

# A new randomized response model for multiple sensitive attributes

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## Abstract

At the beginning of the 20<sup>th</sup> century, Taiwan has transformed into diversity of gender society. Homosexual issue is more and more importance. The purpose of this study is based on estimates of sexual orientation in Taiwan. It is difficult to collect the reliable survey data related to sensitive questions mostly because respondents are inclined to refuse to answer, underreport, or provide bias answers in response to sensitive survey questions. Concerning the improvement of the quality of response to sensitive questions, Randomized Response Techniques (RRT) is one of the important of designs which is commonly used for avoiding response bias under the protection of the respondents' privacy.

In this paper, we propose a new randomized response (RR) model for assessing the sensitive question with multiple attributes. Our work extends the results of Christofides (2003), which is an improved modification of Warner's (1965) pioneering RR technique in estimating the unknown proportion of people bearing a sensitive characteristic in a given community. In response to the survey question designed under the new model, the interviewee is only required to report the difference of two nonnegative integers, the way which can protect personal privacy. A real data set from Taiwan Social Change Survey in 2012 is used to illustrate the proposed methodologies.