Spotify Data Analysis*

Comparison of Audio Features Between Multiple Artists

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Using the `spotifyr` package, this paper analyzes audio data features `danceability`, `energy`, and `loudness` by comparing between three artists, `Coldplay`, `Radiohead`, and `The National`.

1 Introduction

This paper provides an analysis of music using the Spotify API ("Spotify Web API Documentation" 2023). In this analysis, we examine three singers: Coldplay, Radiohead and The National. By utilizing Spotify's extensive database of music and the Spotify API, we analysis three key audio features: Energy, danceability and loudness, which provide quantitative insights into the musical characteristics of each band. Coldplay, Radiohead, and The National differ slightly in musical style: The National shows higher danceability, while Coldplay has greater energy and loudness than Radiohead.

2 Data

For each artist, audio features of their tracks were downloaded from Spotify API ("Spotify Web API Documentation" 2023), including `danceability`, `energy`, and `loudness`. `Danceability` refers to how suitable the audio is for dancing using elements sush as tempo, rhythm, and beat strength. A value of 0.0 is least danceable and 1.0 is most danceable. `Energy` takes into account dynamic range, perceived loudness, timbre, onset rate, and general entropy on a scale of 0.0 to 0.1 where energetic tracks feel fast, loud, and noisy. `Loudness` refers to overall loudness of a track in decibels (dB) typically between -60 and 0 db.

*Code and data are available at: https://github.com/DavidFJ207/spotify_analysis

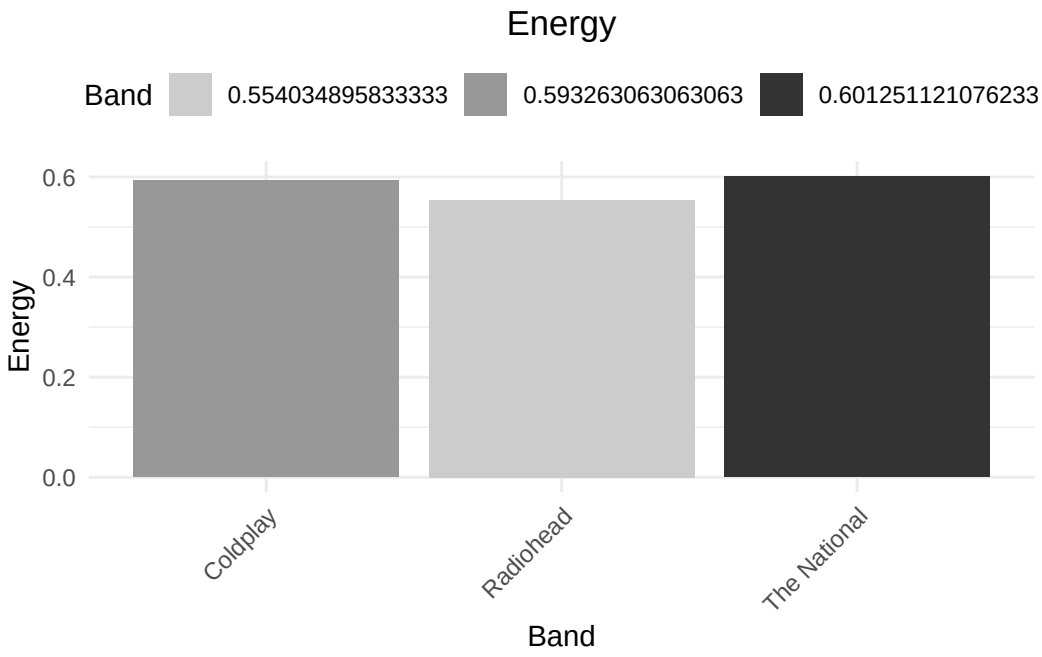

Figure 1: Data summary of audio features for Coldplay

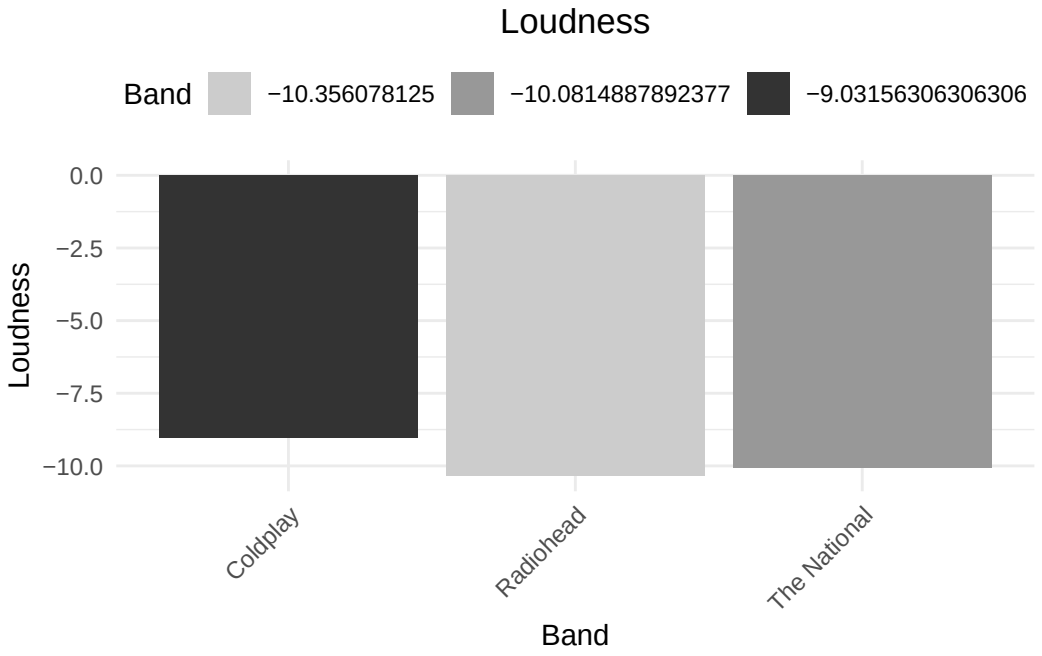

Figure 2: Data summary of audio features for Coldplay

3 Results

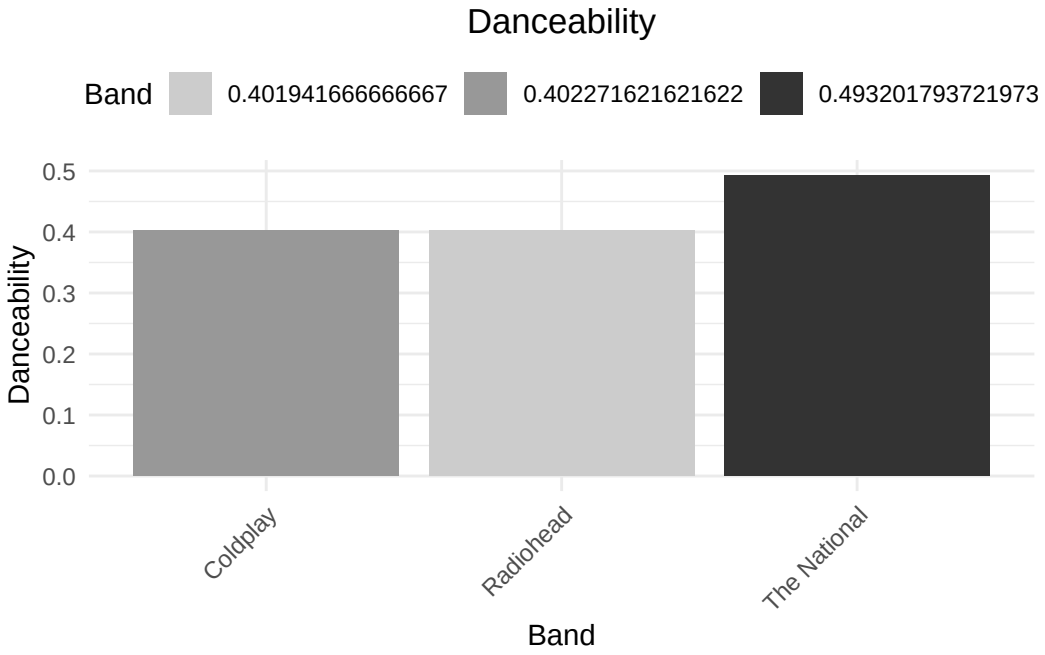

Figure 3: Average Danceability for Coldplay, Radiohead, and The National

3.1 Trends

As band's loudness increases and their energy decreases, we see that the overall danceability increases.

3.2 Implications

The data highlights subtle but meaningful differences in the musical styles of Coldplay, Radiohead, and The National. **Coldplay**'s higher energy and loudness suggest a more mainstream, dynamic appeal, consistent with their stadium-filling sound and pop-rock influence. **Radiohead**'s lower energy and loudness reflect their more introspective, experimental approach, often favoring atmospheric, complex compositions over immediacy. **The National**'s higher danceability, combined with moderate energy and lower loudness, suggests a smoother, emotionally resonant style, balancing accessibility with depth. These variations imply how each band resonates with their respective audiences, shaping listener experiences through distinct blends of energy, mood, and engagement.

4 References

For data analysis, we used R (R Core Team 2023), (Wickham et al. 2019), and the `spotifyr` package (Thompson 2023). The data was obtained through the Spotify API ("Spotify Web API Documentation" 2023), and the starter folder was retrieved from a github reposository (Alexander 2021).

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Thompson, Charlie. 2023. *Spotifyr: R Wrapper for the 'Spotify' Web API*. https://github.com/charlie86/spotifyr.

Wickham, Hadley, Mara Averick, Jennifer Bryan, Winston Chang, Lucy D'Agostino McGowan, Romain François, Garrett Grolemund, et al. 2019. "Welcome to the tidyverse." *Journal of Open Source Software* 4 (43): 1686. https://doi.org/10.21105/joss.01686.