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Structural Modeling of Academic Buoyancy Based on Academic Engagement and Perceived Teacher Support: The Mediating Role of Academic Self-Efficacy among Female Upper-Secondary School Students

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1. Round 1

1.1. Reviewer 1

Reviewer:

The sampling procedure is internally inconsistent and should be rewritten in sufficient detail to permit replication. The manuscript states that “a sample of 350 students was selected through multistage cluster random sampling,” but later reports that “all students in the selected schools were invited to participate.” Inviting all students from four selected schools represents cluster sampling with census recruitment within clusters, whereas selecting exactly 350 students would require an additional random-selection stage. The authors should specify the number of eligible students in each selected school, the number invited, the number who agreed, the number of questionnaires returned, the number excluded, and the final number analyzed. A participant-flow diagram would substantially improve transparency.

The rationale for the sample size is insufficiently developed. The sentence “This sample size was considered appropriate for structural equation modeling because models with latent variables and multiple observed indicators require a sufficiently large

sample" is generic and does not demonstrate that 350 participants were adequate for the specific model. The authors should report an a priori power analysis or another defensible sample-size calculation based on the expected effect sizes, number of latent variables, number of observed indicators, desired statistical power, and model complexity. At minimum, they should explain the participant-to-parameter ratio and identify the number of freely estimated parameters in the final model.

The manuscript should clarify the exact statistical population and educational setting. The statement that the population included "all female students enrolled in upper-secondary schools in Babol, Iran, during the 2024 academic year" is ambiguous because an academic year normally spans two calendar years. The authors should provide the exact academic year, such as 2023–2024 or 2024–2025, and specify whether the sample included grades 10, 11, and 12. The distribution of participants by grade, academic track, school, and field of study should also be reported because these variables may be associated with academic engagement, teacher support, self-efficacy, and academic buoyancy.

The handling of missing data is methodologically weak and requires substantial revision. The authors state that "missing values were replaced using the median replacement method," but do not report the number or percentage of missing responses, the variables affected, the pattern of missingness, or whether the data were missing completely at random. Median substitution can distort variances, attenuate correlations, and underestimate standard errors, particularly in structural equation modeling. The authors should report Little's MCAR test or another assessment of the missing-data mechanism and preferably use full-information maximum likelihood or multiple imputation. If median replacement is retained, a sensitivity analysis should be presented to demonstrate that the conclusions are not dependent on this procedure.

The manuscript promises several analyses that are not actually reported. The Data Analysis section states that "Pearson correlation coefficients were used to examine the bivariate relationships" and that model fit included the Tucker–Lewis index and standardized root mean square residual. However, no correlation matrix is presented, and neither TLI nor SRMR appears in the model-fit table. The authors should add a full correlation matrix with means, standard deviations, reliabilities, and significance levels for the principal variables and subscales. They should also report all fit indices listed in the Methods or revise the Methods to correspond exactly to the analyses presented.

The criteria used to evaluate model fit should be updated and interpreted more rigorously. Table 4 identifies RMSEA values below .10 as acceptable, which is a lenient threshold and may convey an outdated standard. Although the obtained RMSEA of .03 is excellent, the authors should use more conventional criteria, such as values below .06 or .08, and report the 90% confidence interval for RMSEA and the p-close statistic. The chi-square value, degrees of freedom, exact p value, SRMR, TLI, and information criteria should also be provided. Reporting only χ^2/df and incremental fit indices does not permit a sufficiently comprehensive assessment of model adequacy.

Authors uploaded the revised manuscript.

1.2. Reviewer 2

Reviewer:

The treatment of outliers is also problematic. The manuscript reports that "values outside the acceptable range were identified and replaced with the mean of the corresponding variable." Replacing extreme observations with the mean is not a generally acceptable approach because it artificially reduces variance and may bias covariance estimates and path coefficients. The authors should specify the exact standardized-score threshold used, the number of values identified, whether the values reflected data-entry errors or legitimate responses, and whether outliers were examined at the univariate or multivariate level. Legitimate extreme observations should generally be retained, addressed with robust estimation, or examined through sensitivity analyses rather than automatically replaced.

The assessment of the assumptions underlying structural equation modeling is incomplete. The authors report univariate skewness and kurtosis values and conclude that the data were "appropriate for subsequent parametric analyses and structural equation modeling," but they do not report multivariate normality. Because maximum-likelihood SEM depends more directly on multivariate distributional assumptions, the authors should report Mardia's multivariate skewness and kurtosis coefficients

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or another appropriate diagnostic. If multivariate non-normality is present, robust maximum likelihood or bootstrapped standard errors should be used and explicitly reported.

The description of the measurement model is incomplete because academic buoyancy is absent from Table 5. The manuscript states that "all observed indicators had significant factor loadings on their corresponding latent variables," yet factor loadings are reported only for academic engagement, perceived teacher support, and self-efficacy. The Academic Buoyancy Questionnaire contains six items, but neither item-level loadings nor a parceling strategy is presented. The authors must clarify whether academic buoyancy was modeled as a latent construct using six observed items, as an observed total score, or as a single-indicator latent variable. The corresponding factor loadings, residual variance, and identification constraints should be reported.

The psychometric evidence for the instruments in the present sample is inadequate. The manuscript reports Cronbach's alpha coefficients of .71 for both the six-item Academic Buoyancy Questionnaire and the 21-item Perceived Teacher Support Scale. Although .71 may be minimally acceptable, the value for the 21-item teacher-support measure is markedly lower than the original coefficient of .96 and may indicate translation problems, multidimensionality, poorly functioning items, or scoring errors. The authors should report reliability for each subscale, corrected item-total correlations, composite reliability, McDonald's omega, average variance extracted, and evidence of convergent and discriminant validity. The Persian-language validation sources and adaptation procedures for all scales must also be identified.

The use of total scores for multidimensional constructs requires stronger justification. Academic engagement was conceptualized through behavioral, agentic, cognitive, and emotional components, teacher support through guidance, positive regard, accessibility, and expectations, and self-efficacy through social, academic, and emotional dimensions. However, the structural model appears to treat each broad construct as a higher-order latent factor without explaining whether a second-order factor model was tested. The authors should present the competing measurement models evaluated, including correlated first-order factors versus higher-order models, and provide fit indices and factor loadings for the selected structure. Without this information, the validity of the latent-variable specification remains uncertain.

Authors uploaded the revised manuscript.

2. Revised

Editor's decision after revisions: Accepted.
Editor in Chief's decision: Accepted.

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