Appendix 3: Varying Effects Plots and Model Posteriors

April 19, 2023

I. Background

This supplementary document presents additional information related to our statistical analysis. Our aim was to model the performance of home range estimation, as defined in the Methods section, based on different characteristics of the sampling regimes. To achieve this, we employed three binomial Bayesian generalized linear mixed models.

The first model utilized a binary predictor variable to indicate whether the data in the sampling regimes were concentrated or spread, to predict performance. The second model used the number of locations as the predictor, while the third model used the number of unique weeks. We included an interaction between the predictors and the binary variable indicating spread or concentrated data in the last two models, and all models have varying slopes and intercepts per group.

In this document, we provide varying effects plots as referred to in the main text (but not presented there), along with the posterior distributions for all three statistical models.

II. Model 1: HR Performance ~ Binary Predictor (spread vs. concentrated)

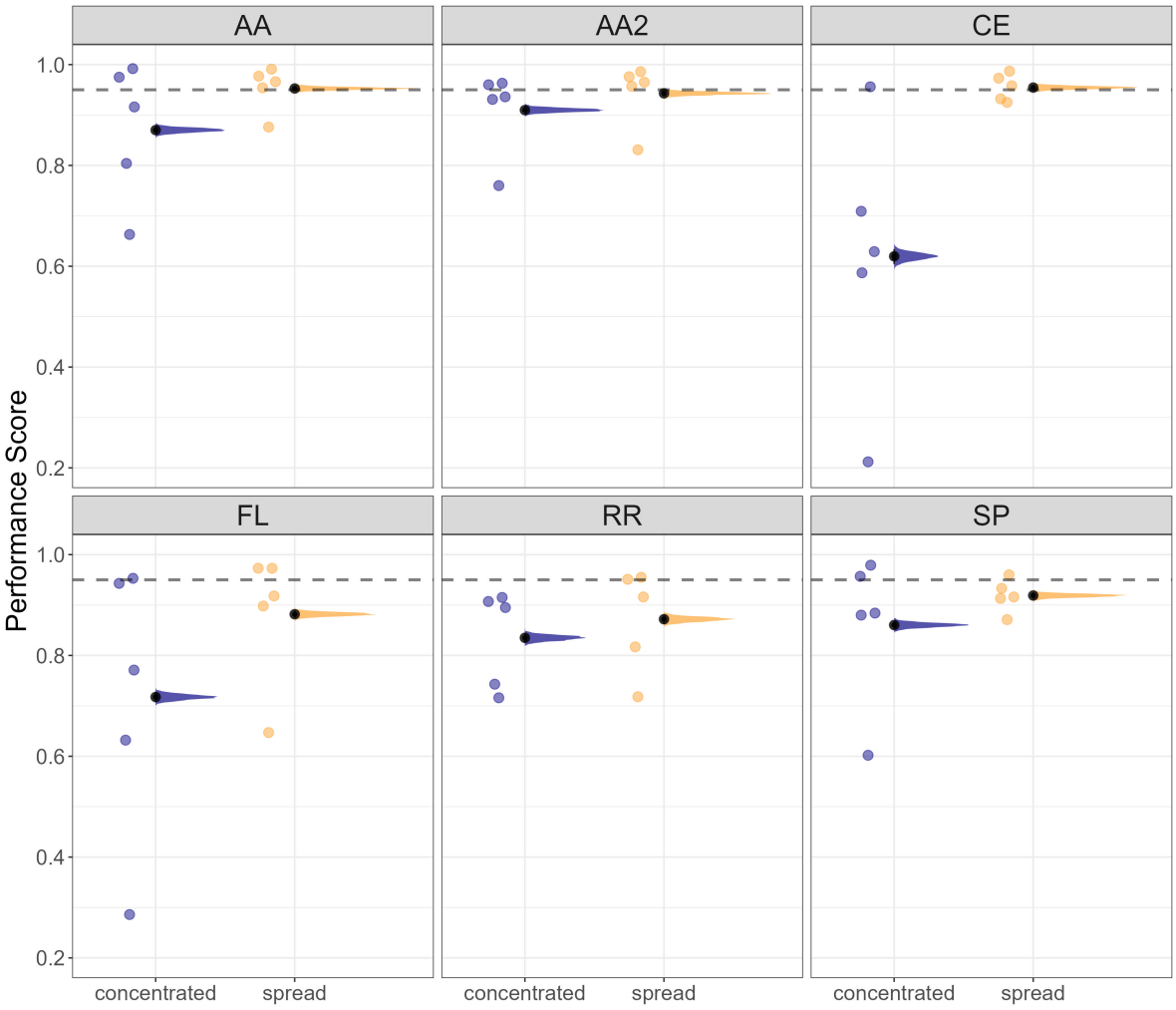

Figure 1: Group effects (varying slopes and intercepts) for bionomial model predicting home range estimation performance by a binary variable indicating whether the data in the sampling regimes are concentrated or spread.

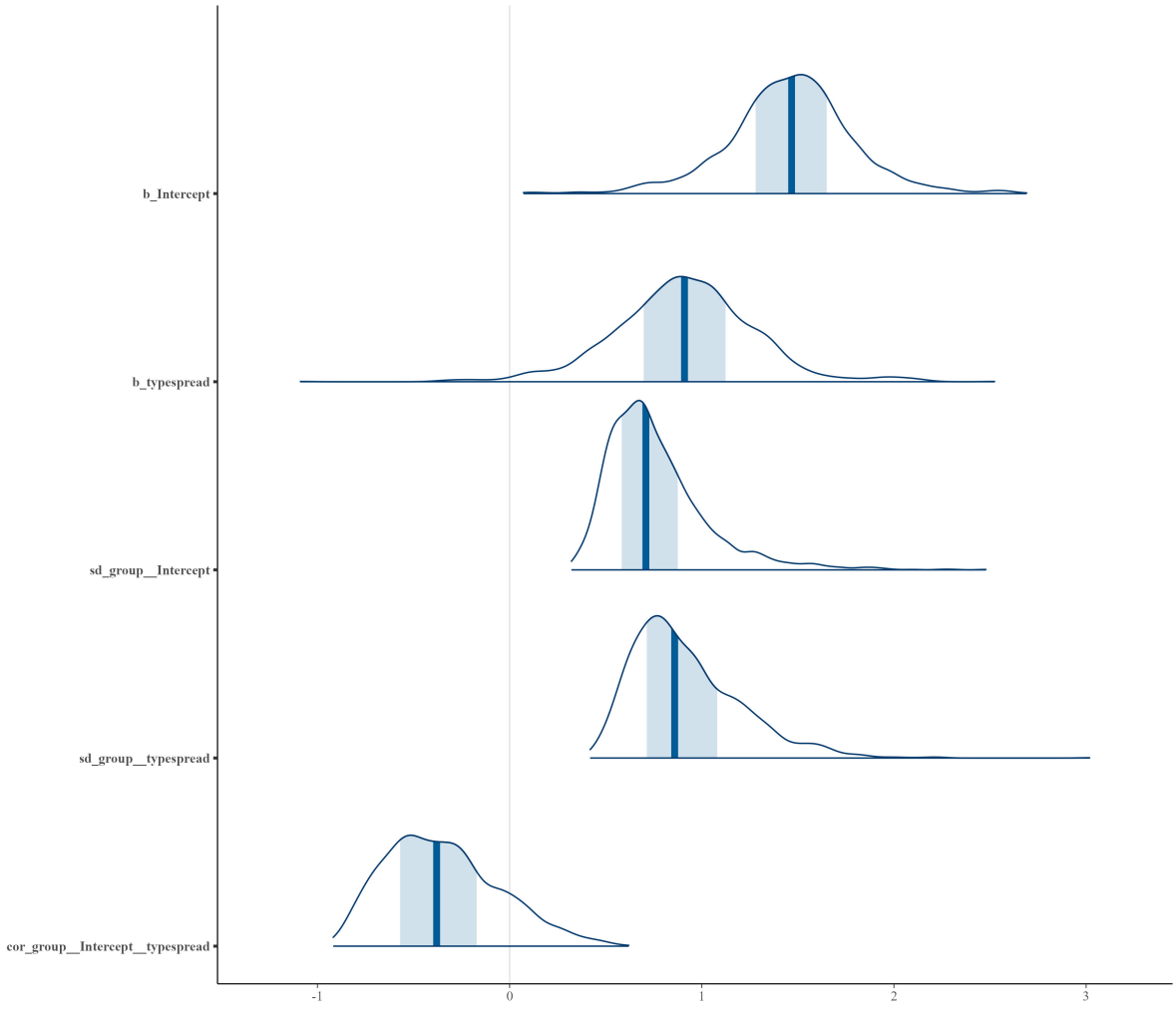

Figure 2: Posterior distributions for parameters in bionomial model predicting home range estimation performance by a binary variable indicating whether the data in the sampling regimes are concentrated or spread. Group is included as a random effect (random slopes and intercepts). Posteriors include the median and 80% credible intervals.

III. Model 2: HR Performance ~ Number of Locations

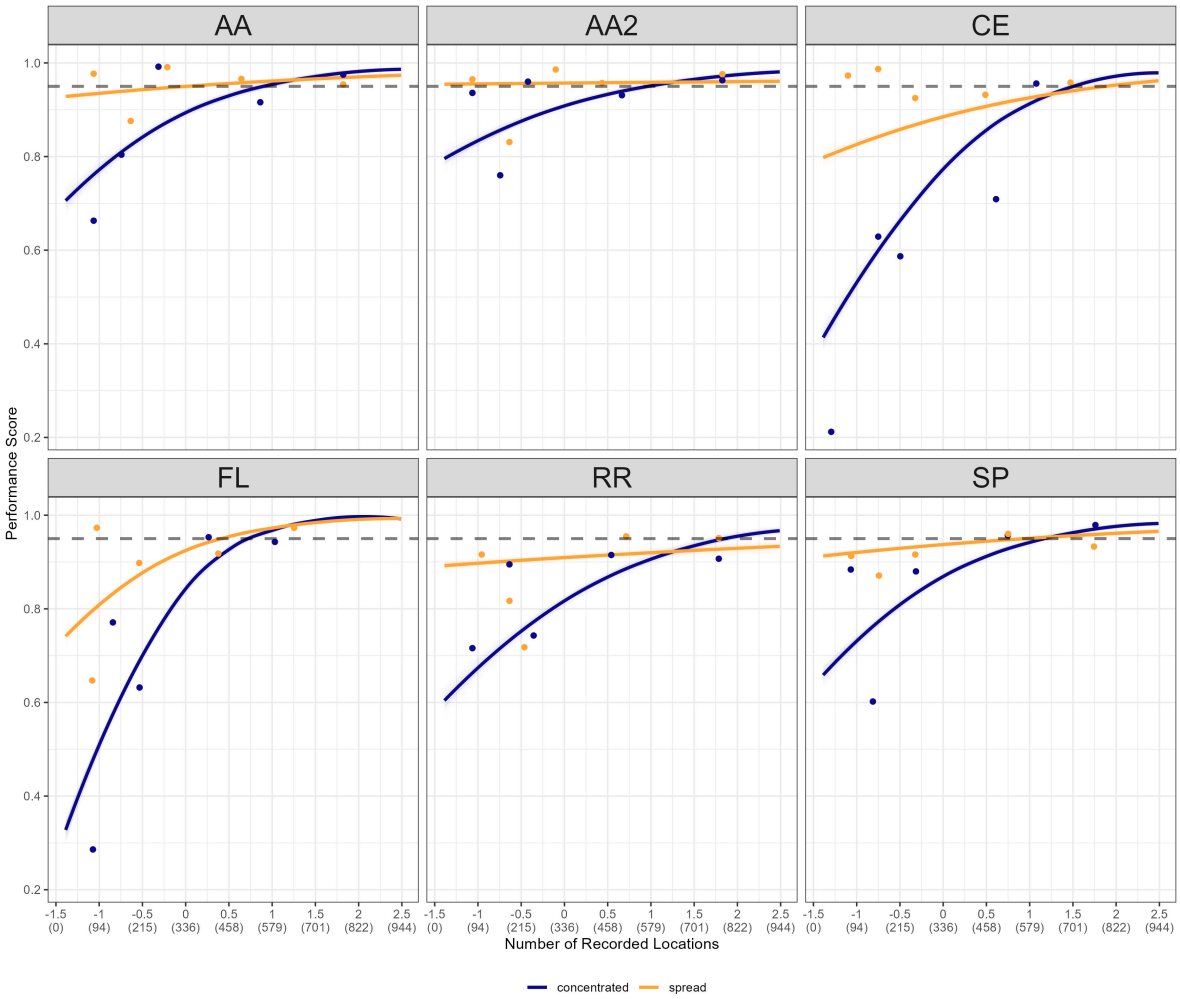

Figure 3: Group effects (varying slopes and intercepts) for bionomial model predicting home range estimation performance by number of locations as predictor with an interaction with the concentracted vs spread variable. Notice that FL and CE require the most locations to achive optimal performance, and are the least robust to low quantities of locations. These groups also have the most fragmented habitats (see Discussion section in the main text).

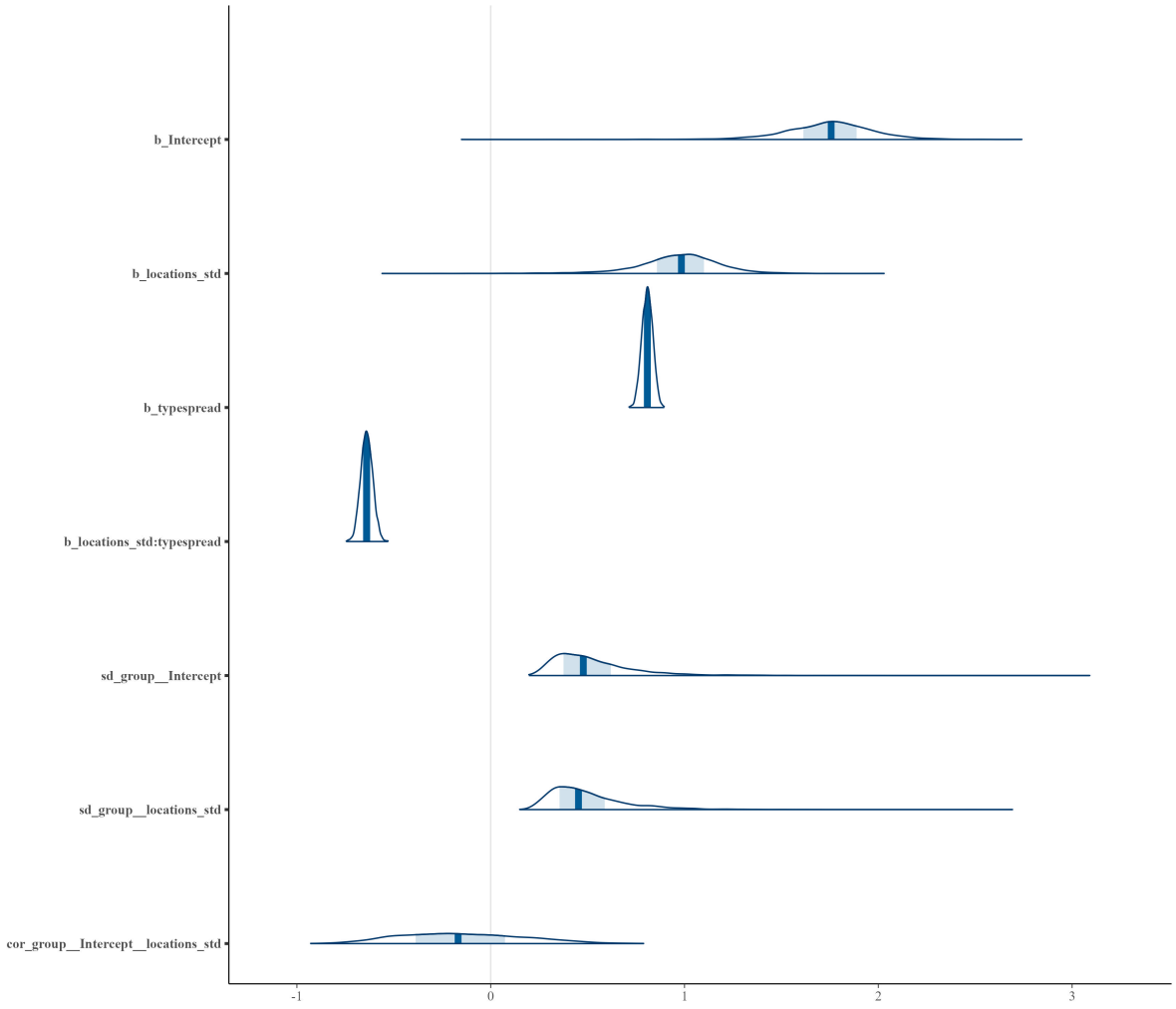

Figure 4: Posterior distributions for parameters in bionomial model predicting home range estimation performance by number of locations as predictor with an interaction with the concentracted vs spread variable. Group is included as a random effect (random slopes and intercepts). Posteriors include the median and 80% credible intervals.

IV. Model 3: HR Performance ~ Number of Unique Weeks

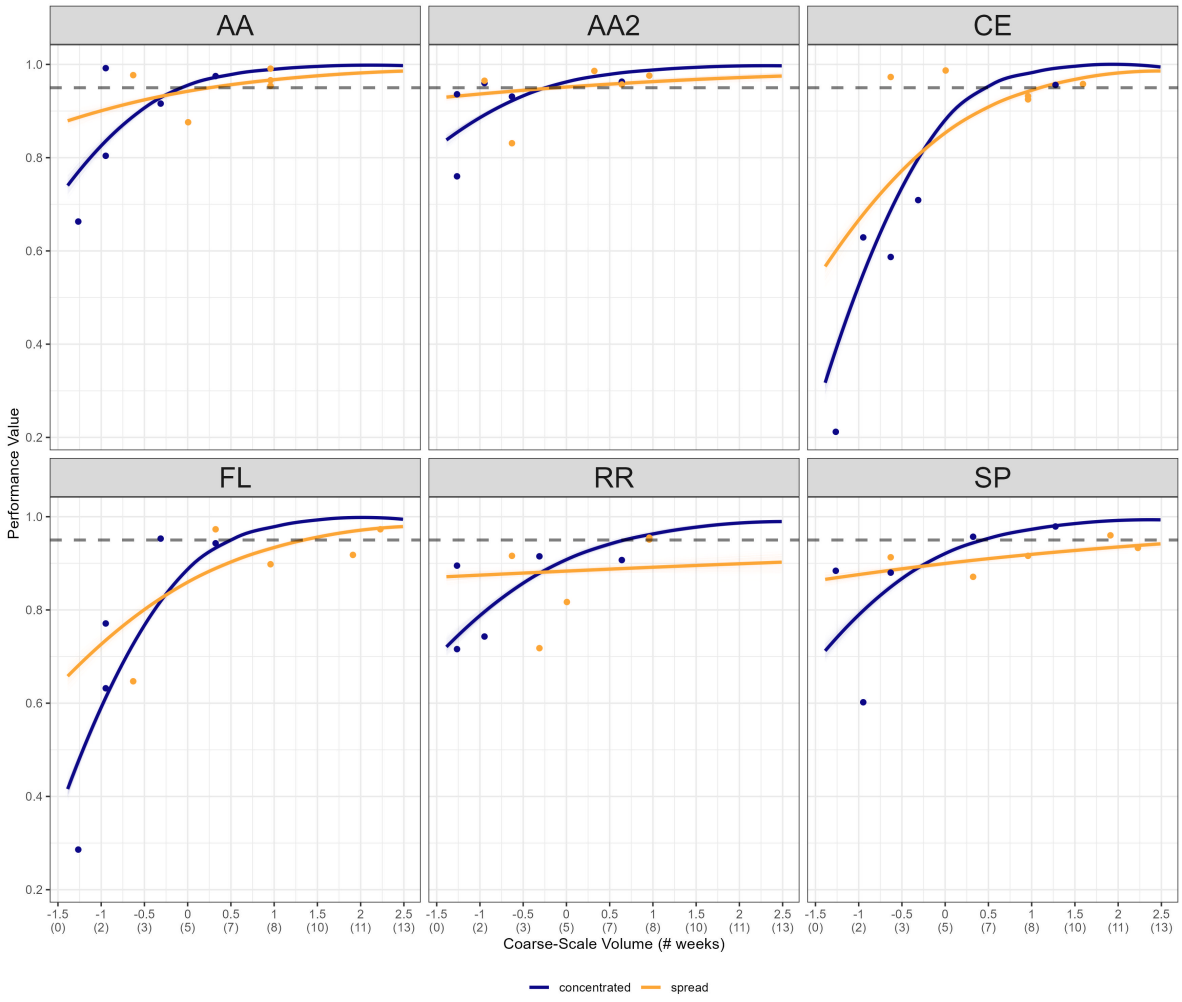

Figure 5: Group effects (varying slopes and intercepts) for bionomial model predicting home range estimation performance by number of unique weeks as predictor with an interaction with the concentracted vs spread variable. Notice that FL and CE require the most weeks to achive optimal performance, and are the least robust to low quantities of weeks. These groups also have the most fragmented habitats (see Discussion section in the main text).

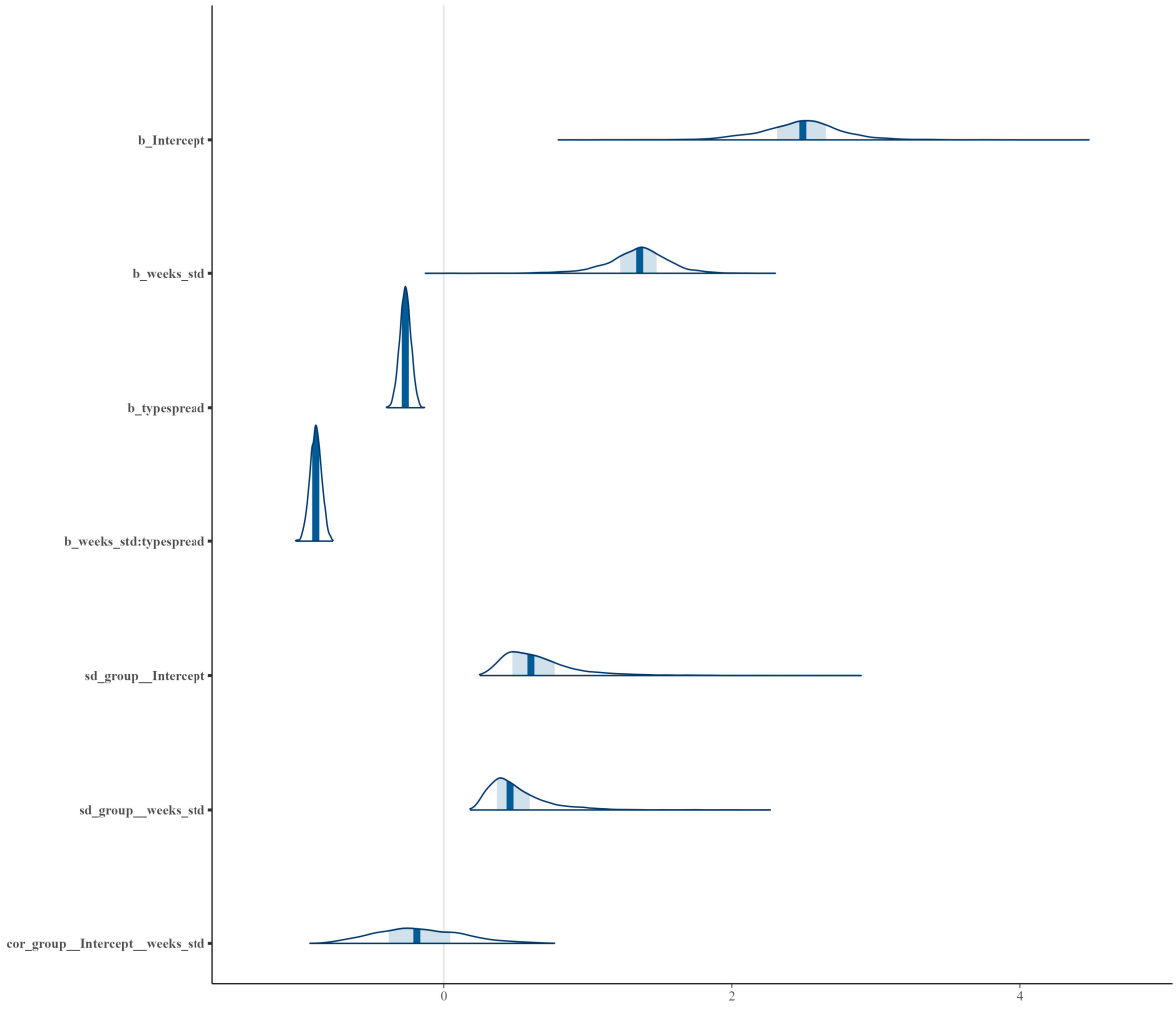

Figure 6: Posterior distributions for parameters in bionomial model predicting home range estimation performance by number of unique weeks as predictor with an interaction with the concentracted vs spread variable. Group is included as a random effect (random slopes and intercepts). Posteriors include the median and 80% credible intervals.