

Estimating Missing Sampling Weights by Using LVQ-ESW Method in a CFA Model

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The paper proposes estimated missing stratum weights (ESW) to infer populationwise parameters of confirmatory factor analysis (CFA) models in a stratified sampling survey. In large survey research, using stratum weights has been proved to be able to ensure proper statistical inferences for populationwise parameters in CFA models (e.g., 蔡良庭、楊志堅, 2008; Asparouhov, 2005; Yang & Tsai, 2006) and others (e.g., Little, 1991). Similarly, importance of properly dealing with missing at random (MAR) data (e.g., Little & Rubin, 1987; Little & Schenker, 1994) in survey research cannot be overemphasized. Yet, methods to analyze observations with missing stratum weights received less attention than they should.

The estimated stratum weights (ESW) is thus proposed to impute missing weights of observations; specifically, ESW is implemented by optimizing learning vector quantization networks (LVQ) (蔡良庭、楊志堅, 2004; White, 1989). Experimental factors, including missing proportions, sampling sizes, unbalanced stratifications and stratified variations, are designed to examine performances of LVQ-ESW in numerical simulation studies. Results show that accuracies and stabilities of LVQ-ESW are much better than the other two methods in all categories of comparisons. Conclusions and discussions are provided for some practical guidelines.

Keywords: CFA, Estimated Stratum Weights, LVQ, Missing at Random