



# DSC1010: Spotify Group Project

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# Overarching Question

WHAT MAKES A SONG SUCCESSFUL ON SPOTIFY?

# Data Dictionary

Variable Name	Type	Description
Loudness	Quantitative	a unit that reflects how loud a sound is perceived by the human ear, accounting for frequency sensitivity and human auditory perception
Tempo	Quantitative	Beats per minute (BPM); the speed of a song
Energy	Quantitative	Measured on a scale of 0 to 1.0; measures the intensity and energy of the song
Duration	Quantitative	Measured on a scale of 0-7 minutes; it shows how long the song goes on for.
Streams	Quantitative	When a user listens to a long for 30 seconds or longer

# How does the loudness of a song impact streams?

- **0 LUFS** is the target loudness as it ensures consistent and balanced audio levels.
- A positive LUF indicates the potential for distortion in an audio clip as it exceeds the maximum safe LUFS value range of 0
- Spotify specifically targets  $-14$  LUFS to maintain a certain consistency across tracks

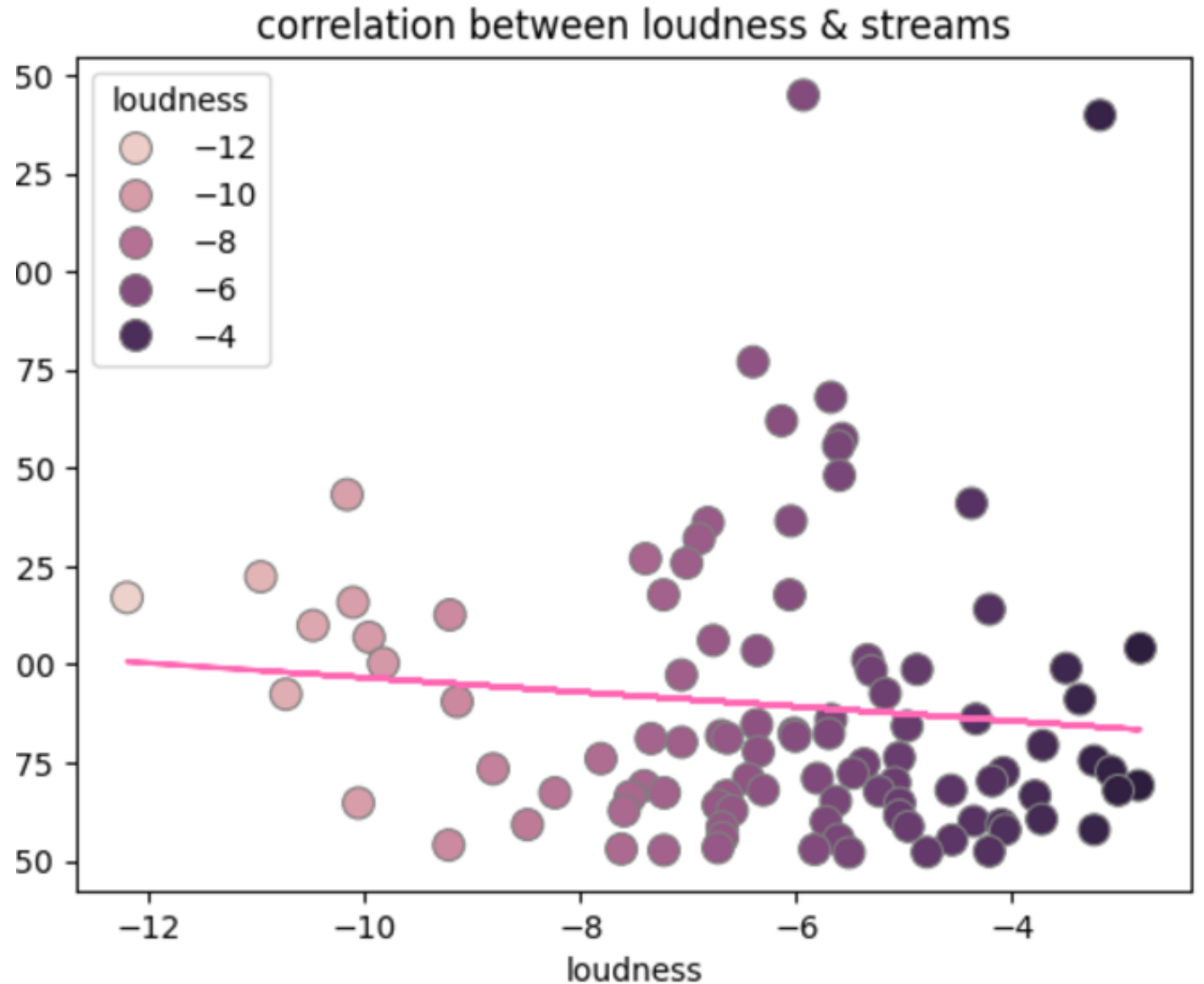
## Examples of contrasting LUFS

- "Fe!n" by Travis Scott featuring Playboi Carti  
**(-6.1 LUFS)**
- "Rockin' Around the Christmas Tree" by Brenda Lee  
**(-13.4)**



# How does the loudness of a song impact streams?

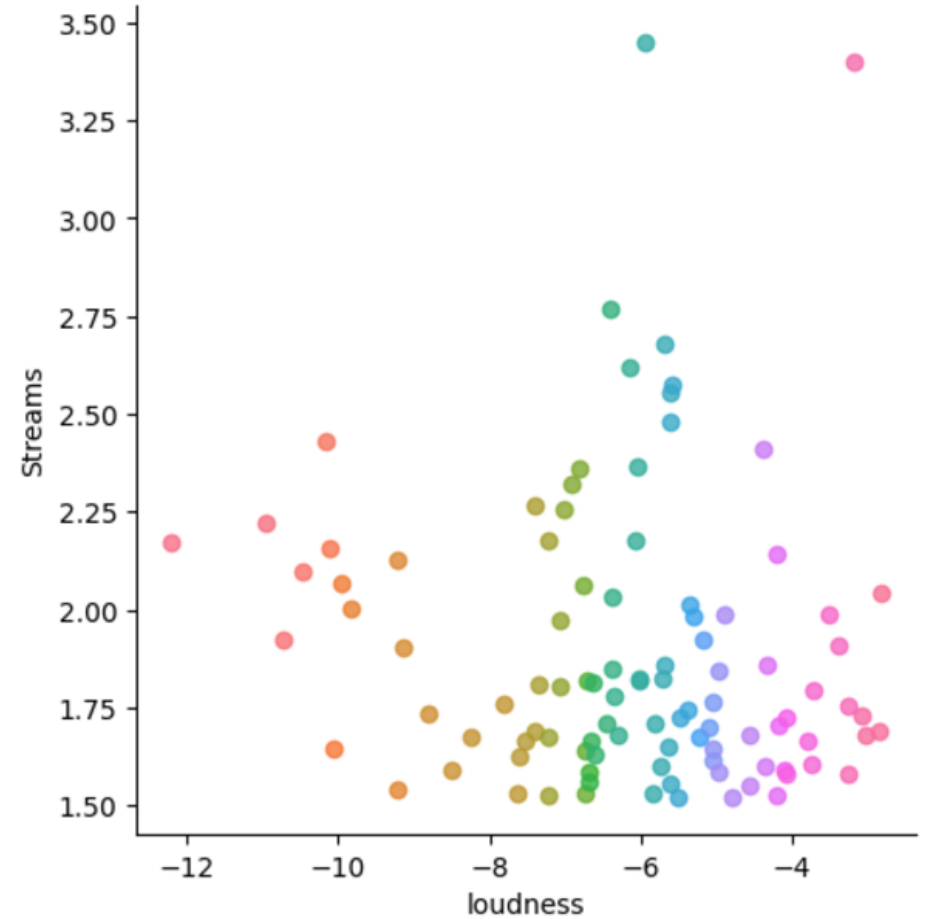
- Taking a look at the data it becomes apparent that there is a moderate correlation between loudness and streams
- **Interpretation:** As LUFS approaches the target loudness of 0 streams also seem to have a higher chance of reaching larger stream numbers



# How does the loudness of a song impact streams?

- o Outliers: -6 & -3 LUFS
- o **What do these values indicate?**
- o -6, loud audio but no risk of distortion (genres: pop, rock, attention-grabbing)
- o -3, indicates a very loud audio, so consistently loud tracks such as EDM, Heavy Metal, Hip Hop

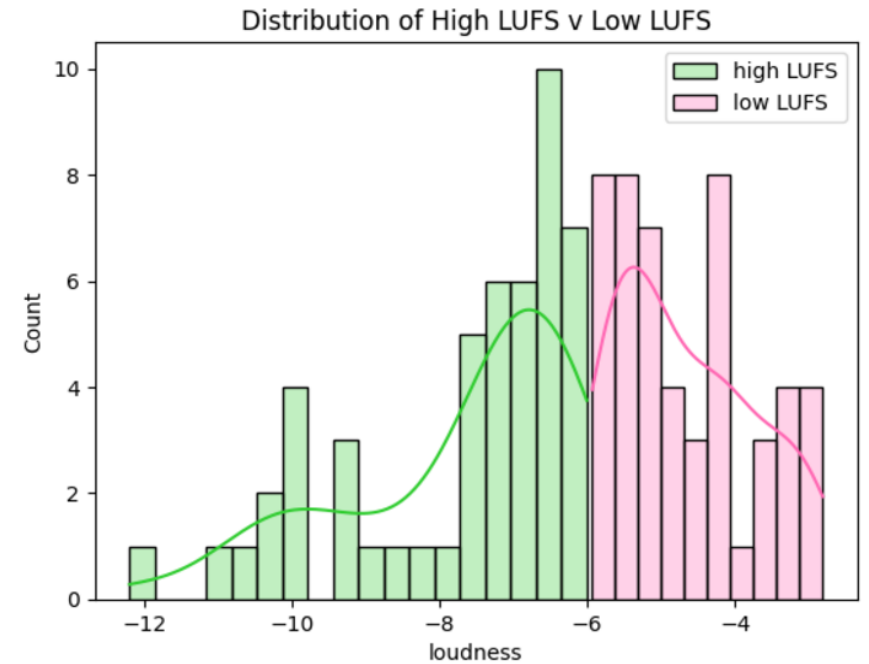
loudness			
● -12.205	● -6.818	● -5.175	
● -10.965	● -6.769	● -5.085	
● -10.732	● -6.726	● -5.044	
● -10.48	● -6.725	● -5.043	
● -10.164	● -6.694	● -5.041	
● -10.109	● -6.687	● -4.972	
● -10.059	● -6.684	● -4.961	
● -9.961	● -6.645	● -4.88	
● -9.828	● -6.638	● -4.787	
● -9.222	● -6.595	● -4.565	
● -9.211	● -6.444	● -4.556	
● -9.144	● -6.4	● -4.374	
● -8.81	● -6.366	● -4.353	
● -8.492	● -6.362	● -4.333	
● -8.237	● -6.351	● -4.209	
● -7.811	● -6.306	● -4.183	
● -7.621	● -6.136	● -4.097	
● -7.596	● -6.061	● -4.078	
● -7.539	● -6.049	● -4.063	
● -7.409	● -6.021	● -3.787	
● -7.398	● -6.009	● -3.724	
● -7.346	● -5.934	● -3.714	
● -7.23	● -5.829	● -3.497	
● -7.227	● -5.804	● -3.37	
● -7.223	● -5.723	● -3.24	
● -7.064	● -5.697	● -3.237	
● -7.063	● -5.679	● -3.183	
● -7.015	● -5.677	● -3.081	
● -6.9	● -5.634	● -3.015	
	● -5.609	● -2.827	
	● -5.608	● -2.81	



# How does the loudness of a song impact streams?

The histogram presented depicts the distribution of LUF values after dividing the LUFs values into

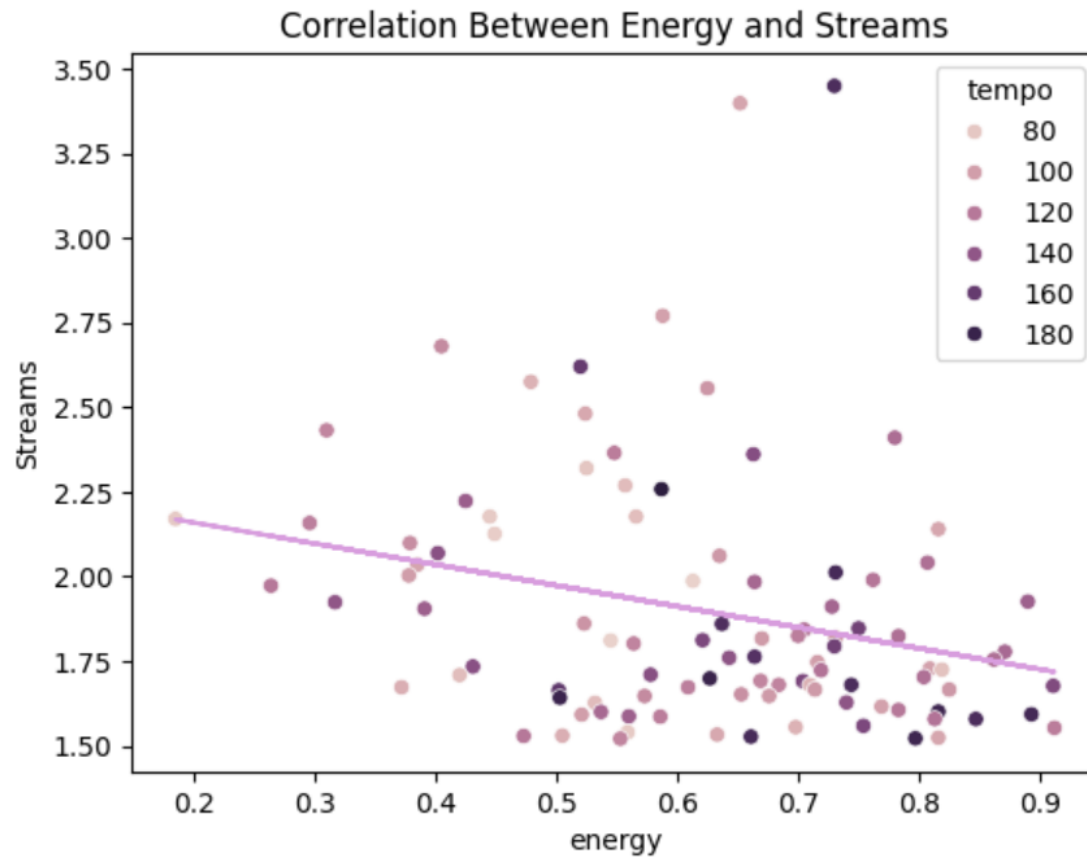
- High LUFs
- Low LUFs
- As represented in the histogram and "describe" function both categories tend to pull to the ranges of  $-8$  and  $-5$  (with a loudness mean of  $-6.18$ ) justifying the conclusion that more successful streaming songs tend to border being relatively louder and compressed for a lasting impact on the listener regardless of the Spotify targeted LUFs score of  $-14$



	loudness
count	100.00000
mean	-6.17631
std	2.00858
min	-12.20500
25%	-7.10375
50%	-5.97150
75%	-4.94075
max	-2.81000

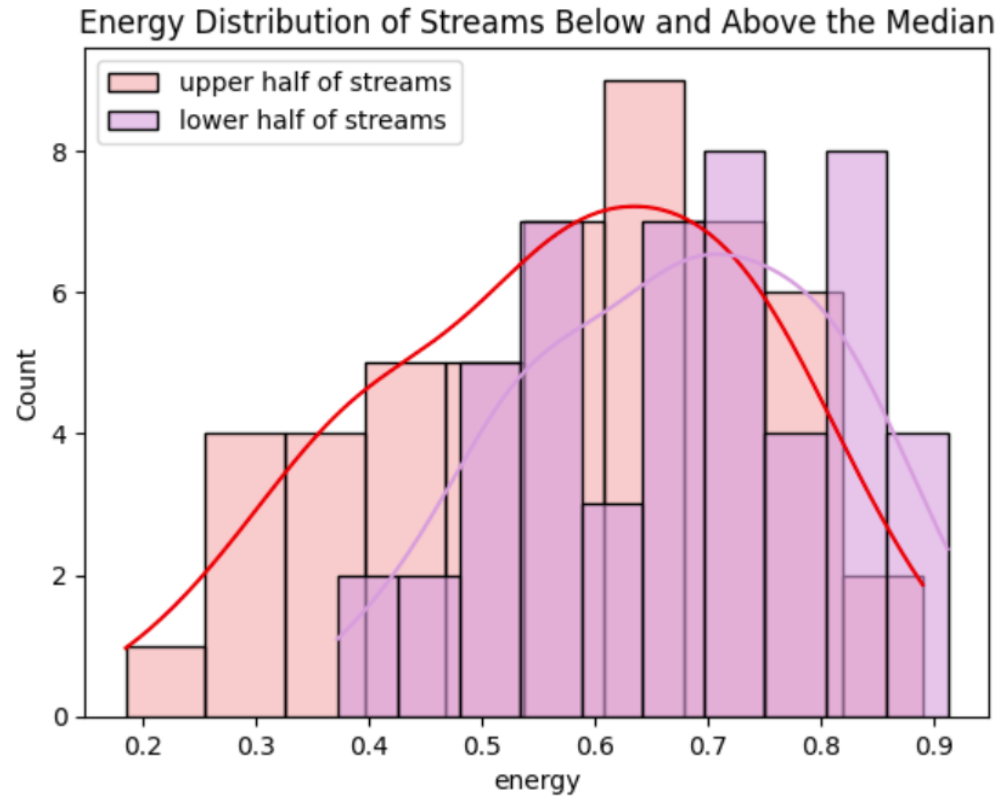
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# How does the tempo and energy of a song impact streams?



- Although there appears to be some correlation, the data is more scattered as the number of streams increase
- It appears faster tempos receive less streams, but it is hard to tell
- Decided to look at songs in two categories: songs above the median number of streams and songs below the median number of streams

# How does the tempo and energy of a song impact streams?



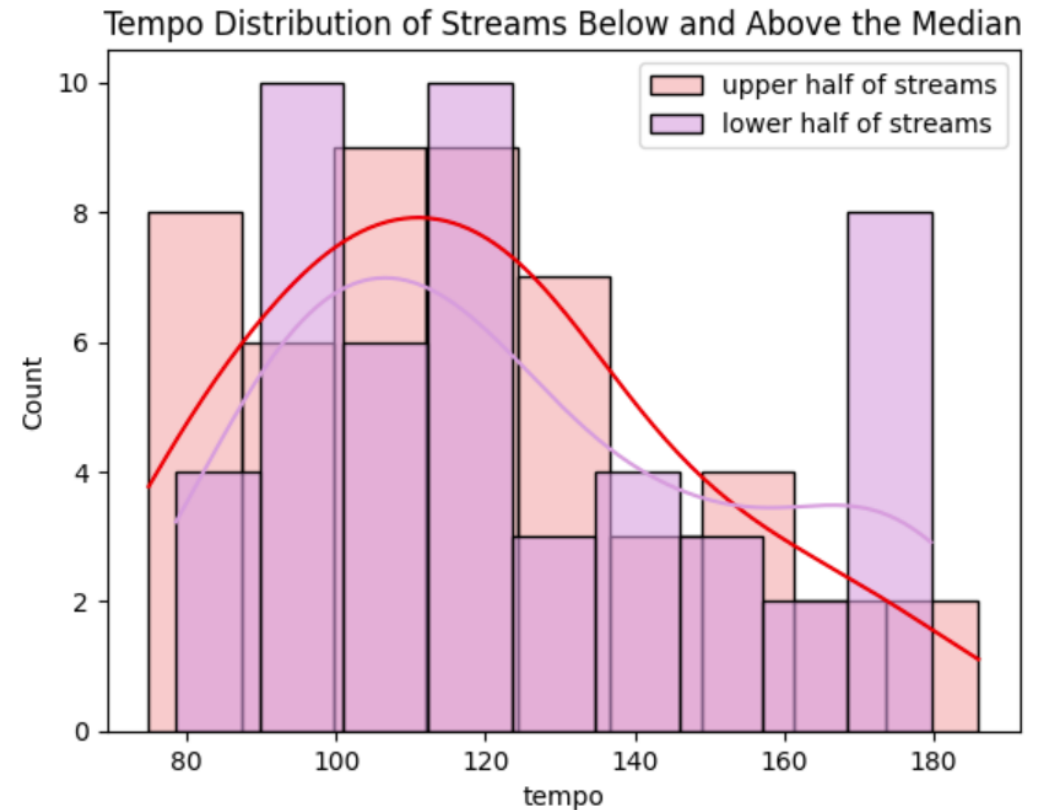
- The lower half of streams are skewed left and has an average of .67
- The upper half of streams is a lot more symmetric, having an average of 0.57
- A majority of the songs in the 0.8-.09 range fall in the lower half of streams category

Conclusion: songs with a high energy are more likely to receive less streams than ones with low to medium energy

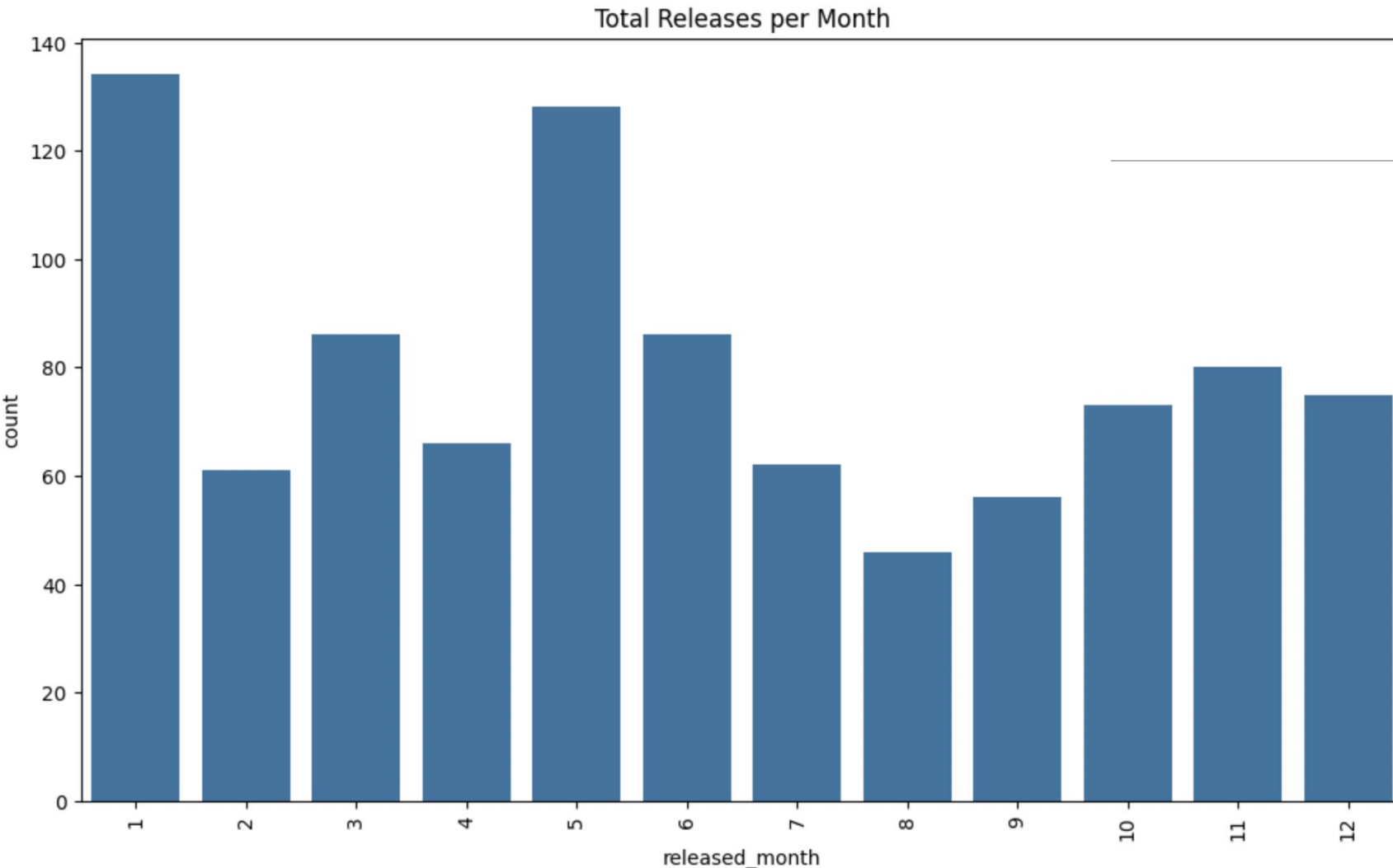
# How does the tempo and energy of a song impact streams?

- Both the upper half and lower half of streams have a similar distribution in the number of streams and tempo
- At 170-180bpm (which is considered the start of presto, or really fast, tempo), the majority of songs received less streams

Conclusion: songs with an incredibly fast tempo are more likely to receive less streams

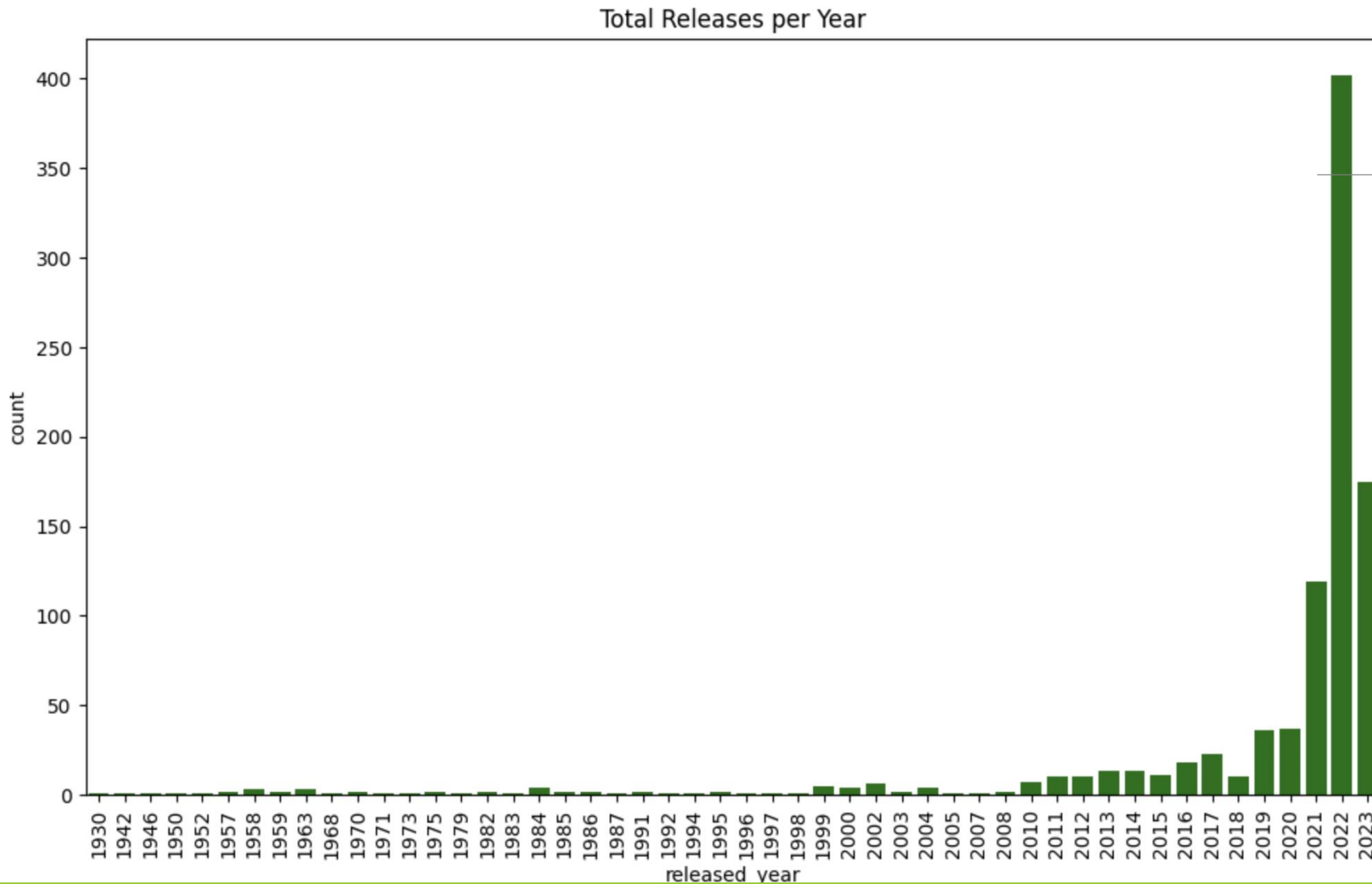


# When is the Best Time to Release a Song?



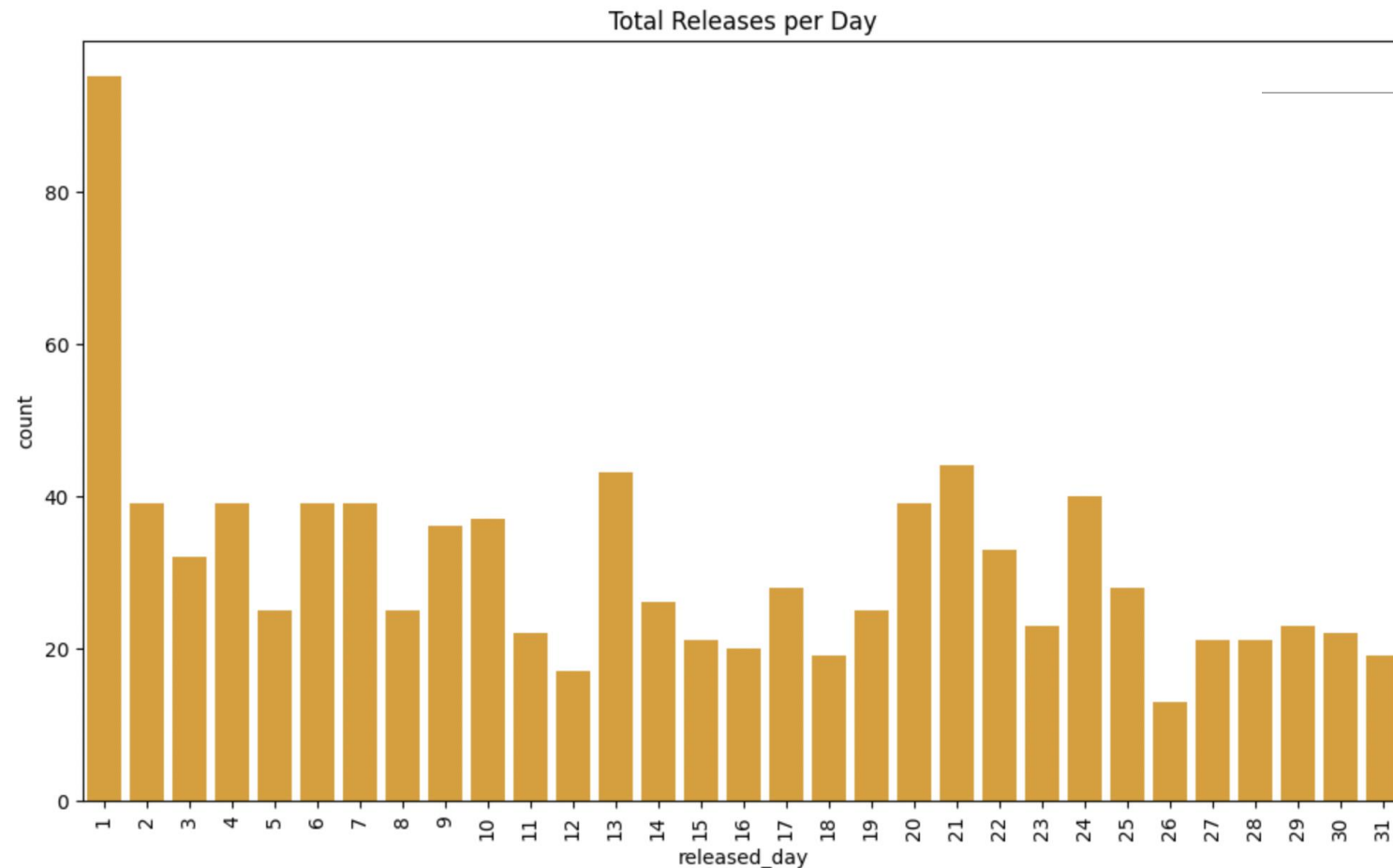
- This graph represents the "Most Streamed Spotify Songs" released each month.
- January and May have a significantly higher number than the other months.
- It's important to note that January is the start of the year and May is the start of summer.
- Conclusion: Songs have more success if they're released in the January or May.

# When is the Best Time to Release a Song



- This graph represents the amount "Most Streamed Spotify Songs" released each year.
- This graph shows a huge jump in 2022.
- Important to note that Spotify did not exist until 2006.
- All songs before 2006 couldn't have been counted for accurately until Spotify was created.
- Conclusion: Create a song that caters to young listeners and has a more modern style to replicate that 2020-2023 feel.

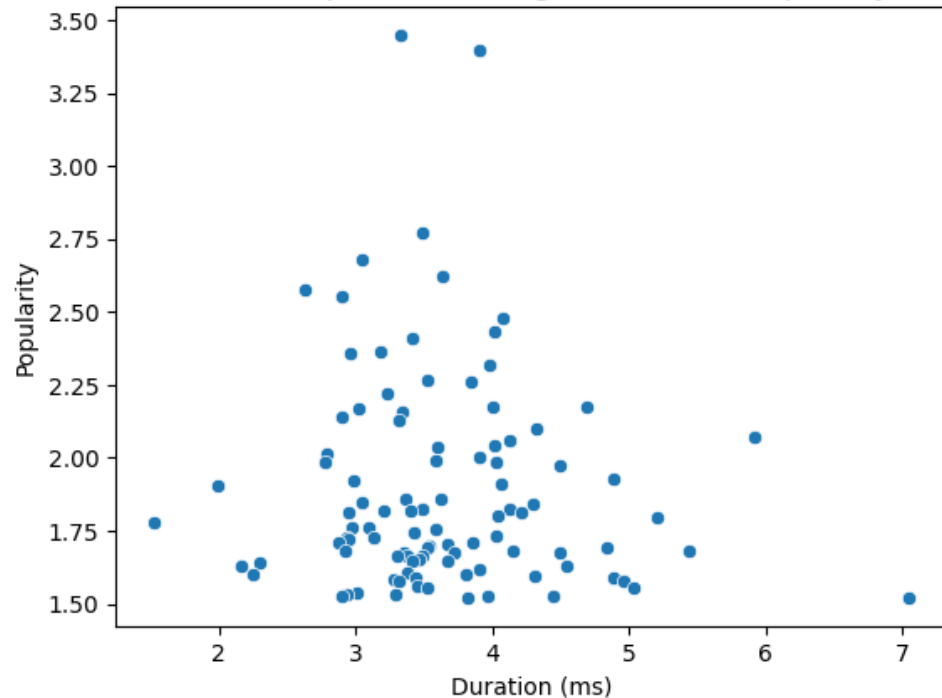
# When is the Best Time to Release a Song



- This Graph represents the amount of "Most Streamed Spotify Songs" released each day
- The first day of a month is much bigger than all the other days.
- It's important to note that the 30 and 31'st days are going to be lower than the other days because not all months have the same number of days.
- Conclusion: releasing a song on the 1st has a bigger chance of becoming a "most Streamed Spotify Song"

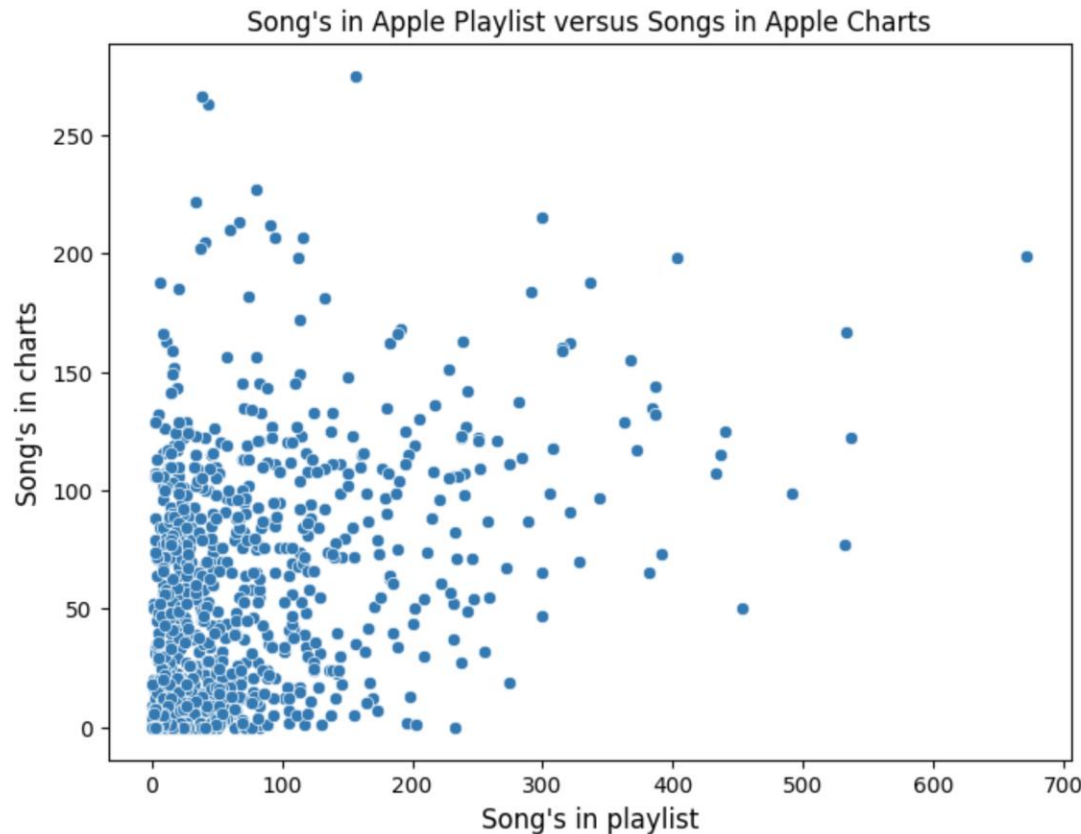
# How does the duration of a song affect its popularity?

Relationship between Song Duration and Popularity



- At first glance, it appears that songs between 3 to 4 minutes are more popular than songs that are 1-2 minutes and over 5 minutes.
- My interpretation of this data is artists are more likely to make songs within 3-4 minutes because they know most people will not stream a song that is too long or too short.
- There is a major correlation between the length of a song and how well it does on the charts.
- Conclusion: Artists should aim to create a song between 3-4 minutes if they want it to do well on the charts.

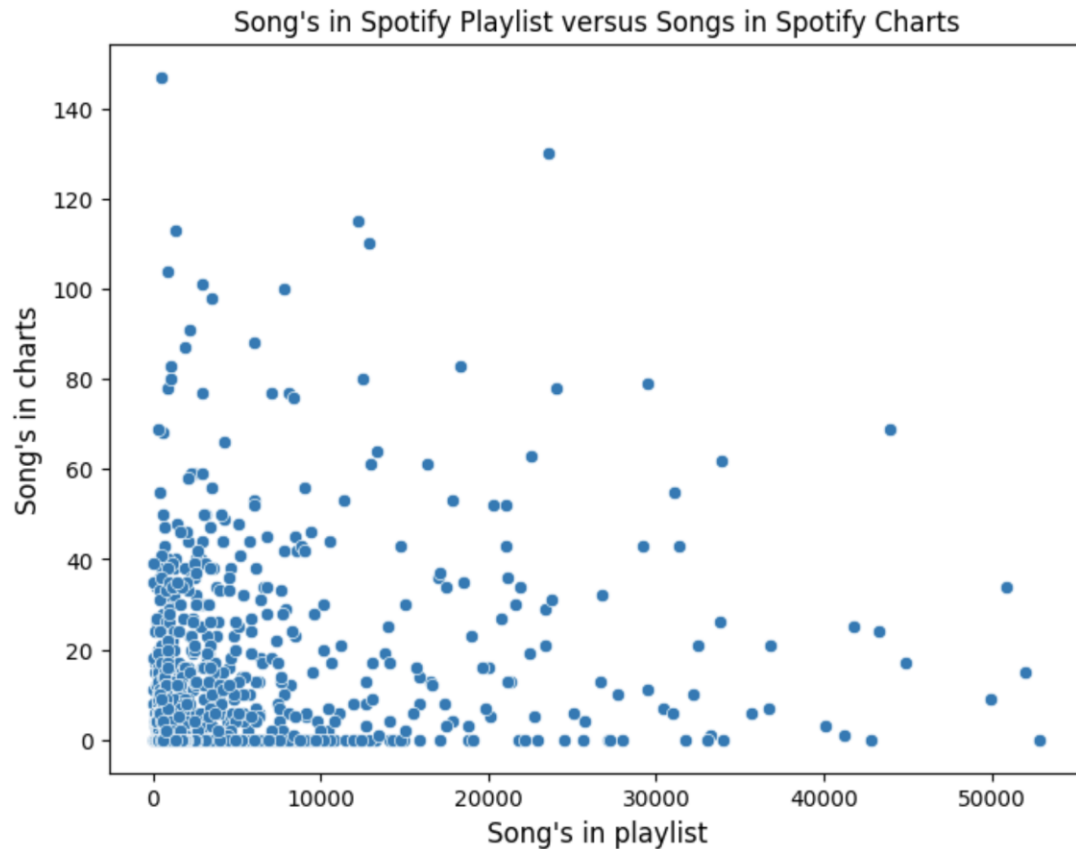
# Is there a relationship between the number of songs an artist has in popular playlists and the likelihood of those songs hitting multiple charts?



- To answer this question, a scatter plot was made with x-axis having songs in playlist and y-axis having songs in charts. From the dataset, we had song data from both Spotify and Apple charts.
- Initial Prediction: Songs that appeared the most in playlist had a higher possibility of appearing in the charts because that would mean the song gets played more if it's on more playlist.
  - More on playlists = more opportunities to get played.
- Conclusion: For songs on Apple, the least a song appears on multiple playlist, the more it tends to get played. Thus, having a higher chance of hitting the charts.

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- Conclusion: For songs on Spotify, the least a song appears on multiple playlist, the more it tends to get played. Thus, having a higher chance of hitting the charts.