

1116-VP-1097 **Dilli Bhatta***, University of South Carolina Upstate, Division of Mathematics and Computer Science, Spartanburg, SC 29303, and **Balgobin Nandram**, Worcester Polytechnic Institute, Department of Mathematical Science, Worcester, MA 01609. *A Bayesian Test of Independence in a Two-way Contingency Table with Covariates under Cluster Sampling.*

We consider a Bayesian approach for the test of independence to study the association between two categorical variables from a two-stage cluster sampling design. We incorporate the covariates at both unit and cluster levels in the test. Our main idea for the Bayesian test of independence is to convert the cluster sample with covariates into an equivalent simple random sample without covariates which provides a surrogate of the original sample. Then, this surrogate sample is used to compute the Bayes factor to make an inference about independence. We apply our methodology to the data from the Trend in International Mathematics and Science Study (2007) for fourth grade U.S. students to assess the association between the mathematics and science scores represented as categorical variables and also provide the simulation study. The result shows that if there is strong association between two categorical variables, there is no significant difference between the tests with and without the covariates. However, in the simulation study, we found noticeable difference in borderline cases (moderate association between the two categorical variables). (Received September 16, 2015)