A Comparative Analysis of Valence, Duration, and Energy in the Music of JJ Lin, Joker Xue, and Leehom Wang*

John Zhang Heyucheng Zhang Ariel Xing

October 10, 2024

This study examines the trends in valence, duration, and energy in the music of three prominent Chinese pop artists: JJ Lin, Joker Xue, and Leehom Wang. Valence, representing the emotional tone of a song, generally shows a slight decline across all three artists, with Joker Xue experiencing the most significant drop. Song duration remains stable for Joker Xue and Leehom Wang but increases for JJ Lin over time. In contrast, energy trends show JJ Lin and Joker Xue with declining intensity, while Leehom Wang's music becomes more energetic.

Table of contents

*Code and data are available at: https://github.com/Clearsky21z/Spotify_Analysis

1 Introduction

The evolution of musical trends in popular music is a well-documented phenomenon, often reflecting changes in cultural preferences, artistic expression, and technological advancements. In recent years, the global music scene has seen significant contributions from Chinese pop artists, among whom JJ Lin, Joker Xue, and Leehom Wang stand out. Each of these artists has built a reputation for their unique contributions to Mandarin pop music, characterized by distinct emotional tones and production qualities.

Valence, energy, and song duration are key musical attributes that influence how audiences perceive songs. Valence represents the positivity or emotional tone of a track; energy captures the intensity or activity level in a song, while duration determines how long a piece lasts. Understanding how these attributes evolve over time can provide insights into the creative trajectories of these artists. This study aims to explore the trends in valence, duration, and energy in the discographies of JJ Lin, Joker Xue, and Leehom Wang, comparing how these elements have changed with the release of new albums over the past two decades.

The remainder of this paper is constructed as follows. Section 2 provides a sample of the downloaded dataset, Section 3 gives three plots comparing Valence, Duration, and Energy in the Music of JJ Lin, Joker Xue, and Leehom Wang and Section 4 mentiones a brief discussion of the result.

The data is downloaded using R R Core Team (2022) and Spotify API Thompson et al. (2022) with the help of usethis package Wickham et al. (2024), and the analysis is conducted with here Müller (2020), tidyverse Wickham et al. (2019), ggplot2 Wickham (2016) and knitr Xie (2023).

2 Data

Table 1: Sample Data

album_release_date	valence	duration_ms	energy
2023-04-21	0.205	231586	0.360
2023-04-21	0.597	204881	0.865
2023-04-21	0.312	239865	0.417
2023-04-21	0.232	230253	0.577
2023-04-21	0.127	226571	0.404

3 Results

3.1 Valence, Duration and Energy of Three Singers' Songs Over Time

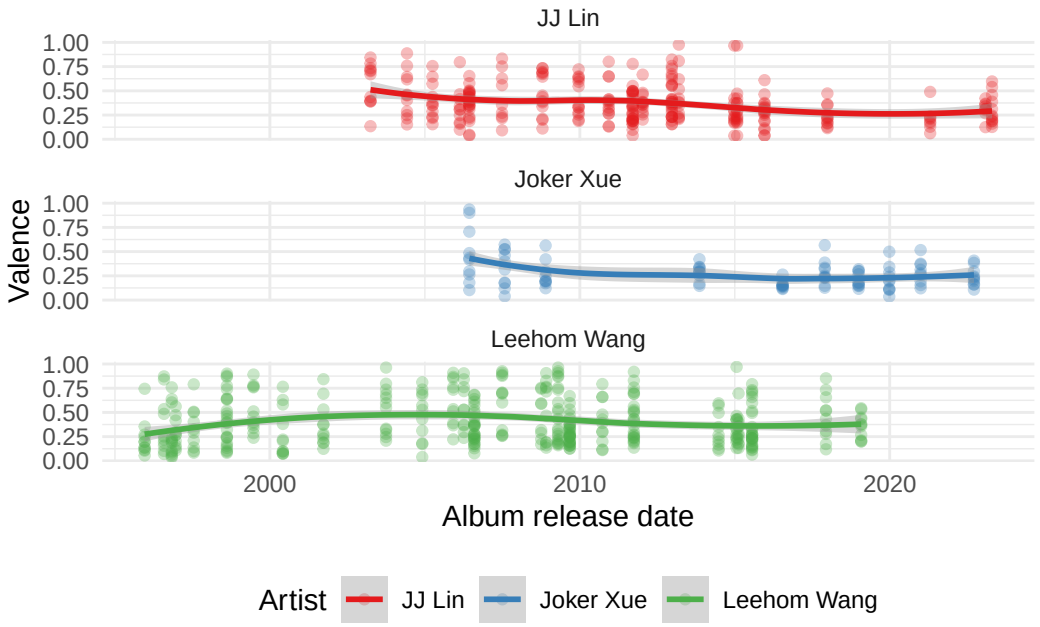

Figure 1: Valence of Three Singers' Songs Over Time

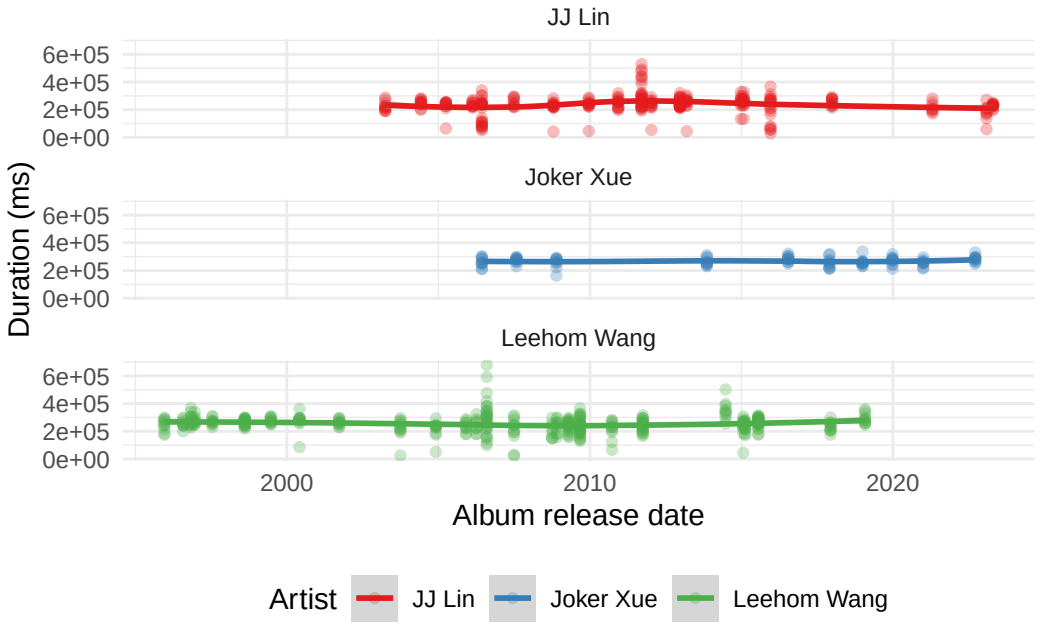

Figure 2: Duration of Three Singers' Songs Over Time

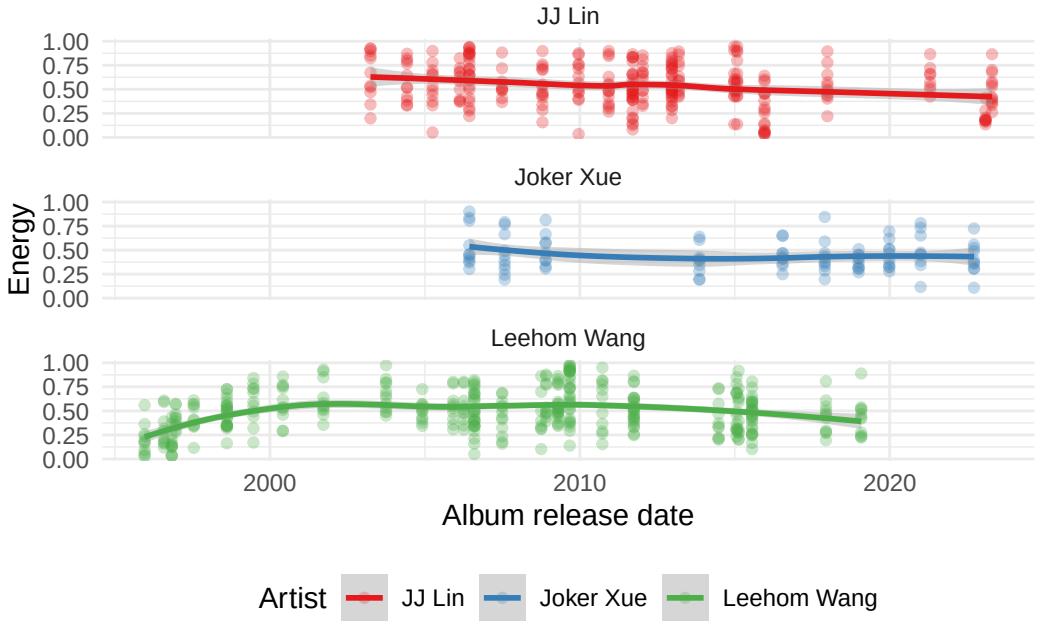

Figure 3: Energy of Three Singers' Songs Over Time

3.2 Observations

The graphs reveal notable trends in the music of JJ Lin, Joker Xue, and Leehom Wang over time. In terms of valence from Figure 1, all three artists show a slight decline, indicating a shift toward less positive emotional tones in their songs. Joker Xue exhibits the most significant drop in valence, suggesting a move toward more melancholic or neutral themes. In Figure 2 for song duration, JJ Lin's songs have become slightly longer over time, while Joker Xue and Leehom Wang have maintained consistent lengths. In terms of energy in Figure 3, both JJ Lin and Joker Xue show a gradual decrease, indicating a shift to less intense, more mellow music. On the other hand, Leehom Wang's energy has increased, suggesting his recent work has become more dynamic and upbeat. Overall, these trends highlight the evolving styles and emotional expressions of the three artists.

4 Discussion

The comparative analysis of valence, duration, and energy across the discographies of JJ Lin, Joker Xue, and Leehom Wang reveals distinct trends that reflect both personal artistic development and broader shifts in pop music.

- Valence Trends: Across the three artists, valence—representing the emotional tone—generally shows a declining trend over time. JJ Lin's music maintains a relatively stable, moderate valence but with a slight decline, suggesting a shift towards more emotionally neutral or melancholic compositions. Joker Xue, on the other hand, exhibits a more pronounced decline, reflecting a trend toward lower valence, potentially highlighting the artist's focus on more emotionally complex or darker themes. Leehom Wang also shows a subtle decrease, but with greater variability, indicating a broader emotional range in his discography.
- Duration Trends: Duration, measured in milliseconds, shows relatively stable trends for Joker Xue and Leehom Wang, with no significant variation in song lengths over time. However, JJ Lin shows a slight upward trend in song duration, indicating that his compositions may be growing longer over the years. This could reflect changes in the artist's production style, possibly exploring more elaborate arrangements or storytelling within songs.
- Energy Trends: Energy, which represents the intensity and activity level in a song, shows diverging trends among the three artists. JJ Lin's energy shows a slight decline, indicating a move toward more mellow or less intense productions. Similarly, Joker Xue also shows a decline, suggesting a preference for slower, perhaps more introspective music in recent years. In contrast, Leehom Wang's energy shows an upward trend, highlighting an increasing intensity in his later works, which may suggest experimentation with more upbeat or dynamic musical elements.

- Broader Implications: These trends provide interesting insights into how individual artists evolve over time and how their music reflects personal or industry-wide changes. The decreasing valence in Joker Xue's music could indicate a move towards more mature or introspective themes, while Leehom Wang's increasing energy may reflect his embrace of more dynamic and experimental production techniques. JJ Lin, meanwhile, seems to be extending the length of his compositions while maintaining a balanced emotional tone, perhaps catering to a broader audience.

In summary, this study shows that while there are common trends in the emotional content (valence) and song structure (duration), the artists display significant individuality when it comes to the energy in their music. These findings may reflect the diversity of Chinese pop music and how artists adapt their style over time.

Appendix

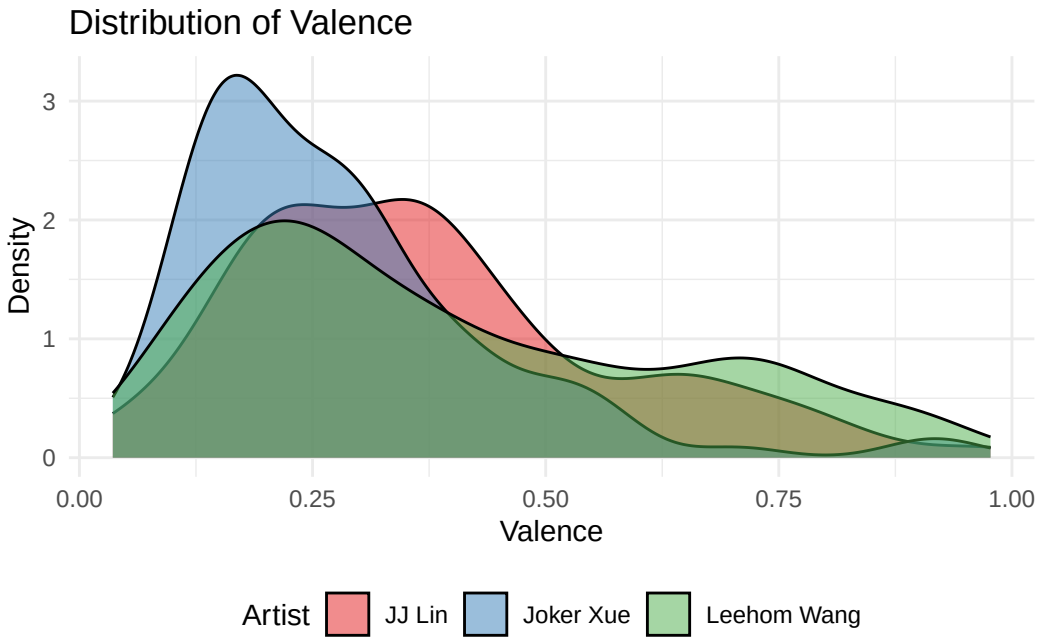

Figure 4: Plot for Valence, Duration and Energy Distribution

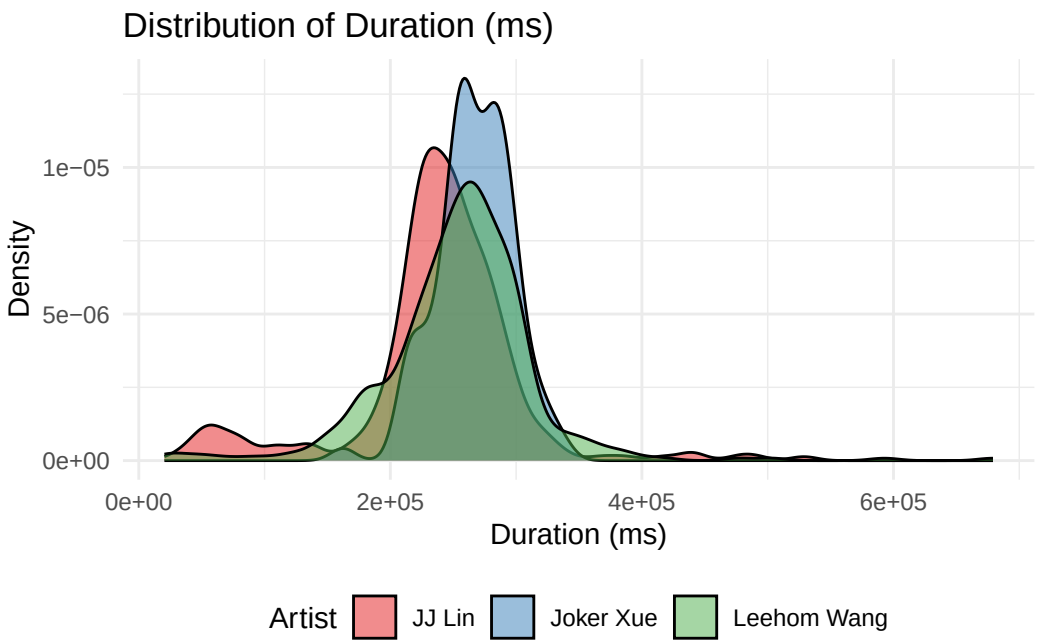

Figure 5: Plot for Valence, Duration and Energy Distribution

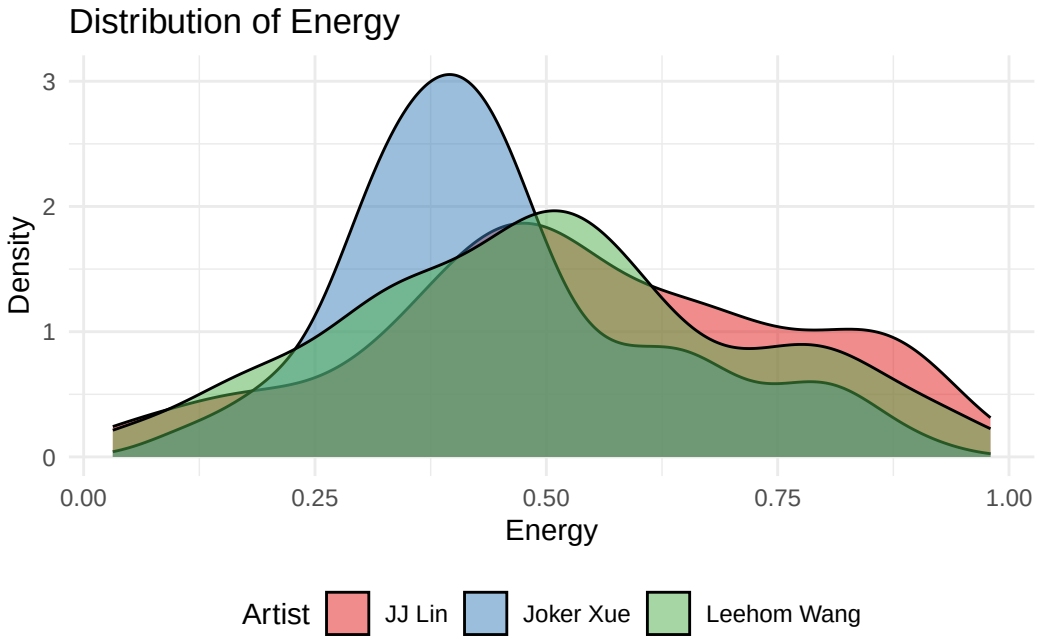

Figure 6: Plot for Valence, Duration and Energy Distribution

References

Müller, Kirill. 2020. *here: A Simpler Way to Find Your Files*. https://CRAN.R-project.org/package=here.

R Core Team. 2022. *R: A Language and Environment for Statistical Computing*. Vienna, Austria: R Foundation for Statistical Computing. https://www.R-project.org/.

Thompson, Charlie, Daniel Antal, Josiah Parry, Donal Phipps, and Tom Wolff. 2022. *Spotifyr: R Wrapper for the 'Spotify' Web API*. https://github.com/charlie86/spotifyr.

Wickham, Hadley. 2016. *ggplot2: Elegant Graphics for Data Analysis*. Springer-Verlag New York. https://ggplot2.tidyverse.org.

Wickham, Hadley, Mara Averick, Jenny 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.

Wickham, Hadley, Jennifer Bryan, Malcolm Barrett, and Andy Teucher. 2024. *Usethis: Automate Package and Project Setup*. https://CRAN.R-project.org/package=usethis.

Xie, Yihui. 2023. *knitr: A General-Purpose Package for Dynamic Report Generation in R*. https://yihui.org/knitr/.