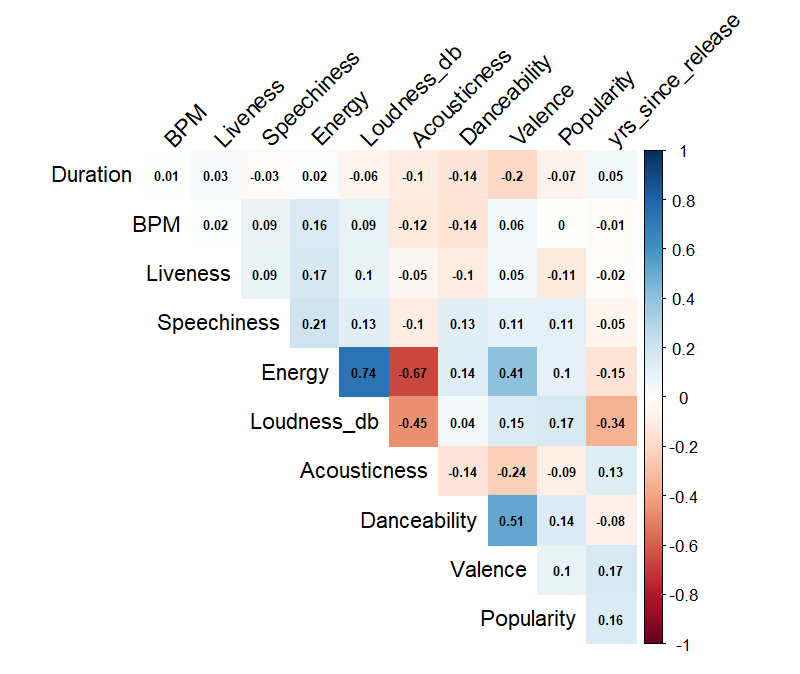
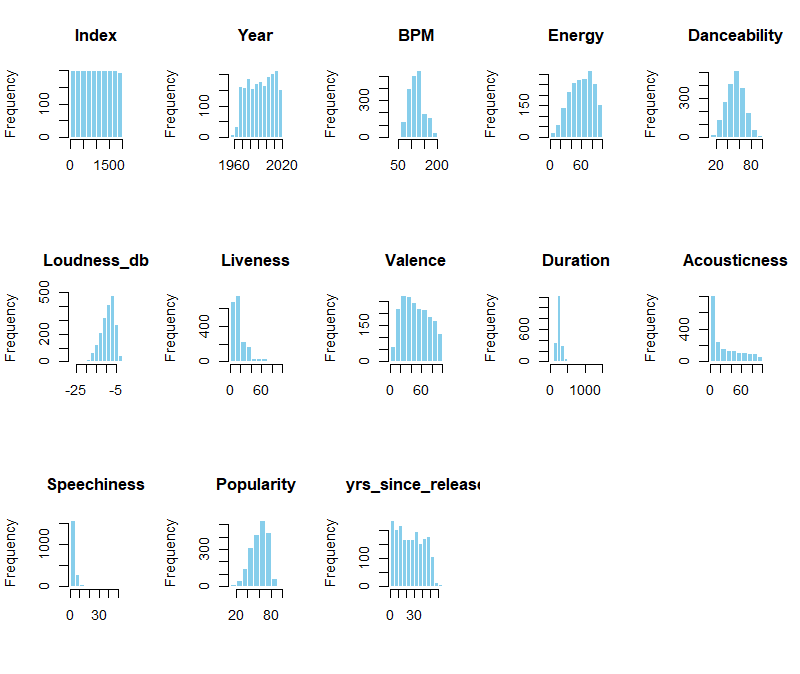
Bayesian Statistics Final Report (4-5pgs)

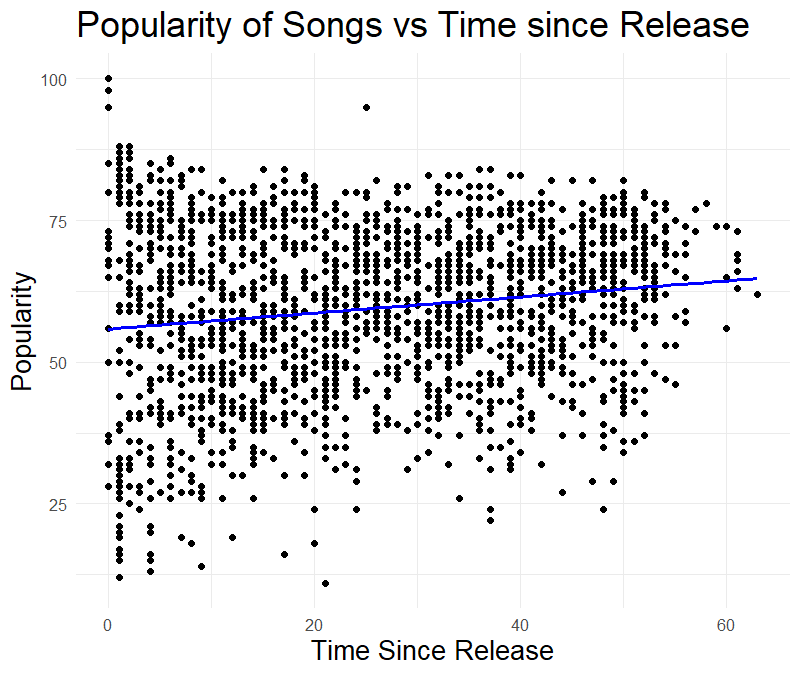
Julia Blake & Kevin Lotharp

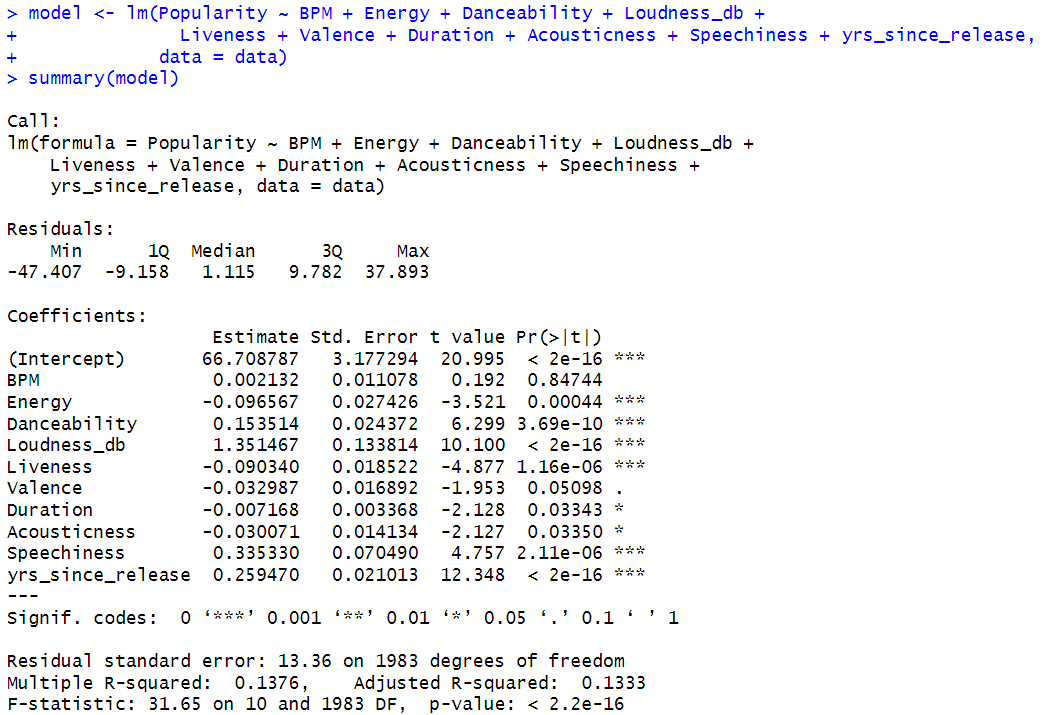
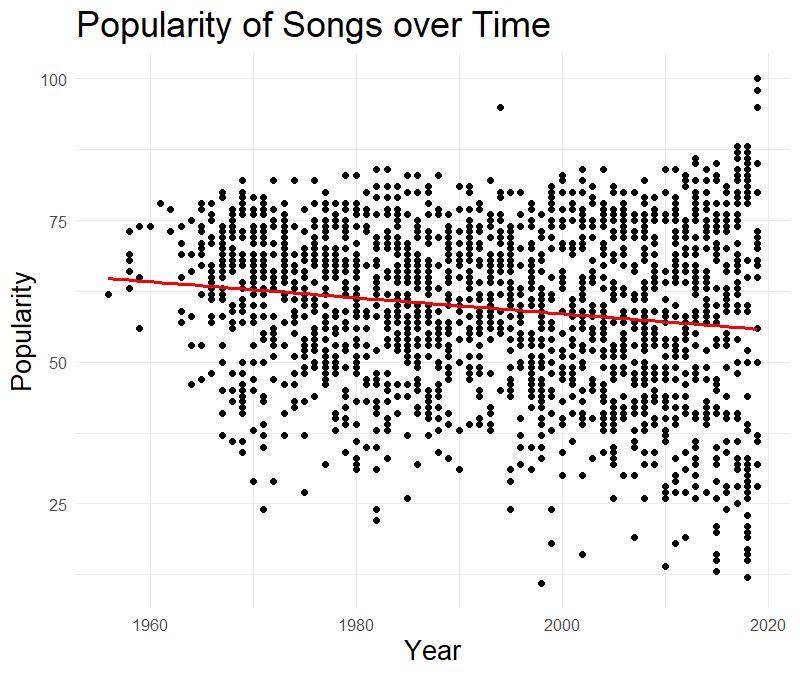
Due: Thursday May 9, 2024

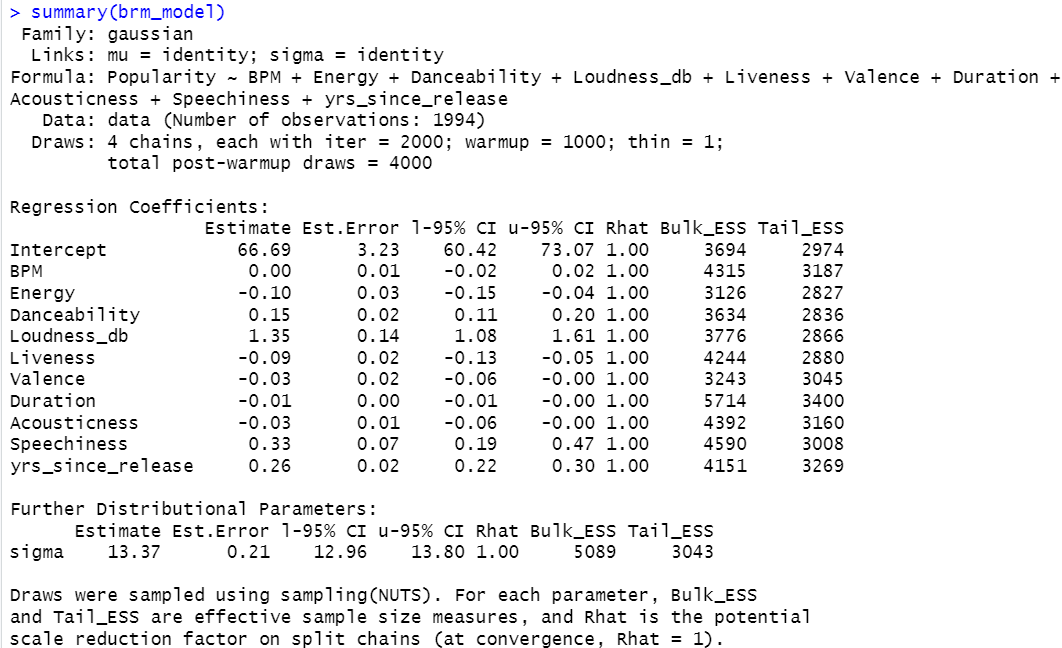
* Research Question & why
* Dataset Description: source & structure
* Methodology: models going to use
* Discussion: discovery attained, further development

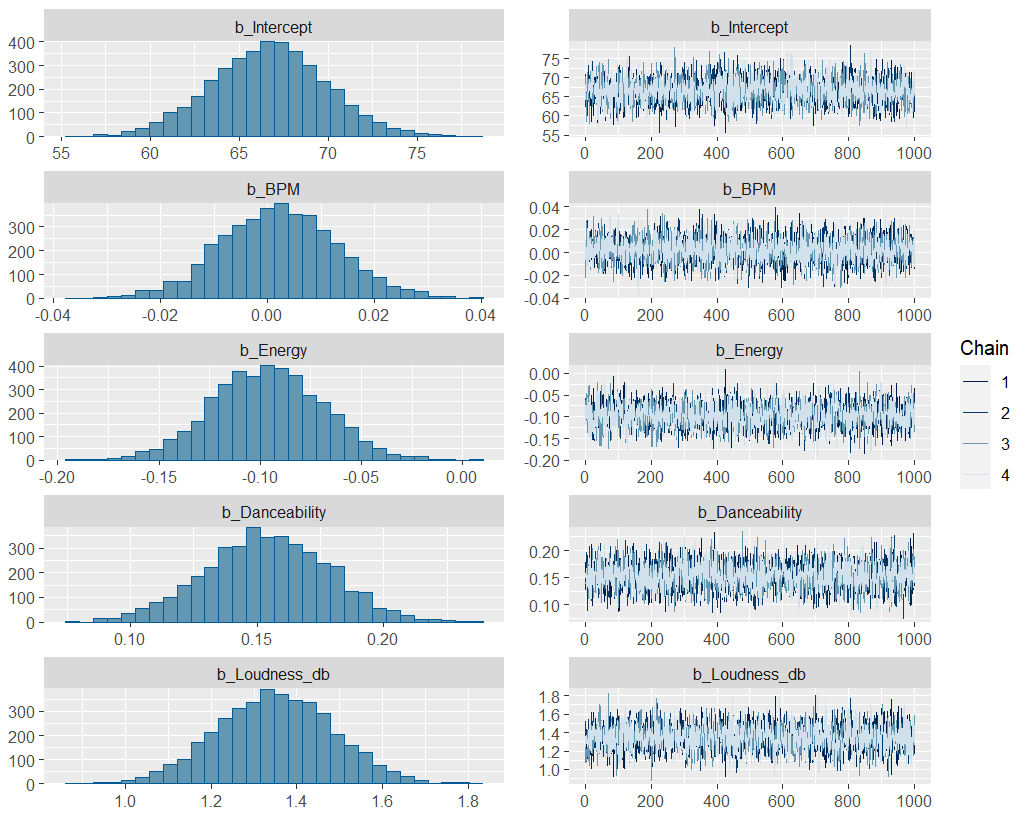


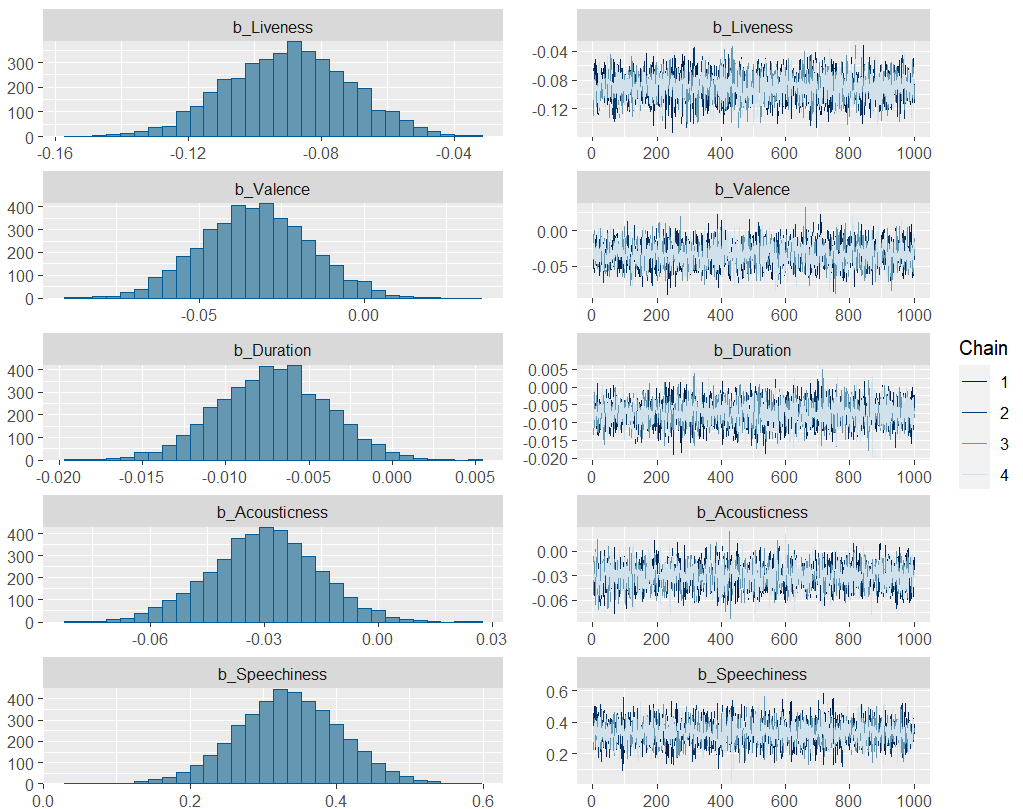


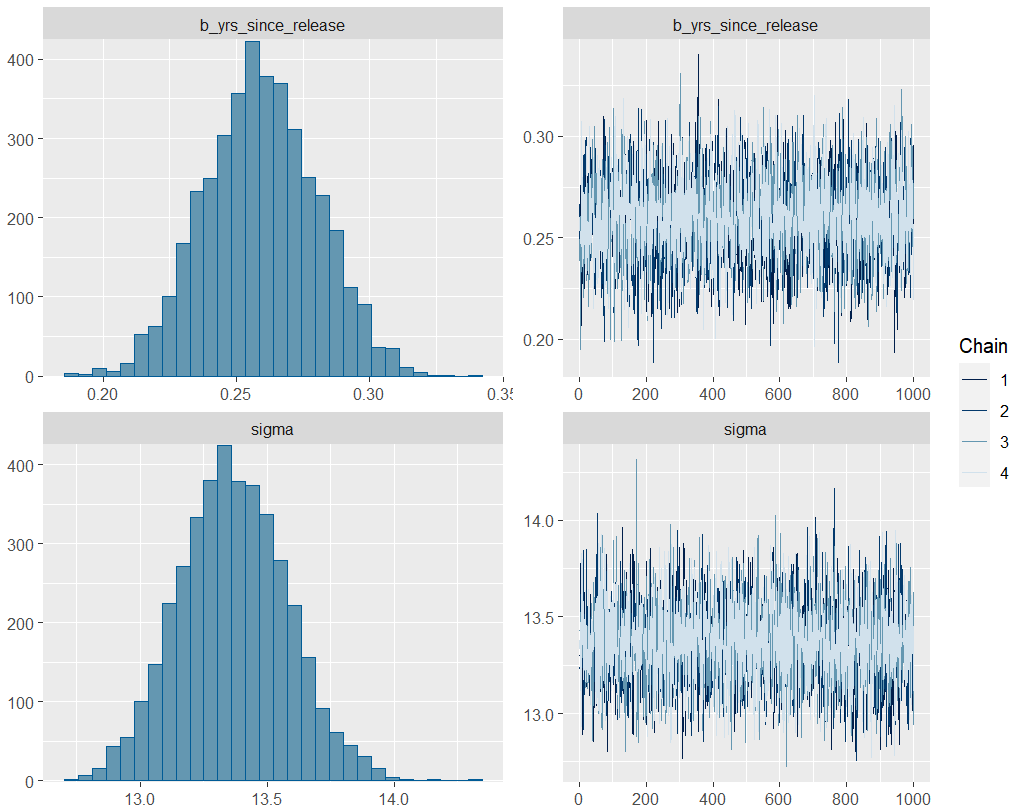


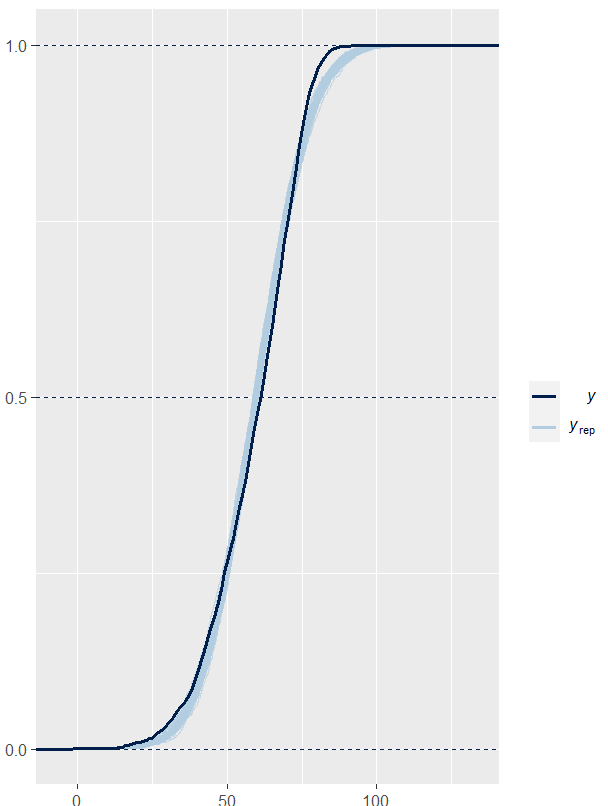




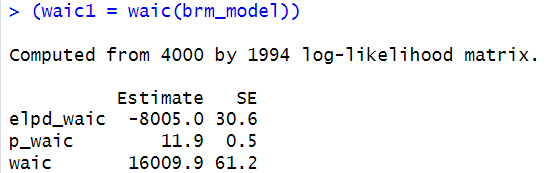
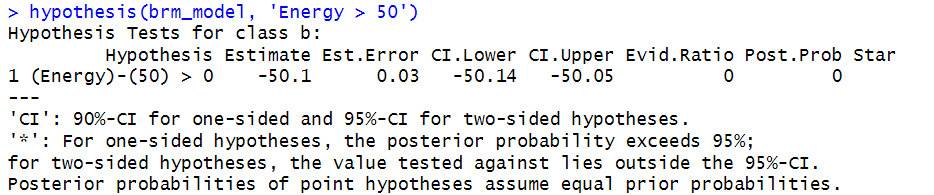


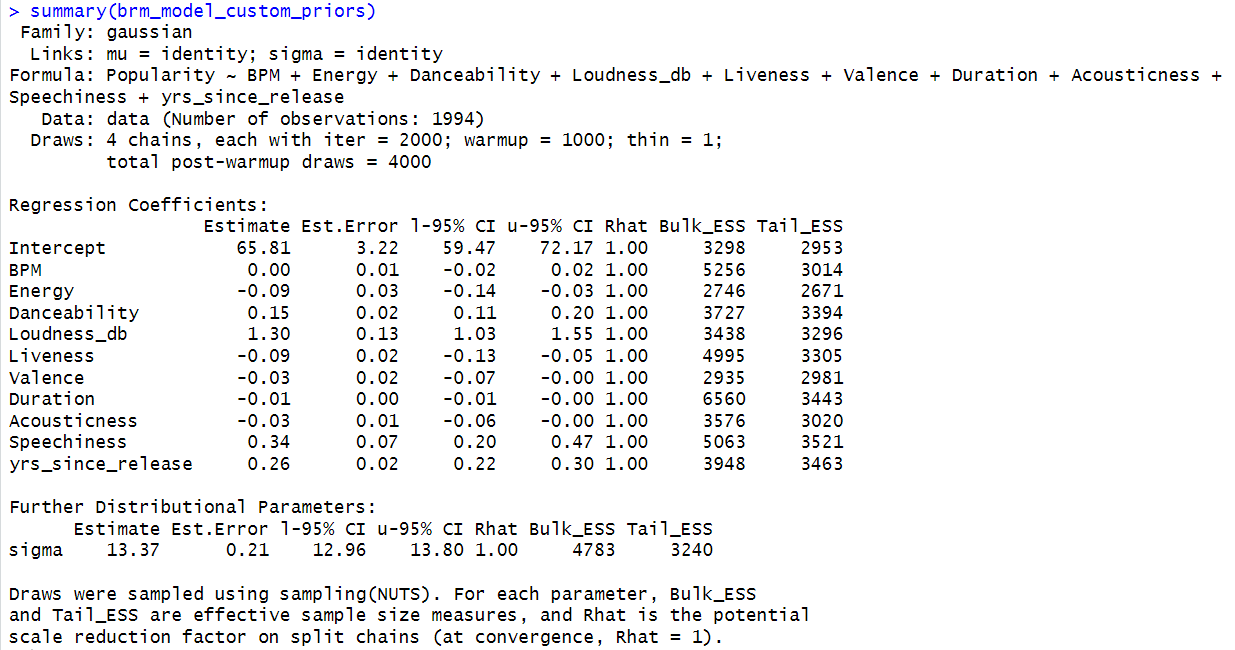


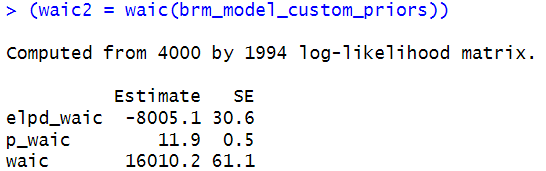




Ppcheck

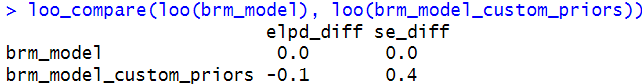






#Conclusion:Loudness, Speechiness and How many years since the song was released are the three variables most important for predicting its Popularity score.

# It appears that audio attributes do not necessarily affect how popular a song becomes.



# Using loo with cross validation, it appears that the first model is better at predicting

#(Expected Log Predictive Density is higher).

Appendix:

> stancode(brm\_model)  
 // generated with brms 2.21.0  
 functions {  
 }  
 data {  
 int<lower=1> N; // total number of observations  
 vector[N] Y; // response variable  
 int<lower=1> K; // number of population-level effects  
 matrix[N, K] X; // population-level design matrix  
 int<lower=1> Kc; // number of population-level effects after centering  
 int prior\_only; // should the likelihood be ignored?  
 }  
 transformed data {  
 matrix[N, Kc] Xc; // centered version of X without an intercept  
 vector[Kc] means\_X; // column means of X before centering  
 for (i in 2:K) {  
 means\_X[i - 1] = mean(X[, i]);  
 Xc[, i - 1] = X[, i] - means\_X[i - 1];  
 }  
 }  
 parameters {  
 vector[Kc] b; // regression coefficients  
 real Intercept; // temporary intercept for centered predictors  
 real<lower=0> sigma; // dispersion parameter  
 }  
 transformed parameters {  
 real lprior = 0; // prior contributions to the log posterior  
 lprior += student\_t\_lpdf(Intercept | 3, 62, 14.8);  
 lprior += student\_t\_lpdf(sigma | 3, 0, 14.8)  
 - 1 \* student\_t\_lccdf(0 | 3, 0, 14.8);  
 }  
 model {  
 // likelihood including constants  
 if (!prior\_only) {  
 target += normal\_id\_glm\_lpdf(Y | Xc, Intercept, b, sigma);  
 }  
 // priors including constants  
 target += lprior;  
 }  
 generated quantities {  
 // actual population-level intercept  
 real b\_Intercept = Intercept - dot\_product(means\_X, b);  
 }