Success Factors of Survival K-pop Idol Groups in the Western Market *

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Abstract

With the success of K-pop idol groups such as BTS and Twice entering the Western market, the question for many other companies became whether they can reproduce the success for their own idol groups. To explore whether specific elements of the songs correlate with increasing hits and audiences, this paper aims to investigate the relationship between danceability, energy, valence, tempo, and listener counts on Spotify. In order to maintain fairness, this paper will only analyze female k-pop idol groups that were formed due to survival shows.This ensures that they have an adequate fanbase and are comparable to each other. By utilizing data pulled from Spotify API, we found that listener counts are closely correlated with tempo and danceability. In addition, implications and possible reasons behind this correlation are discussed and explanations for outliers are provided.

1. Introduction

The Korean pop music industry, commonly known as K-pop, has seen a surge in popularity worldwide over the past few years. K-pop has become a global phenomenon, and its popularity has continued to grow steadily, particularly in Western markets. One factor that has contributed to the increasing popularity of K-pop in the West is the emergence of survival shows that form K-pop groups. These shows, such as "Produce 101" and "Girls Planet 999" , have become increasingly popular in recent years and have been instrumental in the formation of many successful K-pop groups.

The success of these survival show groups has also led to an increase in the overall popularity of K-pop in the Western market. As the popularity of K-pop continues to grow, there is a growing need for the industry to expand in the Western market. This expansion is important for several reasons. Firstly, the Western market represents a significant opportunity for growth, with a large and diverse audience that is hungry for new and exciting music. Secondly, expanding into the Western market can provide K-pop groups with access to new revenue streams, such as merchandise sales, concerts, and collaborations with Western artists. Finally, expanding into the Western market can help to establish K-pop as a mainstream genre, and solidify its position as a global cultural phenomenon. Therefore, I'm interested in whether increasing hits and audiences is correlated with any factors from the songs. If so, which attributes will affect the song's popularity the most? And is it possible to predict how popular a song can be in the future based on certain attributes?

The data used in this report is obtained from Spotify API. The datasets are specified to the five survival show K-pop idol groups that I have selected, and it provides different kinds of information about every released songs such as danceability, tempo, and valence. In these data sets, I'm particularly interested in the different attribute values between their most popular songs and least popular songs, and if we can establish any trends based on these statistics . In section 2, cleaned data sets are obtained and explained to perform further analysis. Visualizations in the forms of tables and figures are presented to help to explain

*Code and data are available at: https://github.com/randalln1140/K-pop-Female-Group-Western-Success

the possible correlation between the different attributes and the listener count on Spotify. In section 3, a model is constructed to justify the relationship between tempo, danceability and listener count, and to make future predictions. The interpretation of the final model along with all the findings regarding the potential success factors for K-pop songs in the Western market is presented in section 4. A discussion is carried out in section 5 on the implications of the findings regarding tempo and danceability, and possible application to K-pop songwriters and composers, as well as the weaknesses and future steps of this paper.

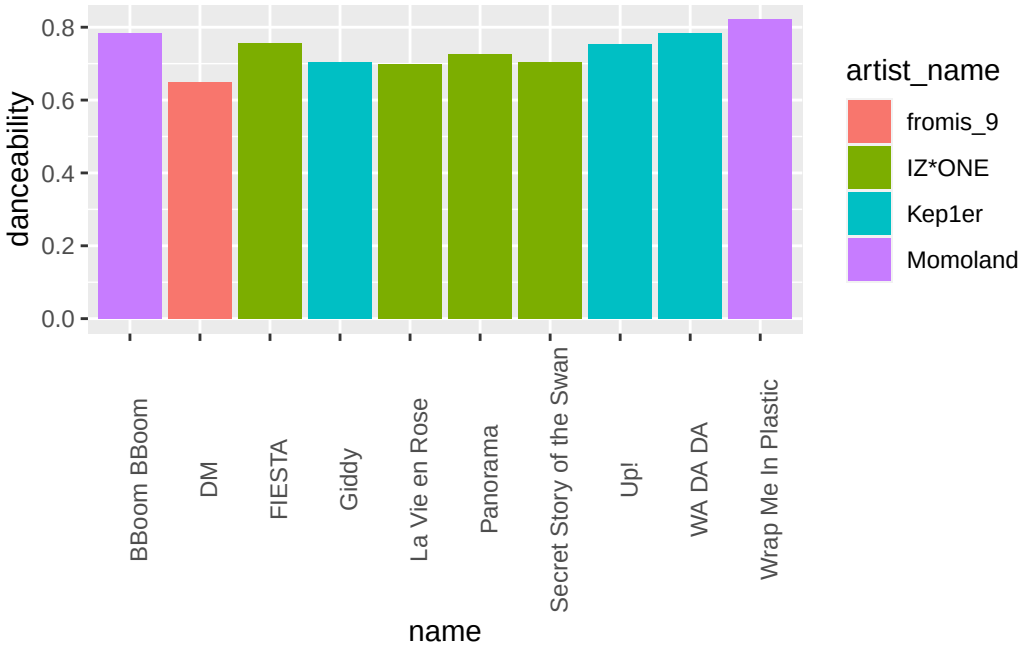
2. Data

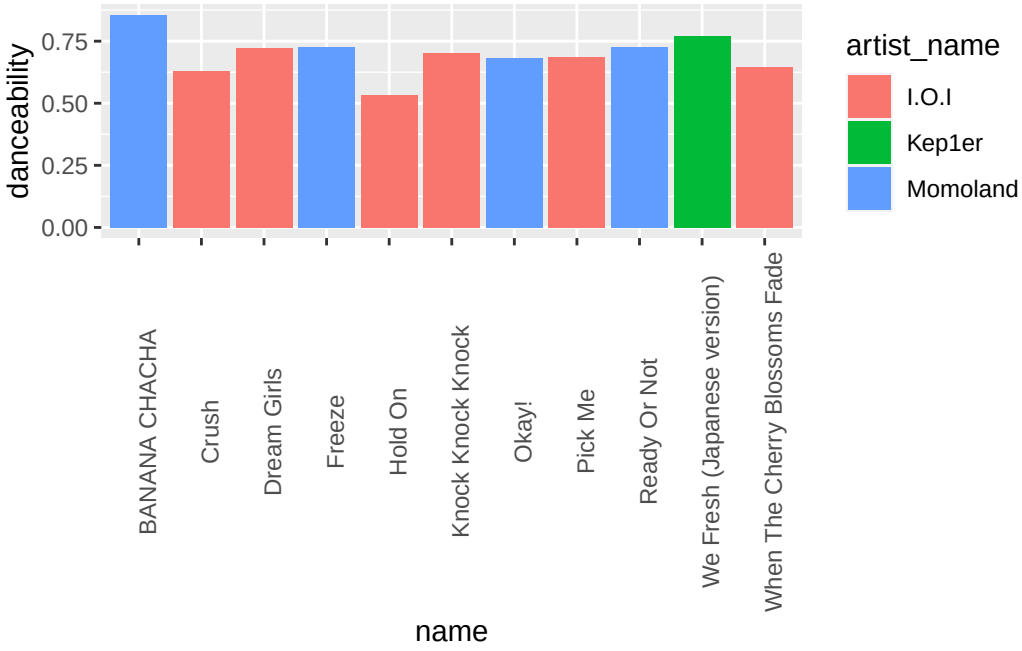
Table 1: Extracting Top 10 Most Popular Tracks made by Selected Kpop Idol Groups

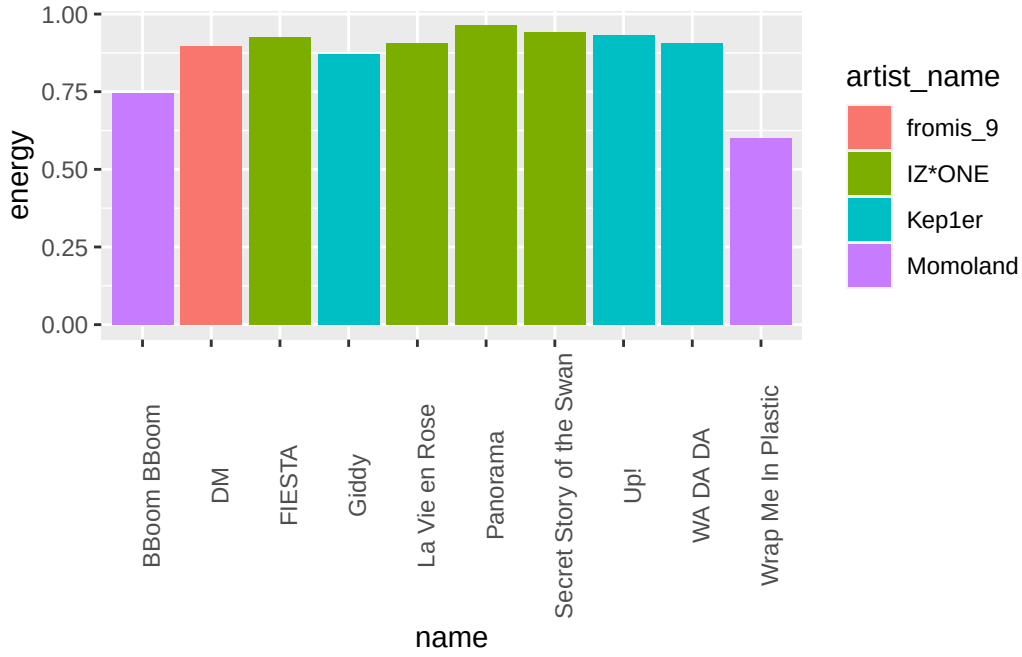
Track Name	Popularity	Album Release Date	Artist Name
WA DA DA	69	2022-01-03	Kep1er
Panorama	69	2020-12-07	IZ*ONE
La Vie en Rose	68	2018-10-29	IZ*ONE
BBoom BBoom	66	2018-01-03	Momoland
FIESTA	66	2020-02-17	IZ*ONE
Secret Story of the Swan	66	2020-06-15	IZ*ONE
DM	65	2022-01-17	fromis_9
Up!	64	2022-06-20	Kep1er
Giddy	63	2023-04-10	Kep1er
Wrap Me In Plastic	63	2021-02-05	Momoland

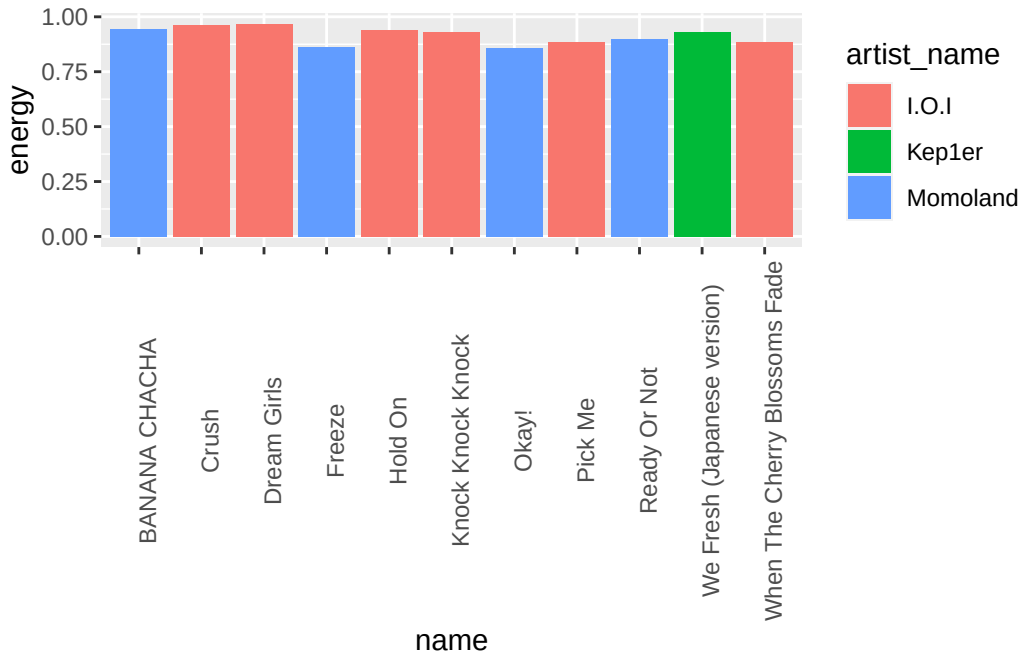
Table 2: Extracting Top 11 Least Popular Tracks made by Selected Kpop Idol Groups

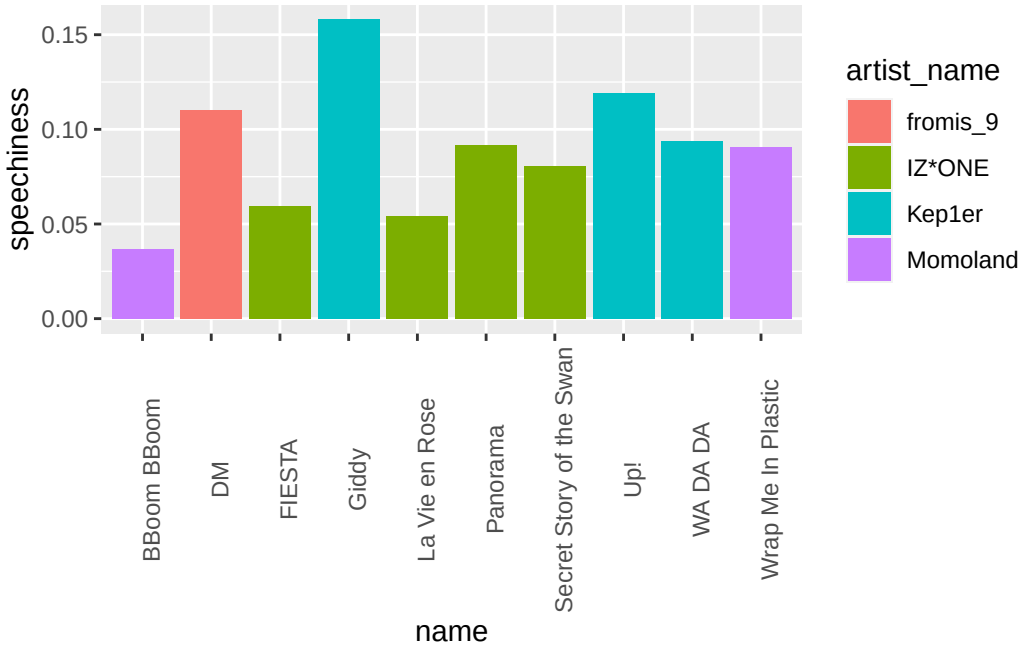
Track Name	Popularity	Album Release Date	Artist Name
Knock Knock Knock	30	2016-05-04	I.O.I
Hold On	38	2016-10-17	I.O.I
Dream Girls	39	2016-05-04	I.O.I
Freeze	39	2017-08-22	Momoland
Crush	40	2016-04-05	I.O.I
Okay!	43	2021-08-27	Momoland
When The Cherry Blossoms Fade	44	2016-05-04	I.O.I
We Fresh (Japanese version)	44	2023-03-15	Kep1er
BANANA CHACHA	44	2019-04-03	Momoland
Pick Me	45	2016-05-04	I.O.I
Ready Or Not	45	2020-11-17	Momoland

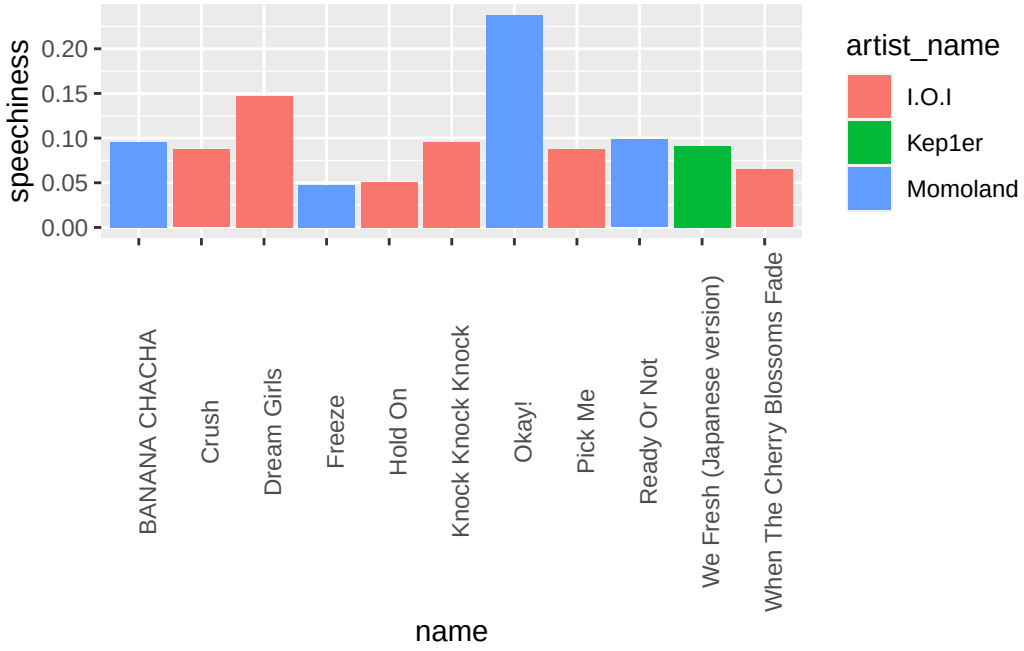

danceability
0.8
0.6
0.4
0.2
0.0
BBoom BBoom
DM
FIESTA
Giddy
La Vie en Rose
Panorama
Secret Story of the Swan
Up!
WA DA DA
Wrap Me In Plastic
name
artist_name
fromis_9
IZ*ONE
Kep1er
Momoland

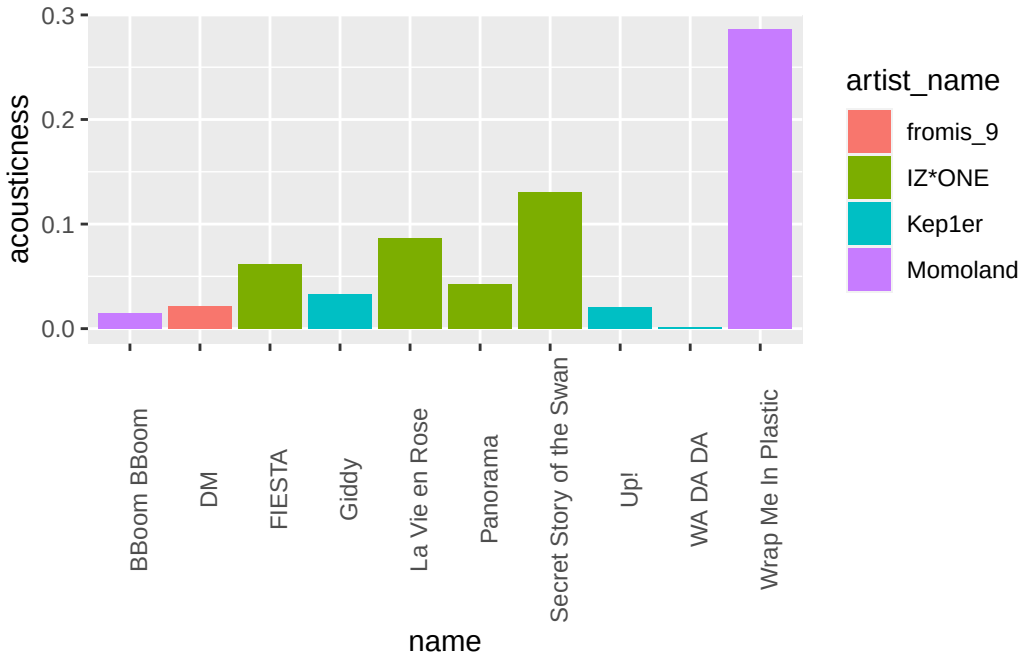

danceability
0.75
0.50
0.25
0.00
BANANA CHACHA
Crush
Dream Girls
Freeze
Hold On
Knock Knock Knock
Okay!
Pick Me
Ready Or Not
We Fresh (Japanese version)
When The Cherry Blossoms Fade
name
artist_name
I.O.I
Kep1er
Momoland

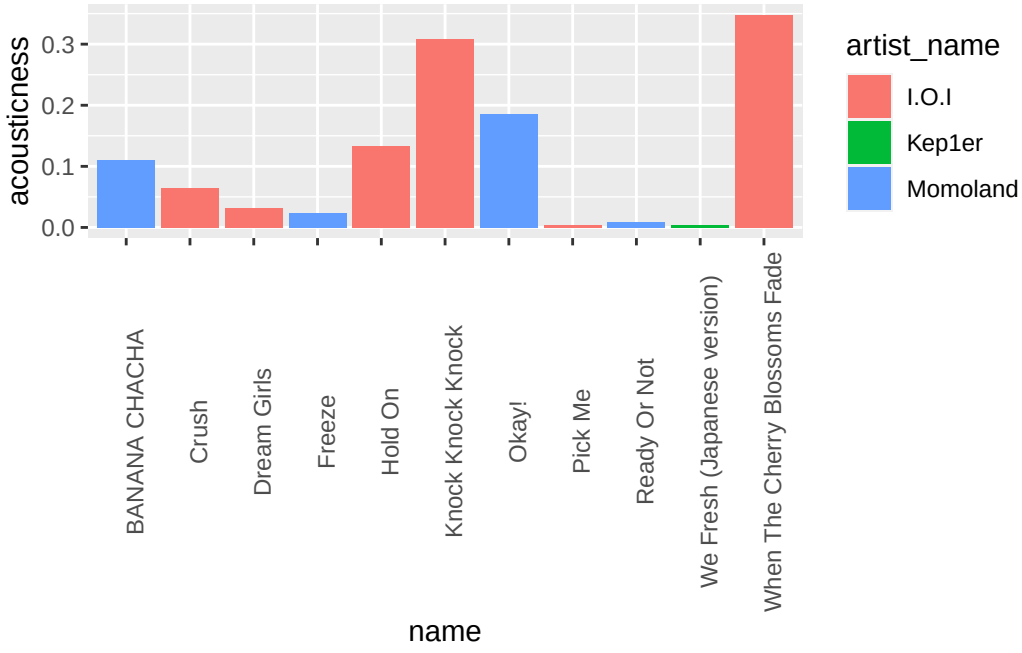

energy
1.00
0.75
0.50
0.25
0.00
BBoom BBoom
DM
FIESTA
Giddy
La Vie en Rose
Panorama
Secret Story of the Swan
Up!
WA DA DA
Wrap Me In Plastic
name
artist_name
fromis_9
IZ*ONE
Kep1er
Momoland


energy
1.00
0.75
0.50
0.25
0.00
BANANA CHACHA
Crush
Dream Girls
Freeze
Hold On
Knock Knock Knock
Okay!
Pick Me
Ready Or Not
We Fresh (Japanese version)
When The Cherry Blossoms Fade
name
artist_name
I.O.I
Kep1er
Momoland


speechiness
0.15
0.10
0.05
0.00
BBoom BBoom
DM
FIESTA
Giddy
La Vie en Rose
Panorama
Secret Story of the Swan
Up!
WA DA DA
Wrap Me In Plastic
name
artist_name
fromis_9
IZ*ONE
Kep1er
Momoland


speechiness
0.20
0.15
0.10
0.05
0.00
BANANA CHACHA
Crush
Dream Girls
Freeze
Hold On
Knock Knock Knock
Okay!
Pick Me
Ready Or Not
We Fresh (Japanese version)
When The Cherry Blossoms Fade
name
artist_name
I.O.I
Kep1er
Momoland


acousticness
0.3
0.2
0.1
0.0
BBoom BBoom
DM
FIESTA
Giddy
La Vie en Rose
Panorama
Secret Story of the Swan
Up!
WA DA DA
Wrap Me In Plastic
name
artist_name
fromis_9
IZ*ONE
Kep1er
Momoland


acousticness
0.3
0.2
0.1
0.0
BANANA CHACHA
Crush
Dream Girls
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Knock Knock Knock
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We Fresh (Japanese version)
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name
artist_name
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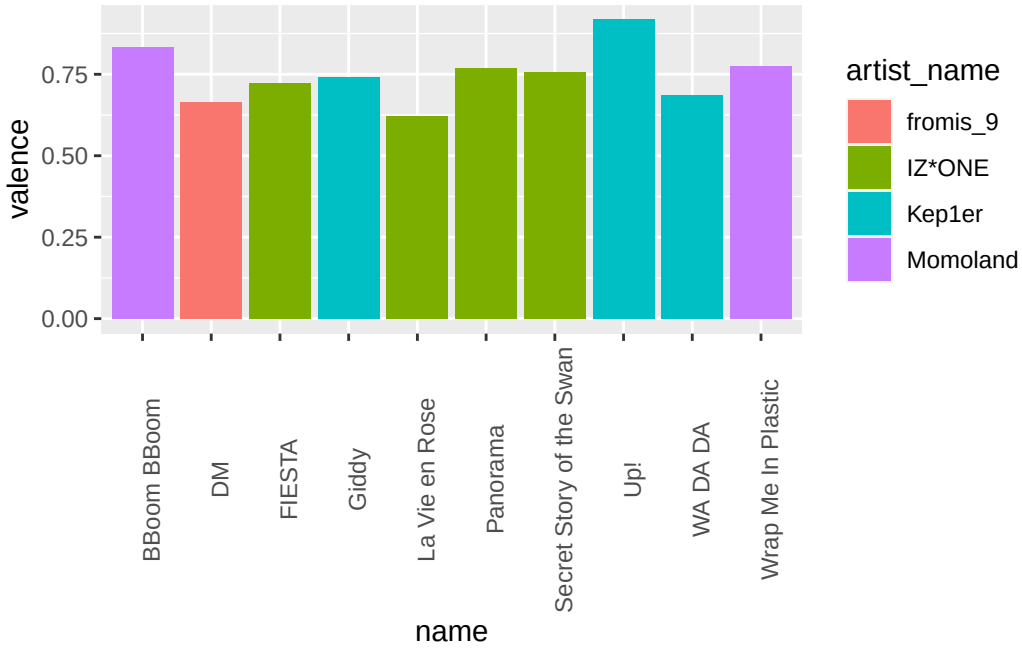
Kep1er
Momoland


valence
0.75
0.50
0.25
0.00
BBoom BBoom
DM
FIESTA
Giddy
La Vie en Rose
Panorama
Secret Story of the Swan
Up!
WA DA DA
Wrap Me In Plastic
name
artist_name
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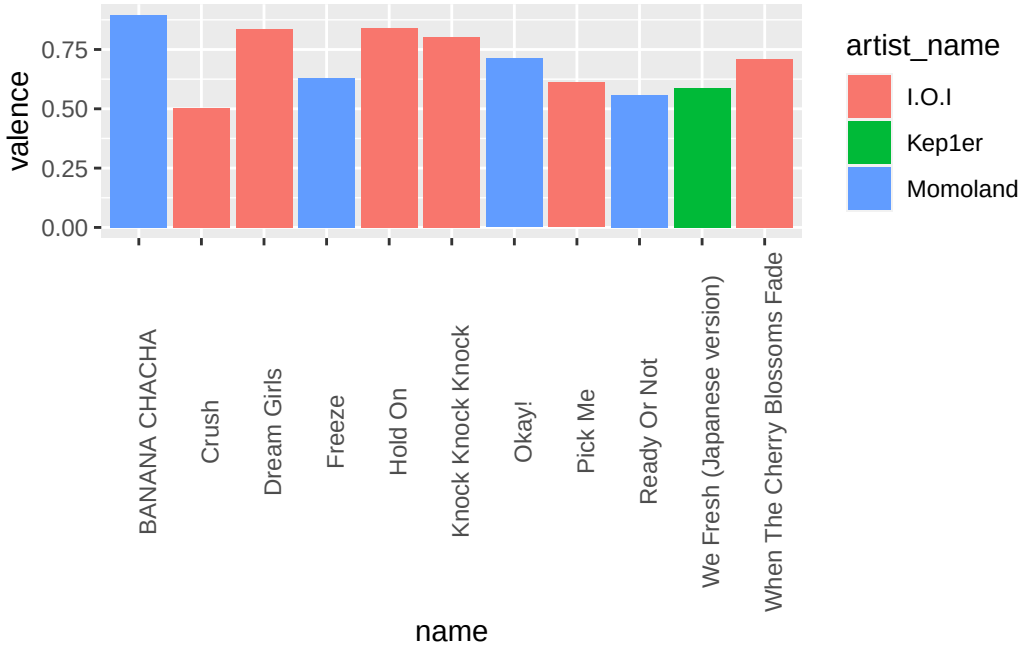
IZ*ONE
Kep1er
Momoland


valence
0.75
0.50
0.25
0.00
BANANA CHACHA
Crush
Dream Girls
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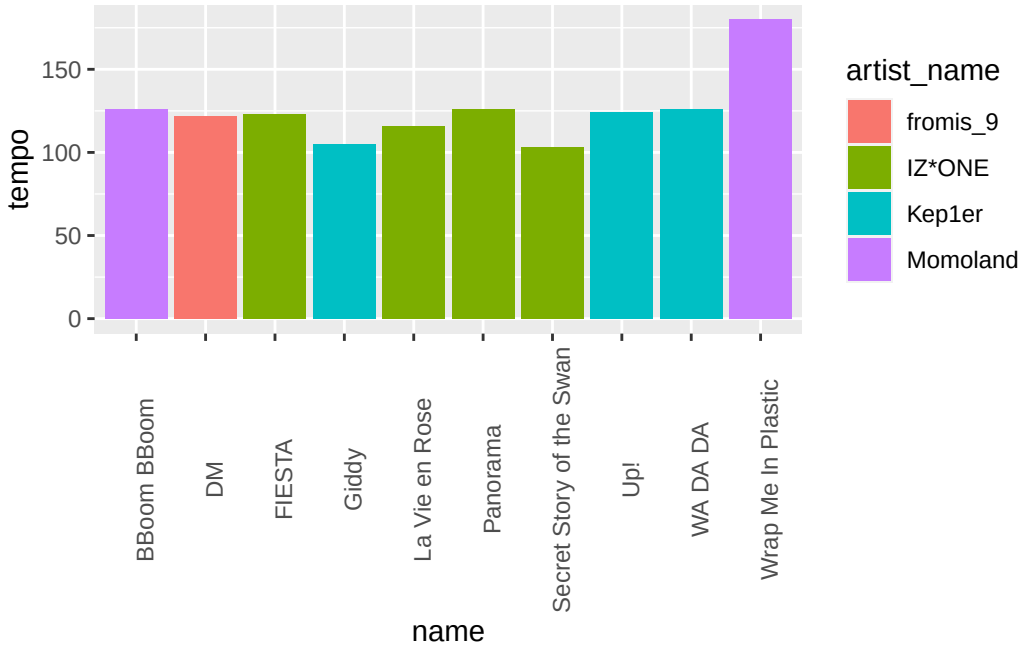
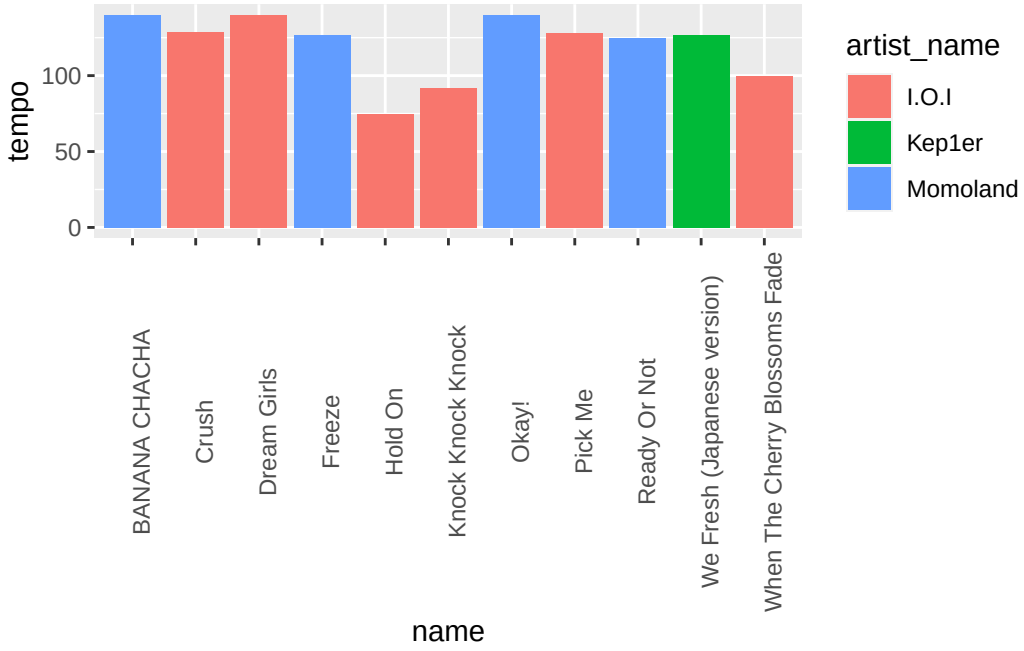
Hold On
Knock Knock Knock
Okay!
Pick Me
Ready Or Not
We Fresh (Japanese version)
When The Cherry Blossoms Fade
name
artist_name
I.O.I
Kep1er
Momoland





3. Model

Define y_i as the number of seconds that the plane remained aloft. Then β_i is the wing width and γ_i is the wing length, both measured in millimeters.

$$y_i|\mu_i, \sigma \sim \text{Normal}(\mu_i, \sigma) \tag{1}$$
$$\mu_i = \alpha + \beta_i + \gamma_i \tag{2}$$
$$\alpha \sim \text{Normal}(0, 2.5) \tag{3}$$
$$\beta \sim \text{Normal}(0, 2.5) \tag{4}$$
$$\gamma \sim \text{Normal}(0, 2.5) \tag{5}$$
$$\sigma \sim \text{Exponential}(1) \tag{6}$$

4. Results

5. Discussion

6. Appendix

7. References