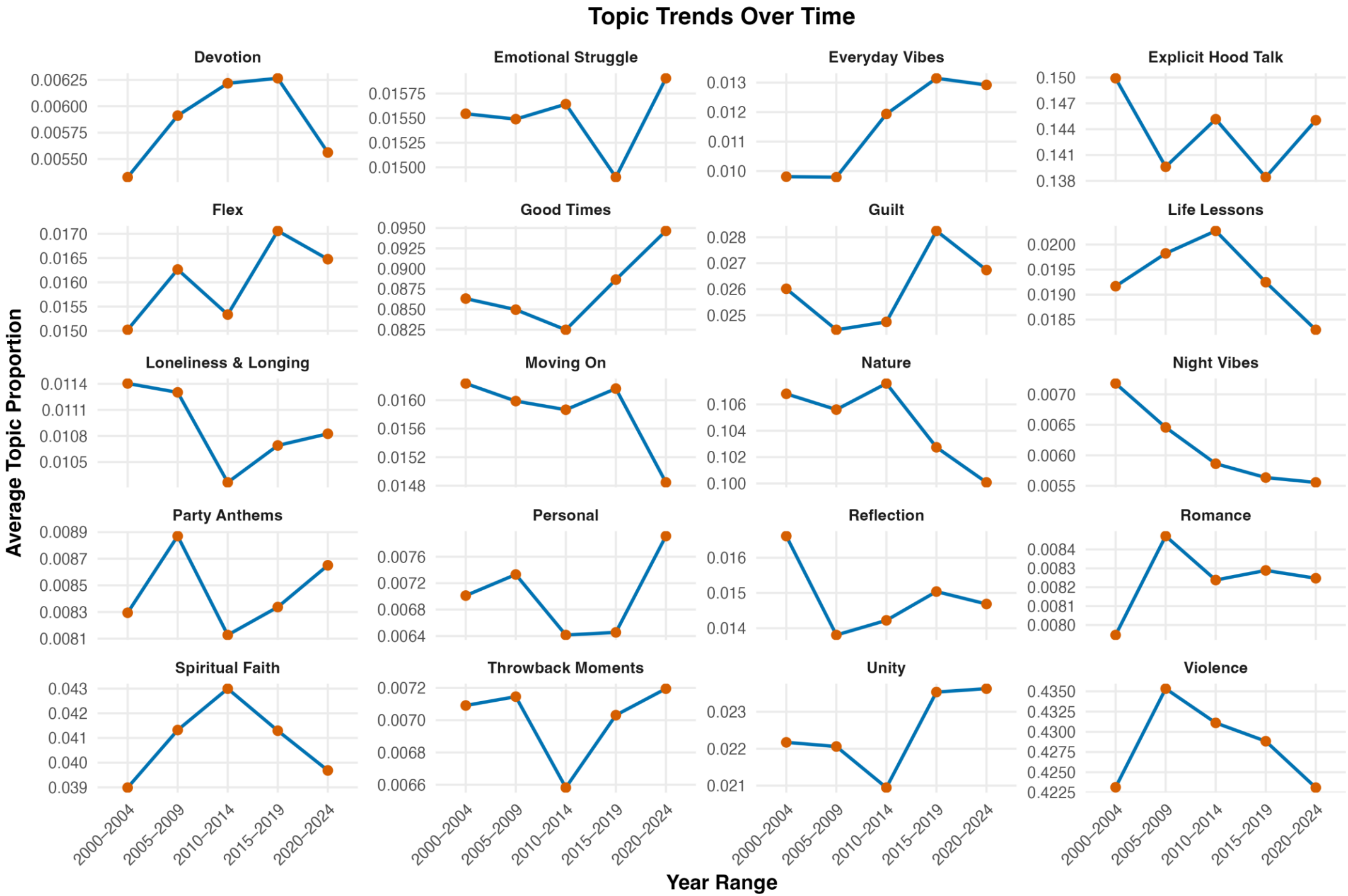


Appendix


Confusion Matrix for Genre Prediction Using Curse Words
Actual Genre
Rock
Pop
Hip Hop
321
27
2765
204
20
2484
975
34
1757
Hip Hop
Pop
Rock
Predicted Genre
Count
2000
1000

Similarity of unpopular songs over released time




Topic Trends Over Time
Devotion
Emotional Struggle
Everyday Vibes
Explicit Hood Talk
Flex
Good Times
Guilt
Life Lessons
Loneliness & Longing
Moving On
Nature
Night Vibes
Party Anthems
Personal
Reflection
Romance
Spiritual Faith
Throwback Moments
Unity
Violence
Average Topic Proportion
2000–2004
2005–2009
2010–2014
2015–2019
2020–2024
Year Range