Why is it important that we determine the optimal number of groups and estimate regression coefficients in a single modeling step?

1. When attempting to determine the optimal number of groups, it might not be entirely clear how many groups were detected because there will oftentimes be groups that are marginally important. Unfortunately, results might differ substantially depending on the actual number of groups
2. Using a two-step approach (e.g., first the optimal number of groups is determined using the TSB prior approach and then a separate model is fitted to determine the influence of covariates) is not ideal because:

* Uncertainty associated with determining the optimal number of groups is not properly propagated to inference and predictions
* The model with TSB prior might identify substantially different groups than the model without the TSB prior. As a result, it does not make sense to use the results from the first model to make decisions about the second model.