Construct reliability of structural equation modelling (SEM) exploratory factor analysis for a distracted driving behavior survey

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Abstract This paper presents an exploratory factor analysis (EFA) of a road safety behavior survey instrument prior to be used for collecting a Structural Equation Modelling (SEM) data. Through a self-administered survey, the data obtained from 100 respondents were analyzed using EFA to measure the survey instrument reliability. The questionnaire consisted of 14 items with responses recorded on a 10-point Likert scale. The results indicated that Kaiser-Meyer-Olkin values obtained were 0.767, 0.865 and 0.872 respectively, and for the three constructs measured, the Bartlett's Test of Sphericity values were found to be statistically significant. In addition, the Cronbach's alpha was 0.922 (road violations), 0.959 (cognitive error) and 0.958 (action errors) which strongly suggest that all three constructs were within the required range of internal consistency. The results indicate that the questionnaire is valid and reliable tool for measuring driving errors due to distracted driving behavior.

Keywords: distracted driving behavior, exploratory factor analysis (EFA), reliability, Structural Equation Modelling (SEM)

1 Introduction

Structural Equation Modelling, or commonly known as SEM, is one of the most prominent and comprehensive quantitative data analysis techniques emerged in recent decades (Hair et al., 2016) as this technique can handle the theoretical relationships among several manifest (observed) variables and one or more latent (unobserved) variables. To be precise, it is used to capture how sets of observed variables specifies constructs (latent variables or latent factors) that are not measured directly and how these constructs create interrelated dependence relationships among each other (Schumacker & Lomax, 2004). Schumacker and Lomax (2004, p. 2) suggested that "the