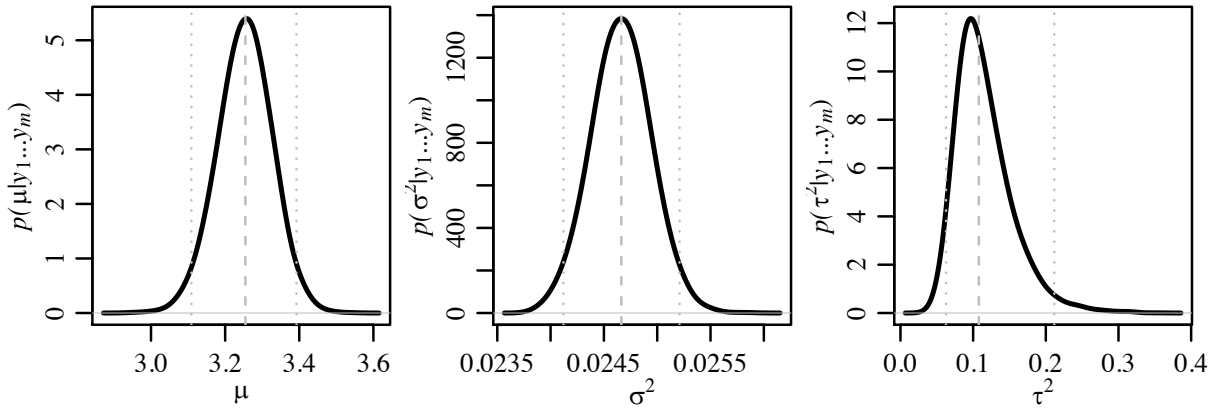
Results

The posterior distribution about the three parameters are shown in figure 3.

Figure 3
Posterior distribution of three key parameters of the hierarchical model



The most left one show the posterior distribution of the group mean among 22 countries. The middle chart show the posterior distribution of the individual variances within each country (this paper assumes the equal within-group variance for the sake of model simplicity; however, the different within-group variance model can be achieved by a little bit of further programming later). And the most right chart shows the posterior distribution about the between-group variances. With those posterior distributions of the parameters, researchers can make a probabilistic statement regarding their beliefs about the parameters. For example, it is valid to say that the probability for the mean of a country between 3.1 and 3.5 is approximately 95%.

For the sake of group comparison, the posterior offers a more direct and intuitive explanations. For example, as it is in the figure 4. The posterior for the US is the black line and India the grey line. Instead of simply testing the alternative hypothesis that they are different by using the frequentist t-test. The posterior result can inform us the exact probability that the mean of the US is smaller than India, which is 67%.

This paper ends the analysis at the hierarchical model using the Bayesian simulation method. It is far from complete to fully explore the dynamics of the nativism construct.

Further analysis can be done by using the Bayesian regression method to estimate the relationship between nativism and other variables. I will also keep learning the Bayesian application to social science by exploring this dataset.

Figure 3
Posterior distribution of the mean of the US and India