

Testing Factorial Validity and Gender Invariance of the Survey of Attitudes toward Statistics Scale

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Abstract

Objective: The main goal of this study was to test the psychometric properties of the Survey of Attitudes Towards Statistics (SATS-36) among undergraduate students. **Materials and Methods:** Cross-sectional study was conducted among a sample comprising of 218 undergraduate students at University Malaysia Sarawak. A convenience sampling technique was implemented while selecting participants. The self-report questionnaire consisted of two parts. The first section included the socio-demographic characteristics of participants, such as age, gender, and ethnicity. The second section was the Survey of Attitudes Towards Statistics (SATS-36). Exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) was used to arrive at the best factor solution. To assess factor invariance, multi-group CFA was performed. **Results:** Descriptive statistics of students' attitudes toward statistics revealed that most of the students held positive attitudes toward statistics. EFA analysis deemed to have produced the incorrect factor structure as most items were misclassified on the wrong factor. CFA suggested a 6-factor solution with 30 items. Thus the 36 items were reduced to SATS-30. The goodness-of-fit statistics for the SATS-30 showed a passable model fit. Responses of male and female students to the SATS-30 were then examined to explore scale invariance across gender. Consistency was found across two groups. This was, furthermore, supported by the assessment of composite reliability which was also found to be relatively high. **Conclusion:** The present findings are consistent with extant research literature on factor structure and invariance of the Survey of Attitudes Toward Statistics scale. Further research on SATS-30 could include longitudinal studies in order to analyze causality.

Keywords: Composite reliability, confirmatory factor analysis, exploratory factor analysis, invariance, university students

INTRODUCTION

Statistics is an important part of medical curriculum as it helps students appreciate epidemiology, make inference about clinical trials, and draw reasonable conclusions. Since medical experts are expected to have at least basic skills with numerical information that can inform decision-making in their daily work, statistics is an indispensable component of the medical curriculum.^[1] In medical training, statistics is considered a very difficult course to learn and teach. Current studies have found that students' attitudes toward statistics can influence their learning process.^[2,3] Today, most medical research depends on statistics, and interpreting these is crucial as the world tries to improve health outcomes. Medical students are at the front line in this effort, but many have negative attitudes toward statistics.^[4] Most statistics educators are likely to focus and develop on the cognitive factor while students experienced dilemma in learning statistics due to noncognitive factors like

negative attitude toward the course.^[5,6] Majority of students find the subjects difficult due to noncognitive factors like attitude, perception, interest, expectation, and motivation. The degree to which students perceived themselves to be competent in mathematics was related to the degree to which they felt confident in their own ability to master statistics.^[7] Cognitive factors also play significant roles in contributing to the capability of the students excelling the subject. Both factors could interrupt the learning process involved and hinder the students from using statistics daily.^[8] There is an interplay

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