

Hybrid Stratified Three-Stage Randomized Response Model for Estimating Rare Sensitive Attributes

Tanveer Ahmad Tarray^{1*}, Gazala Salam^{1**}, Ashiq Mohd Ilyas^{1***},
Eid Sadun Alotaibi^{2****}, Aafaq A. Rather^{#3*****}, and Danish Qayoom^{3*****}

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Department of Mathematical Sciences, Islamic University of Science and Technology, Kashmir, India

*²Department of Mathematics and Statistics, Alkhurmah University College, Taif University,
Taif, 21944 Saudi Arabia*

³Symbiosis Statistical Institute, Symbiosis International (Deemed University), Pune, India

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Abstract—Recognizing that estimating rare sensitive traits in survey research is always problematic in terms of willingness among the respondents to disclose the core details, this aspect is well suited for implementation of the indirect staying method to random response technique which assures data collection without distortion but with confidentiality. Such populations with unique sensitive characteristics that are stratified and different sized clusters have proven difficult using the existing RRT models techniques are prone to high variability and inadequacy in most cases. The hybrid stratified three-stage RRT employs Poisson distribution to understand the relationship by employing stratified sample technique and conducting three stages of randomization so as to enhance the flexibility and efficiency of the model. This PPS sampling approach is of high use to cover both unknown and known attributes which are not related to one another. The main findings of these simulations are that, compared to basic methods, Monte Carlo simulation is more effective in reducing bias and variance with the particular model introduced. Above all, the deployment of a real data set for an empirical test confirms the usability of the method in real situation sensitive surveys. Hence, this definitively leads to a more effective way of estimating sensitive parameters that are usually quite rare such as this that may have direct benefits in applied research in social science, public health or criminology.

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