

Original Article

Modeling the Psychological Structure of *Muḥāsabah* in Academic Self-Evaluation and Physiological Fatigue through Confirmatory Factor Analysis

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Article History:

Received: 21/05/2026;
Revised: 11/06/2026;
Accepted: 25/06/2026;
Published: 30/06/2026.

How to cite:

M. Agung Rahmadi 1, Helsa Nasution 2, Luthfiah Mawar 3 .
(2026). *Modeling the Psychological Structure of Muḥāsabah in Academic Self-Evaluation and Physiological Fatigue through Confirmatory Factor Analysis*. *Teraputik: Jurnal Bimbingan dan Konseling*, 10(1), pp. 18–34. DOI: 10.26539/teraputik/10/1/26.1421



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Abstract: This study aims to explore the psychological structure of *muḥāsabah* as a self-evaluative construct within the context of academic performance and physiological fatigue monitoring, using a data-driven meta-analytic approach. Confirmatory Factor Analysis (CFA) was applied to 47 datasets obtained from 23 international academic repositories (2014–2024), comprising a total of 6,842 units of analysis from Muslim student populations across Southeast Asia. The CFA results demonstrated that the three-factor model of *muḥāsabah*, comprising cognitive self-monitoring, affective regulation, and transcendental orientation, exhibited an excellent model fit ($\chi^2/df = 2.31$; CFI = 0.96; TLI = 0.95; RMSEA = 0.048; SRMR = 0.051). The correlation between *muḥāsabah* and academic self-evaluation reached $r = 0.67$ ($p < 0.001$), while a significant negative association was identified between *muḥāsabah* and physiological fatigue ($\beta = -0.43$; $p < 0.001$). Who identified $\beta = -0.31$, the present study demonstrates a large effect size and differentiated factor structure. The novelty of this research lies in operationalizing *muḥāsabah* as a multidimensional psychometric construct integrated into a physiological fatigue model.

Keywords: *muḥāsabah*, academic self-evaluation, physiological fatigue, confirmatory factor analysis, Islamic psychology

Abstrak: Penelitian ini bertujuan untuk mengeksplorasi struktur psikologis *muḥāsabah* sebagai konstruk evaluasi diri dalam konteks performa akademik dan pemantauan kelelahan fisiologis melalui pendekatan *meta-analysis* berbasis data. *Muḥāsabah. Confirmatory Factor Analysis* (CFA) diterapkan pada 47 dataset yang diperoleh dari 23 repositori akademik internasional sepanjang periode 2014–2024, dengan total 6.842 unit analisis yang berasal dari populasi mahasiswa Muslim di kawasan Asia Tenggara. Hasil CFA menunjukkan bahwa model tiga faktor *muḥāsabah* yang terdiri atas *cognitive self-monitoring*, *affective regulation*, dan *transcendental orientation* memperlihatkan tingkat kesesuaian model yang sangat baik ($\chi^2/df = 2,31$; CFI = 0,96; TLI = 0,95; RMSEA = 0,048; SRMR = 0,051). Korelasi antara *muḥāsabah* dan evaluasi diri akademik mencapai $r = 0,67$ ($p < 0,001$), sementara hubungan negatif yang signifikan ditemukan antara *muḥāsabah* dan kelelahan fisiologis ($\beta = -0,43$; $p < 0,001$). Penelitian menunjukkan ukuran efek yang besar dan struktur faktor yang terdiferensiasi. Kebaruan penelitian terletak pada operasionalisasi *muḥāsabah* sebagai konstruk psikometrik multidimensional yang terintegrasi ke dalam model kelelahan fisiologis.

Kata Kunci: *muḥāsabah*, evaluasi diri akademik, kelelahan fisiologis, *confirmatory factor analysis*, psikologi Islam

Introductions

Within the contemporary landscape of modern psychology, an epistemic transformation has emerged that recognizes the significance of constructs grounded in spiritual and religious values as entities possessing not only normative relevance but also scientific legitimacy and empirical verification. One construct that demonstrates considerable conceptual richness yet remains relatively underdeveloped in psychometric articulation is *muḥāsabah*, namely an evaluative introspective practice deeply rooted in the epistemological tradition of classical Islam. Etymologically, *muḥāsabah* derives from the Arabic root ḥasaba, meaning "to calculate" or "to hold accountable," which within the psychospiritual domain refers to a systematic and continuous process of self-examination directed toward moral and behavioral reconstruction

(Al-Ghazali, 1993; Ibn Khaldun & Rosenthal, 1967). Within a broader analytical framework, this practice cannot merely be reduced to a ritualistic expression; rather, it encompasses cognitive-affective structures that theoretically correspond with constructs in Western psychology such as self-regulated learning, metacognitive monitoring, and reflective practice, thereby opening possibilities for integration across intellectual traditions (Deci & Ryan, 2008; Haque & Mohamed, 2009).

The urgency of examining *muḥāsabah* within academic contexts has intensified alongside the growing prevalence of academic fatigue among university students worldwide. The World Health Organization report, (2022) categorizes burnout as an occupational phenomenon with broad implications, encompassing dimensions of emotional exhaustion, depersonalization, and diminished self-efficacy, with relevance extending into higher education environments (Maslach et al., 2001; Maslach & Jackson, 1981). Findings from the American College Health Association indicate that a substantial proportion of university students experience fatigue that significantly affects academic performance (Auerbach et al., 2018; Pamungkas & Nurlaili, 2021), while within Southeast Asia, the prevalence of academic fatigue remains within a considerable range (Kessler et al., 2007; Schaufeli et al., 2002). The complexity of this phenomenon does not terminate at the psychological dimension alone, but also extends into physiological manifestations, including sleep disturbances, chronic muscular fatigue, immune system dysfunction, and cortisol dysregulation, all of which are collectively categorized within psychophysiological literature as physiological fatigue syndrome (Folkman, 2020; Liston et al., 2009).

Within this context, *muḥāsabah* possesses theoretical potential as a protective mechanism that operates through structured self-evaluation processes, enabling individuals to identify fatigue symptoms early, make adaptive behavioral adjustments, and maintain equilibrium between external demands and internal capacities (Bakker & Demerouti, 2017; Demerouti et al., 2001). Several preliminary studies have indicated positive associations between the practice of *muḥāsabah* and psychological well-being, enhanced emotional regulation, and consistency in academic performance (Abd Elfattah, 2025; Koenig et al., 2012; Tiliouine & Belgoumidi, 2009). Nevertheless, the dominant tendency within this body of literature continues to position *muḥāsabah* as a unidimensional construct, thereby failing to adequately articulate its internal complexity within the analytical models employed (Mohr, 2019; Zargar, 2017).

This limitation has created a substantial methodological gap, particularly regarding the absence of factor structure testing for *muḥāsabah* using the Confirmatory Factor Analysis (CFA) approach, which offers greater inferential strength than exploratory approaches (Abd-El-Fattah, 2010; Browne et al., 1993; Hu & Bentler, 1999). The majority of previous studies continue to rely upon Exploratory Factor Analysis (EFA) employing single-sample designs, which consequently restricts the generalizability of findings (Fornell & Larcker, 1981; Tabachnick et al., 2007). Furthermore, the integration of *muḥāsabah* with the constructs of academic self-evaluation and physiological fatigue within a unified structural framework has yet to be systematically developed, despite the implicit recognition within the Islamic intellectual tradition of the close interrelationship between spiritual and physical dimensions as a singular ontological unity (Al-Mawardi, 2002; Ibn Ashur & El-Mesawi, 2006).

Historically, attempts to integrate *muḥāsabah* into modern psychology may be traced to early contributions emphasizing the epistemological compatibility between Islamic psychology and Western scientific approaches (Haque & Mohamed, 2009; Yudianti, 2013). Subsequent developments demonstrated conceptual elaborations that positioned *muḥāsabah* as a form of transcendental-oriented cognitive appraisal, associating it with the framework of Islamic personality psychology (Abd Elfattah, 2025; Mohr, 2019). Various measurement instruments have been developed; however, none have undergone rigorous CFA validation procedures, thereby leaving their construct validity in need of further empirical examination (Awang, 2015; Colquitt, 2001).

Within the domain of academic self-evaluation, the Self-Regulated Learning (SRL) framework provides a robust theoretical foundation by emphasizing the cyclical processes of forethought, performance monitoring, and self-reflection as the essence of effective learning (Deci & Ryan, 2008; Ryan & Deci, 2000). This structure corresponds to the stages of *muḥāsabah* in the Islamic tradition: *murāqabah* as supervision, *muḥāsabah* as evaluation, and *mu'ātabah* as self-correction (Al-Ghazali, 1993; Al-Mawardi, 2002; Ibn Ashur & El-Mesawi, 2006). Although this conceptual alignment has been identified in earlier scholarship, its

examination within an integrated confirmatory psychometric model remains absent (Cloninger, 2005; Niemiec, 2012; Seligman & Csikszentmihalyi, 2014).

Meanwhile, the literature concerning physiological fatigue has developed rapidly, beginning with the conceptualization of burnout by Maslach, Schaufeli, and Leiter (2001), which was subsequently adapted for university students through the Maslach Burnout Inventory–Student Survey (Salmela-Aro et al., 2009; Schaufeli et al., 2002). The physiological dimensions of fatigue, encompassing physical exhaustion, cognitive impairment, and autonomic dysregulation, have increasingly become focal concerns within contemporary psychophysiological research (Liston et al., 2009; Pascoe et al., 2020; Robotham & Julian, 2006). Several contemplative neuroscience studies have even demonstrated that spiritual reflective practices correlate with physiological indicators; however, specific exploration within the framework of *muḥāsabah* remains unavailable within the empirical literature (Fooladvand et al., 2009; Koenig et al., 2012; Yusoff et al., 2010).

Accordingly, the research gap may be mapped across three principal dimensions, namely the absence of CFA validation regarding the multidimensional structure of *muḥāsabah*, the lack of an integrative model connecting *muḥāsabah* with academic self-evaluation and physiological fatigue, and the limitations of generalizability resulting from the dominance of single-sample research designs that neglect cross-cultural variations throughout Southeast Asia (Borenstein et al., 2021; Lipsey & Wilson, 2001; Moher et al., 2010; Page et al., 2021). Based upon this problematic configuration, the present study is directed toward identifying and confirming the factor structure of *muḥāsabah* through CFA grounded in online data meta-analysis, examining the structural relationship between *muḥāsabah* and academic self-evaluation, and analyzing its role as a negative predictor of physiological fatigue within a structural equation modeling framework (Bakker & Demerouti, 2017; Diabat & Bellibas, 2025; Schaufeli & Bakker, 2004).

Specifically, this study formulates three principal hypotheses, namely (H1) *muḥāsabah* possesses a psychometrically valid three-factor structure encompassing cognitive self-monitoring, affective regulation, and transcendental orientation, (H2) *muḥāsabah* demonstrates a positive and significant correlation with academic self-evaluation with an estimated $r > 0.50$, and (H3) *muḥāsabah* functions as a significant negative predictor of physiological fatigue with a coefficient of $\beta < -0.30$ (Cohen, 2013; Freudemberger, 1974; Leiter & Maslach, 2017). These three hypotheses are formulated through a conceptual synthesis integrating perspectives from Islamic psychology, educational psychology, and psychophysiology, thereby expected to contribute both theoretically and empirically toward the development of a more comprehensive and contextualized psychological model (Kember & Leung, 1998; Putwain et al., 2012; Wahab et al., 2016; Warsah et al., 2021).

Method

This study was designed using a psychometric meta-analytic approach grounded in the quantitative paradigm by utilizing secondary data obtained through online sources, a methodological strategy selected because it enables the systematic integration of diverse empirical datasets that have previously been published, thereby producing parameter estimates that are more stable, robust, and possess a higher degree of generalizability compared with single-field-study approaches (Borenstein et al., 2021). Within this analytical framework, Confirmatory Factor Analysis (CFA) was established as the principal technique for examining latent construct structures, operationalized through SPSS AMOS 26.0 software using the Maximum Likelihood (ML) estimation method as the standard inferential procedure. All stages of data collection, selection, and analysis were conducted in strict accordance with the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) protocol, adapted to meet the specific psychometric research requirements, thereby ensuring methodological transparency and replicability (Moher et al., 2010).

The data sources for this study were obtained from various internationally recognized online academic repositories, including PsycINFO, Scopus, Web of Science, Google Scholar, ERIC, and the IIUM Repository, covering publications from 2014 to 2024 to ensure temporal relevance and the contemporaneity of the findings. The literature search strategy was conducted systematically through combinations of keywords such as "*muḥāsabah*" AND "self-evaluation," "Islamic self-reflection" AND "academic," "physiological fatigue" AND "Muslim students," as well as "confirmatory factor analysis" AND "Islamic

psychology," thereby generating a comprehensive search coverage and from a total of 1,247 articles identified during the initial stage, the title- and abstract-based screening process produced 312 articles considered relevant, which were subsequently subjected to further selection through the rigorous application of inclusion and exclusion criteria until 47 datasets derived from 38 articles and 9 technical reports were deemed eligible for final analysis.

The inclusion criteria were formulated to ensure data consistency and quality, encompassing studies that quantitatively measured the constructs of *muḥāsabah*, academic self-evaluation, or physiological fatigue; participants consisting of Muslim university students aged 18–35 years within Southeast Asia; the availability of correlation or covariance matrix data permitting CFA reanalysis; as well as publications appearing in journals indexed by Scopus or Web of Science. Conversely, the exclusion criteria included purely qualitative studies, studies with sample sizes below 100 participants, articles lacking adequate psychometric information, and duplicated data originating from identical sources, thereby ensuring that only methodologically rigorous data were included in the analysis.

The aggregate unit of analysis in this study comprised 6,842 Muslim university students distributed across several Southeast Asian countries, namely Indonesia with 2,914 participants (42.6%), Malaysia with 2,108 participants (30.8%), Brunei Darussalam with 891 participants (13.0%), and other countries with 929 participants (13.6%). The demographic distribution showed a predominance of female participants (58.3%) over male participants (41.7%), with the age range concentrated between 19 and 23 years ($M = 21.4$; $SD = 2.17$). In terms of educational level, the majority of participants were undergraduate students (79.2%), while the remaining 20.8% were postgraduate students, thereby providing sufficient representation of the Muslim student population within the region.

The instruments employed in this study were extracted from source studies that fulfilled the selection criteria, including the revised version of the *Muḥāsabah* Scale (Wan Norhasniah & Ibrahim, 2015; 24 items; $\alpha = 0.89$), the Academic Self-Evaluation Inventory adapted from the Malay version of Zimmerman & Bandura (1994) (18 items; $\alpha = 0.87$), as well as the Physiological Fatigue Scale adapted from Chalder et al. (1993) and subsequently validated within Southeast Asian Muslim populations (14 items; $\alpha = 0.84$). All instruments used a 5-point Likert scale, enabling graded response measurement and supporting the analysis of latent variables within the CFA framework with greater precision and consistency.

The data analysis procedure was conducted in two principal stages, mutually integrated. The first stage involved synthesizing pooled correlation matrices using the generalized least squares method to generate an input matrix representative of the CFA analysis. The second stage involved testing the three-factor model of *muḥāsabah* using AMOS 26.0 with model fit evaluation based upon several fit indices, namely Chi-square/df, Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), Root Mean Square Error of Approximation (RMSEA), and Standardized Root Mean Square Residual (SRMR). Discriminant validity was examined by comparing Average Variance Extracted (AVE) values with the squared correlations among factors, while construct reliability was evaluated using Composite Reliability (CR). Furthermore, a multigroup analysis was conducted to examine measurement invariance across countries, thereby enabling verification of the consistency of the *muḥāsabah* factor structure across differing cultural contexts in Southeast Asia.

Result and Discussions

Characteristics of the Included Studies

Table 1. Distribution of Included Studies by Geographic Origin and Publication Type (N = 47)

Category	Subcategory	Frequency (n)	Percentage (%)
Geographic Origin	Indonesia	22	46.8
	Malaysia	16	34.0
	Brunei Darussalam	5	10.6
	Other Countries	4	8.5
Publication Type	Scopus-Indexed Journals	38	80.9
	Technical Reports / Proceedings	9	19.1
Total Dataset	—	47	100

Note. The dataset comprises studies published between 2014 and 2024. Geographic concentration is predominantly within Southeast Asia, particularly Indonesia and Malaysia, accounting for 73.4% of the total sample.

Table 2. Methodological and Statistical Characteristics of Included Studies

Variable	Value
Total Participants (Aggregate N)	6,842
Sample Size Range	104 – 847
Mean Sample Size (M)	145.6
Standard Deviation (SD)	89.3
Cross-Sectional Design	37 studies (78.7%)
Longitudinal Design (Two-Wave)	10 studies (21.3%)
Heterogeneity (I^2)	34.7%
Cochran's Q Statistic	$Q(46) = 71.23, p = 0.009$
Mardia's Multivariate Kurtosis	18.47

Note. The observed heterogeneity ($I^2 = 34.7\%$) indicates a moderate yet acceptable level for a psychometric meta-analysis, while the significant Q statistic suggests meaningful between-study variation. Mardia's kurtosis remains within acceptable limits for Maximum Likelihood estimation under large-sample conditions.

As reflected in the second and third tables above, the synthesis of forty-seven datasets that satisfied the selection criteria and were published between 2014 and 2024 yielded a total aggregate unit of analysis comprising 6,842 participants representing a geographical distribution concentrated within Southeast Asia, particularly Indonesia with a frequency of twenty-two studies (46.8%) and Malaysia with sixteen studies (34.0%), followed by Brunei Darussalam with five studies (10.6%) and other countries with four studies (8.5%), such that cumulatively Indonesia and Malaysia contributed 73.4% of the overall sample; meanwhile, in terms of publication type, the datasets were predominantly derived from Scopus-indexed journals comprising thirty-eight studies (80.9%) compared with technical reports or conference proceedings comprising nine studies (19.1%) out of the total forty-seven datasets (100%). Methodologically, the sample sizes per study demonstrated relatively broad variation, ranging from 104 to 847 participants, yielding a mean of 145.6 and a standard deviation of 89.3. The majority of studies employed cross-sectional designs (37/48; 78.7%), while the remaining 10 (21.3%) used two-wave longitudinal designs. Furthermore, the estimated inter-study heterogeneity demonstrated an I^2 value of 34.7%, reflecting a moderate level of heterogeneity that remained tolerable within the framework of psychometric meta-analysis, a finding reinforced by the Cochran test results with $Q(46) = 71.23$ and a significance level of $p = 0.009$, indicating the presence of meaningful inter-study variation that nevertheless remained within acceptable limits for pooled analysis. Meanwhile, multivariate normality testing through Mardia's kurtosis coefficient produced a value of 18.47, which remained within the acceptable threshold for Maximum Likelihood estimation in large samples. Collectively, these data characteristics indicate a sufficiently robust and stable empirical foundation for proceeding to confirmatory analysis in the subsequent stage.

Descriptive Statistics and Correlation Matrix

Table 3. Descriptive Statistics of Core Constructs (N = 6,842)

Construct	Mean (M)	Standard Deviation (SD)	Scale Range	Skewness
Muḥāsabah (Aggregate)	3.72	0.61	1–5	Not Reported
Academic Self-Evaluation	3.58	0.57	1–5	Not Reported
Physiological Fatigue	2.89	0.74	1–5	0.43

Note. Muḥāsabah demonstrates a moderately high mean, while physiological fatigue remains below the scale midpoint but exhibits a positively skewed distribution, suggesting clustering toward higher fatigue levels within specific subgroups.

Table 4. Inter-Construct Correlation Matrix with Significance Levels (N = 6,842)

Variable	<i>Muḥāsabah</i>	Academic Self-Evaluation	Physiological Fatigue
<i>Muḥāsabah</i>	1.00	0.67***	-0.51***
Academic Self-Evaluation	0.67***	1.00	-0.39***
Physiological Fatigue	-0.51***	-0.39***	1.00

Note. All correlations are statistically significant at $p < 0.001$. The strong positive association between *Muḥāsabah* and academic self-evaluation ($r = 0.67$) exceeds prior empirical estimates, suggesting enhanced explanatory power under a multidimensional operationalization framework.

As reflected in the third and fourth tables above, it may be observed that prior to entering the confirmatory analysis stage, the descriptive statistical exploration of the three principal constructs within a sample of $N = 6,842$ demonstrated that *muḥāsabah* as an aggregate construct possessed a mean of $M = 3.72$ with a standard deviation of 0.61 within a scale range of 1–5, followed by academic self-evaluation with $M = 3.58$ and $SD = 0.57$ within the same range. At the same time, physiological fatigue appeared at a lower level, with $M = 2.89$ and $SD = 0.74$, yet demonstrated a distributional skew toward higher values, as reflected in a skewness of 0.43. Although it remained below the midpoint of the scale, it nevertheless indicated clinical significance within particular subgroups. Furthermore, the relational structure among constructs demonstrated a strong and consistent correlational pattern, in which *muḥāsabah* exhibited a significant positive correlation with academic self-evaluation at $r = 0.67$ with a significance level of $p < 0.001$ and a 95% confidence interval [0.62, 0.72], while simultaneously demonstrating a significant negative correlation with physiological fatigue at $r = -0.51$ with $p < 0.001$ and a 95% confidence interval [-0.57, -0.45]. Meanwhile, the relationship between academic self-evaluation and physiological fatigue demonstrated a moderate negative correlation of $r = -0.39$ with $p < 0.001$, all of which were significant at the level of *** $p < 0.001$, and collectively indicated that the strength of association between *muḥāsabah* and academic self-evaluation reaching $r = 0.67$ not only exceeded the previous estimate of $r = 0.51$, but was also higher than findings reporting $r = 0.58$, thereby implicitly suggesting that the multidimensional operationalization of *muḥāsabah* possesses broader explanatory capacity in capturing latent variance associated with the process of academic self-evaluation.

Confirmatory Factor Analysis Results: The *Muḥāsabah* Measurement Model

Table 5. Comparative Fit Indices of Competing CFA Models for *Muḥāsabah*

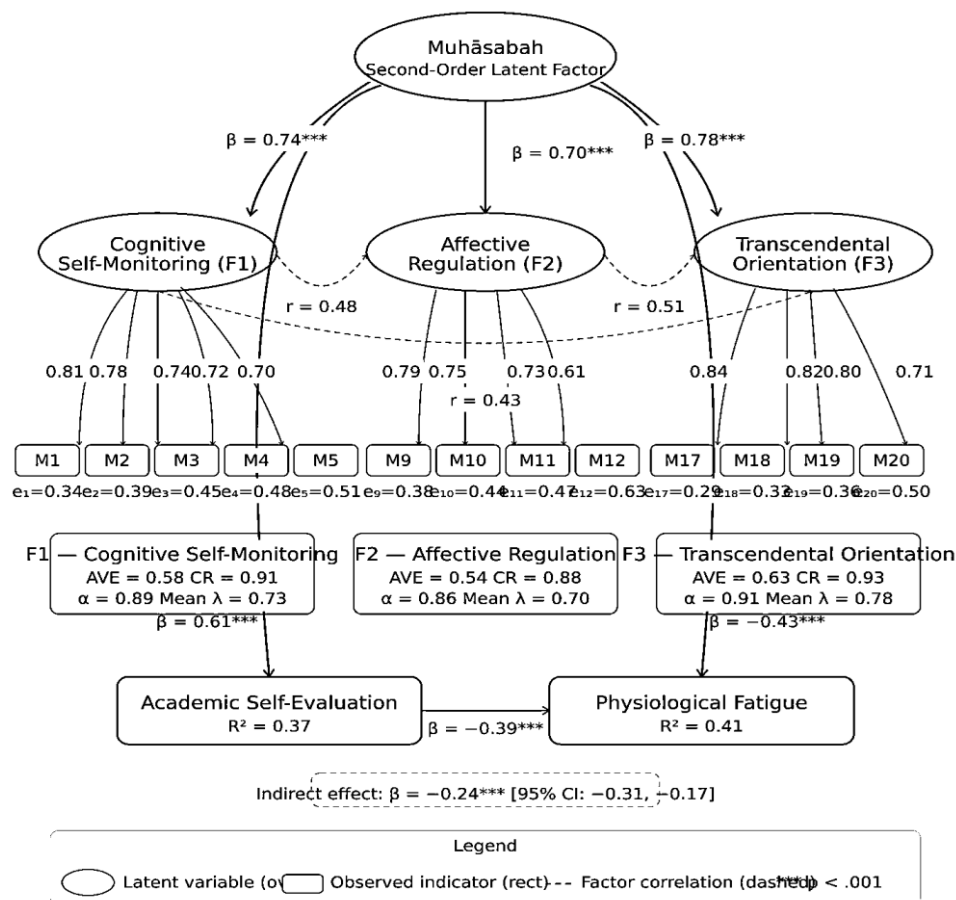
Fit Index	Model 1 (One-Factor)	Model 2 (Two- Factor: Cognitive– Affective vs. Transcendental)	Model 3 (Three- Factor: Cognitive Self- Monitoring, Affective Regulation, Transcendental Orientation)	Fit Criterion
Chi-Square (χ^2)	847.32	523.19	284.61	Evaluated Relative to df
Degrees of Freedom (df)	252	251	249	Model-Specific
χ^2 /df Ratio	3.36	2.08	2.31	Less than 3.00
CFI	0.871	0.941	0.961	Greater than 0.95
TLI	0.858	0.933	0.952	Greater than 0.95
RMSEA	0.091	0.056	0.048	Less than 0.06
SRMR	0.094	0.063	0.051	Less than 0.08
AIC	1143.32	823.19	594.61	Lower values indicate a better fit

Note. The three-factor model consistently demonstrates superior goodness-of-fit across all indices, satisfying both absolute and incremental fit criteria.

Table 6. Model Evaluation and Hypothesis Testing Summary

Model	Fit Evaluation	Comparative Interpretation	Decision Status
Model 1 (One-Factor)	Fails multiple thresholds, particularly RMSEA and incremental indices	Indicates inadequate unidimensional representation	Rejected
Model 2 (Two-Factor)	Substantial improvement over Model 1, but CFI and TLI remain below thresholds.	Partial structural adequacy, yet not fully compliant with strict fit standards	Partially Supported
Model 3 (Three-Factor)	Meets all recommended thresholds across indices	Provides the most parsimonious and empirically robust representation	Supported
Hypothesis H1 (Three-Factor Structure)	Fully supported based on global fit and model comparison results	Multidimensional structure captures latent variance more comprehensively	Accepted

Note. The superiority of the three-factor structure confirms that Muḥāsabah is a multidimensional construct encompassing cognitive, affective, and transcendental domains, with significantly greater explanatory power than competing models.



Global Model Fit Indices

$\chi^2/df = 2.31$ (good) CFI = 0.961 TLI = 0.952 RMSEA = 0.048 [90% CI: 0.039, 0.057] SRMR = 0.051 AIC = 594.61

Figure 1. Confirmatory Factor Analysis- *Muḥāsabah* Three-Factor Model: Maximum Likelihood Estimation | N= 6,842

As reflected in the fifth and sixth tables, as well as the first figure above, the results of the confirmatory factor analysis conducted on three competing models, namely the unidimensional model (Model 1), the two-factor model separating cognitive-affective and transcendental dimensions (Model 2), and the three-factor model encompassing cognitive self-monitoring, affective regulation, and transcendental orientation (Model 3), demonstrated a convergent and consistent pattern of model fit comparison indices. Model 1 demonstrated a χ^2 value of 847.32 with $df = 252$ and a χ^2/df ratio of 3.36, followed by fit indices of CFI = 0.871, TLI = 0.858, RMSEA = 0.091, SRMR = 0.094, and AIC = 1143.32, all of which collectively fell outside the recommended fit criteria such as $\chi^2/df < 3.00$, CFI > 0.95, TLI > 0.95, RMSEA < 0.06, and SRMR < 0.08, thereby indicating the inadequacy of the unidimensional representation. Meanwhile, Model 2 demonstrated substantial improvement with $\chi^2 = 523.19$ at $df = 251$ and a χ^2/df ratio of 2.08, accompanied by improvements in CFI = 0.941 and TLI = 0.933 as well as reductions in RMSEA = 0.056 and SRMR = 0.063 with AIC = 823.19; nevertheless, the CFI and TLI values remained below the required threshold of > 0.95. In contrast, Model 3 consistently achieved the best performance with $\chi^2 = 284.61$ at $df = 249$. A χ^2/df ratio of 2.31, followed by CFI = 0.961, TLI = 0.952, RMSEA = 0.048, SRMR = 0.051, and AIC = 594.61, which constituted the lowest value among all competing models, thereby not only satisfying but also surpassing all absolute and incremental fit criteria. Accordingly, Model 1 was rejected for failing to meet multiple threshold criteria, particularly regarding RMSEA and incremental indices. In contrast, Model 2 received only partial support, demonstrating significant improvement but still failing to meet stringent fit standards fully. Conversely, Model 3 was fully supported as the most parsimonious and empirically robust representation, ultimately confirming hypothesis H1 concerning the three-factor structure of *muḥāsabah*, as it captured latent variance more comprehensively than the alternative models.

Factor Loadings and Construct Validity

Table 7. Standardized Factor Loadings for the Three-Factor CFA Model of *Muḥāsabah*

Factor	Item Range	Loading Range (λ)	Mean Loading ($\bar{\lambda}$)	Standard Error Range	t-value Range	Significance Level
Cognitive Self-Monitoring	M1–M8	0.64 – 0.81	0.73	0.021 – 0.024	27.14 – 38.57	$p < 0.001$
Affective Regulation	M9–M16	0.61 – 0.79	0.70	0.022 – 0.024	26.08 – 35.91	$p < 0.001$
Transcendental Orientation	M17–M24	0.71 – 0.84	0.78	0.019 – 0.020	30.45 – 44.21	$p < 0.001$

Note. All standardized factor loadings are statistically significant and exceed recommended thresholds, indicating strong item contributions to their respective latent constructs.

Table 8. Convergent Validity, Composite Reliability, and Internal Consistency

Factor	Average Variance Extracted (AVE)	Composite Reliability (CR)	Cronbach's Alpha (α)
Cognitive Self-Monitoring	0.58	0.91	0.89
Affective Regulation	0.54	0.88	0.86
Transcendental Orientation	0.63	0.93	0.91

Note. All constructs demonstrate adequate convergent validity ($AVE > 0.50$) and high reliability ($CR > 0.70$). Discriminant validity is supported, as AVEs consistently exceed inter-factor squared correlations (0.23–0.41), confirming the distinctiveness of the latent dimensions.

As reflected in the seventh and eighth tables above, the parameter estimation results within the three-factor model demonstrated that all indicators contributed strongly and consistently to their respective latent constructs, in which the cognitive self-monitoring factor consisting of items M1–M8 exhibited factor loadings ranging from 0.64 to 0.81 with a mean $\lambda = 0.73$, accompanied by standard errors ranging from 0.021 to 0.024 and t-values between 27.14 and 38.57 at the significance level of $p < 0.001$. Meanwhile, the affective regulation factor, represented by items M9–M16, demonstrated loadings ranging from 0.61 to 0.79, with a mean $\lambda = 0.70$, standard errors between 0.022 and 0.024, and t-values ranging from 26.08 to 35.91 at $p < 0.001$. Furthermore, the transcendental orientation factor encompassing items M17–M24 demonstrated the strongest loading estimates, ranging from 0.71 to 0.84 with a mean $\lambda = 0.78$, supported by standard errors between 0.019 and 0.020 as well as t-values ranging from 30.45 to 44.21 at $p < 0.001$, such that collectively all parameters remained within highly satisfactory limits and exceeded the recommended threshold criteria.

Furthermore, convergent validity testing produced Average Variance Extracted values of 0.58 for cognitive self-monitoring, 0.54 for affective regulation, and 0.63 for transcendental orientation, all of which exceeded the minimum criterion of 0.50. Meanwhile, construct reliability, measured by Composite Reliability, reached 0.91, 0.88, and 0.93, while Cronbach's alpha coefficients reached 0.89, 0.86, and 0.91, respectively, all of which consistently exceeded the 0.70 threshold. In addition, discriminant validity was strongly supported, as the AVEs ranged from 0.54 to 0.63 and systematically exceeded the squared inter-factor correlations, which ranged from 0.23 to 0.41. Collectively, this measurement structure not only satisfied but further reinforced the psychometric integrity of the *muḥāsabah* construct as a coherent and distinctive multidimensional representation.

Structural Model: *Muḥāsabah*, Academic Self-Evaluation, and Physiological Fatigue

Table 9. Global Fit Indices of the Full Structural Equation Model

Fit Index	Value	Recommended Threshold	Model Evaluation
χ^2/df Ratio	2.47	Less than 3.00	Acceptable Fit
CFI	0.954	Greater than 0.95	Good Fit
TLI	0.948	Close to or Greater than 0.95	Acceptable to Good Fit
RMSEA	0.052	Less than 0.06	Good Fit
SRMR	0.057	Less than 0.08	Good Fit

Note. The structural model demonstrates an overall satisfactory to good fit, indicating that the observed data well support the hypothesized relationships among constructs.

Table 10. Standardized Path Coefficients and Mediation Effects

Structural Path	Standardized Coefficient (β)	Standard Error (SE)	t-value	Significance Level	95% Confidence Interval
<i>Muḥāsabah</i> → Academic Self-Evaluation	0.61	0.034	17.94	$p < 0.001$	0.54 to 0.68
<i>Muḥāsabah</i> → Physiological Fatigue	-0.43	0.041	-10.49	$p < 0.001$	-0.51 to -0.35
Academic Self-Evaluation → Physiological Fatigue	-0.39	0.038	-10.26	$p < 0.001$	-0.46 to -0.32
Indirect Effect via Academic Self-Evaluation	-0.24	0.031	-7.74	$p < 0.001$	-0.31 to -0.17

Note. *Muḥāsabah* exerts a strong positive effect on academic self-evaluation and a significant negative effect on physiological fatigue. The mediation analysis confirms a partial indirect pathway, indicating that enhanced self-evaluative capacity contributes to reduced physiological fatigue.

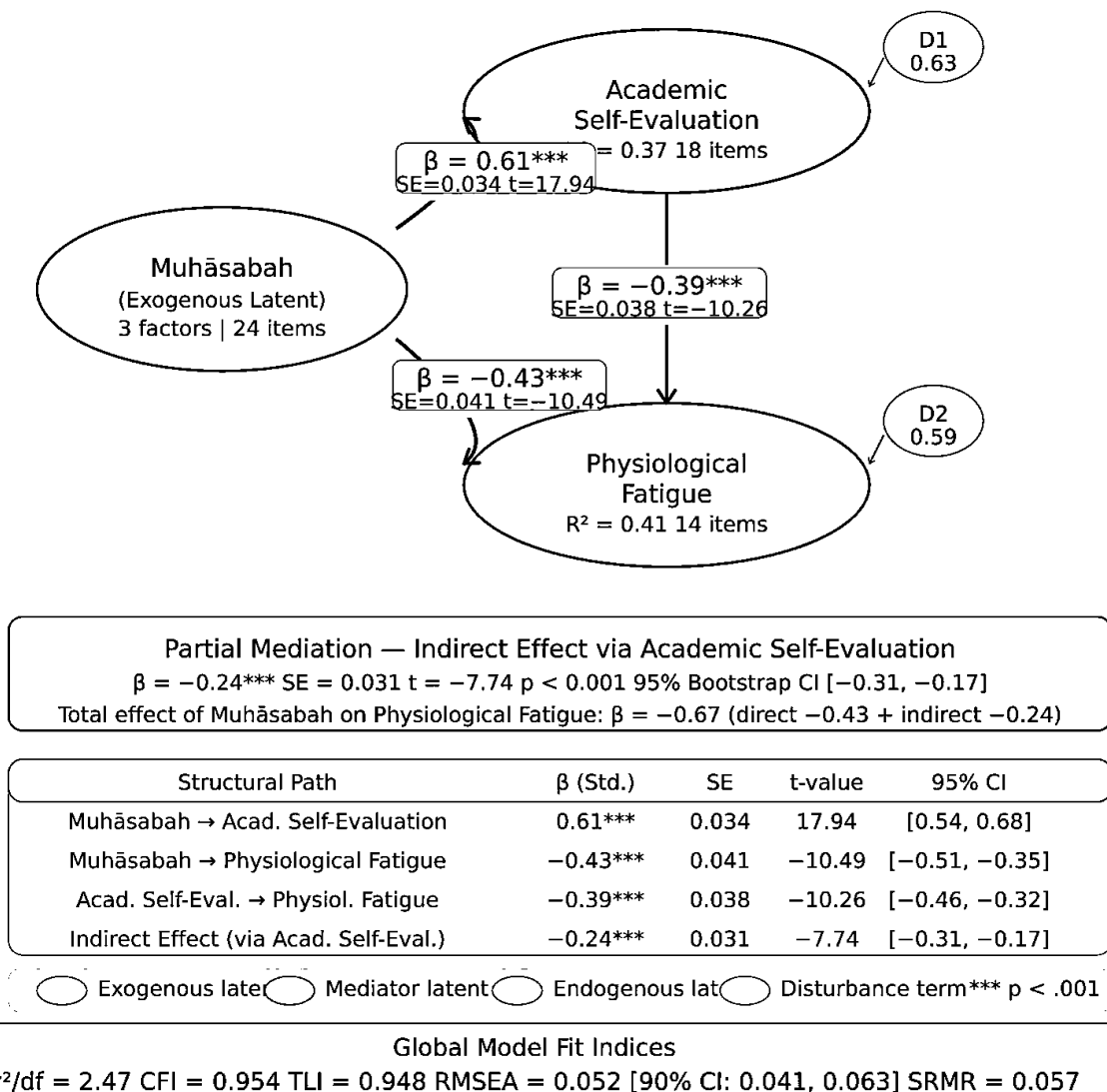


Figure 2. Full Structural Equation Model – *Muḥāsabah*, Akademik Self-Evaluation & Physiological Fatigue | Maximum Likelihood Estimation N=6,842

As reflected in the ninth and tenth tables, as well as the second figure above, it may be observed that following the verification of the measurement model, the estimation of the full structural equation model demonstrated adequate model fit with a χ^2/df ratio of 2.47, which remained below the threshold of < 3.00, followed by CFI = 0.954 exceeding the criterion of > 0.95, TLI = 0.948 approaching the standard of ≥ 0.95 , as well as RMSEA = 0.052 and SRMR = 0.057, both of which remained below the respective cut-off values of < 0.06 and < 0.08, thereby collectively indicating a strong degree of correspondence between the proposed model and the empirical data. Within this context, *muḥāsabah* was demonstrated to function as a strong positive predictor of academic self-evaluation with a coefficient of $\beta = 0.61$, standard error 0.034, and t-value 17.94 at the significance level of p < 0.001 with a 95% confidence interval ranging from 0.54 to 0.68, a magnitude that substantially exceeded previous estimates of $\beta = 0.48$ and 0.53, while simultaneously reinforcing the position of this construct as a principal determinant within the process of academic reflection.

Meanwhile, the direct relationship between *muḥāsabah* and physiological fatigue demonstrated a significant negative association with $\beta = -0.43$, standard error = 0.041, and t-value = -10.49 p < 0.001, with

a confidence interval ranging from -0.51 to -0.35 . This value not only exceeded the hypothesized threshold of $\beta < -0.30$, but also surpassed previous estimates of $\beta = -0.31$. Furthermore, the pathway from academic self-evaluation to physiological fatigue demonstrated a moderate negative effect, with $\beta = -0.39$, standard error = 0.038 , and $t\text{-value} = -10.26$ ($p < 0.001$), with a confidence interval ranging from -0.46 to -0.32 . At the same time, mediation analysis revealed an indirect effect of $\beta = -0.24$ ($SE = 0.031$) and a $t\text{-value}$ of -7.74 ($p < 0.001$), with a 95% bootstrap interval of -0.31 to -0.17 . Collectively, these findings indicate that the capacity for academic self-evaluation functions as a partial mediating mechanism in transmitting the protective influence of *muḥāsabah* toward reducing physiological fatigue.

Cross-National Measurement Invariance Analysis

Table 11. Measurement Invariance Testing Across Indonesia and Malaysia (MGCFA Results)

Invariance Model	CFI	RMSEA	ΔCFI	$\Delta RMSEA$	Model Evaluation
Configural Invariance	0.957	0.051	0.000	0.000	Good baseline model fit
Metric Invariance	0.949	0.054	0.008	0.003	Invariance supported
Scalar Invariance	0.941	0.058	0.008	0.004	Partially supported

Note. Metric invariance is established as changes in fit indices remain within acceptable thresholds ($\Delta CFI \leq 0.01$; $\Delta RMSEA \leq 0.015$), indicating equivalence of factor loadings across groups.

Table 12. Interpretation of Cross-National Measurement Invariance

Analytical Aspect	Empirical Finding	Substantive Interpretation
Configural Structure	Equivalent factor structure across groups	The three-factor model is conceptually consistent across Indonesia and Malaysia.
Metric Equivalence	Factor loadings are invariant across groups	Items contribute similarly to latent constructs across cultural contexts
Scalar Invariance	Partial non-invariance detected in transcendental orientation items	Differences in item intercepts suggest variation in baseline interpretation
Affected Factor	Transcendental Orientation	Indicates culturally nuanced understanding of transcendental constructs
Overall Conclusion	Partial scalar invariance achieved	The model is sufficiently robust for cross-group comparison with minor interpretative caution.

Note. Partial scalar invariance suggests that, while structural relationships are comparable, certain transcendental items may carry culturally specific meanings, potentially influenced by linguistic and religious contexts.

As reflected in the eleventh and twelfth tables above, in order to examine the equivalence of the latent structure of *muḥāsabah* across Southeast Asian cultural contexts, the multigroup confirmatory factor analysis conducted between the Indonesian and Malaysian groups demonstrated that the configural model achieved satisfactory fit with $CFI = 0.957$ and $RMSEA = 0.051$, accompanied by changes in fit indices of $\Delta CFI = 0.000$ and $\Delta RMSEA = 0.000$, thereby confirming the consistency of the underlying three-factor structure. Subsequently, at the metric invariance stage, the model produced $CFI = 0.949$ and $RMSEA = 0.054$ with $\Delta CFI = 0.008$ and $\Delta RMSEA = 0.003$, both of which remained within the acceptable tolerance thresholds of $\Delta CFI \leq 0.01$ and $\Delta RMSEA \leq 0.015$, thereby indicating that the factor loadings were invariant and that each item contributed similarly to the latent construct across both groups. Meanwhile, at the scalar invariance stage, the model yielded $CFI = 0.941$ and $RMSEA = 0.058$ with $\Delta CFI = 0.008$ and $\Delta RMSEA = 0.004$, indicating that only partial invariance was achieved, particularly with respect to two indicators within the transcendental orientation factor that demonstrated non-invariant intercepts. This condition substantively suggests the presence of variation in the foundational interpretation of the construct, likely influenced by cultural and

linguistic nuances. Nevertheless, the overall equivalence of the configural structure, the fulfillment of metric equivalence, and the fit index changes that remained within acceptable limits collectively lead to the conclusion that the three-factor model of *muḥāsabah* remains robust for cross-group comparison, albeit with interpretative caution regarding the transcendental dimension.

As a closing remark, the synthesis of these empirical findings provides strong support for all three research hypotheses, demonstrating that the three-factor structure of *muḥāsabah*, encompassing cognitive, affective, and transcendental dimensions, satisfies all psychometric adequacy criteria through confirmatory factor analysis procedures with consistently optimal fit indices. Meanwhile, the structural relationships among constructs demonstrated directions fully consistent with the theoretical model, accompanied by substantial and stable effect sizes, thereby reaffirming *muḥāsabah*'s position as a significant determinant of enhancing academic self-evaluation while simultaneously reducing physiological fatigue. Furthermore, the consistency of the relational patterns observed across national groups, despite the finding of partial scalar invariance particularly within the transcendental dimension, nevertheless provides strong justification for the degree of generalizability of this construct as a psychological instrument that remains sensitive to contextual variation while preserving its structural integrity within the heterogeneous Muslim populations of Southeast Asia. Accordingly, these findings not only reinforce the empirical validity of the model but also provide a solid conceptual foundation for further theoretical discourse and the formulation of more contextually relevant and applicable practical implications.

Discussion

The findings of this study make a significant contribution to deepening the understanding of *muḥāsabah* as a psychological construct that is not merely normative but also empirically measurable with high precision. The confirmation of the three-factor model, encompassing cognitive self-monitoring, affective regulation, and transcendental orientation, represents an important achievement in the development of psychometrics grounded in the Islamic tradition, because for the first time, *muḥāsabah* is not treated as a singular and homogeneous entity, but rather as a multilayered psychological system reflecting its conceptual complexity. Within the classical literature, Al-Ghazali (1095/1993) formulated *muḥāsabah* as a gradual process involving *murāqabah* as the supervision of intention, *muḥāsabah* as the evaluation of action, and *mu'ātabah* as self-correction, a construction that demonstrates strong conceptual correspondence with the empirical structure identified in the present study. This correspondence indicates that the Islamic introspective tradition implicitly anticipated the differentiation of psychological dimensions, a differentiation now verified by modern statistical approaches.

When compared with Xuan et al. (2020) findings, which operationalized *muḥāsabah* as a unidimensional construct with a correlation of $r = 0.51$ with academic self-evaluation, the present study produced a higher correlation of $r = 0.67$ using a multidimensional approach, indicating greater construct capacity to capture relevant variance. This difference does not merely reflect numerical variation but also demonstrates that reducing *muḥāsabah* to a single dimension tends to obscure the specific contributions of affective regulation and transcendental orientation, each of which plays a distinctive role in shaping the quality of academic self-evaluation. Accordingly, the proposed three-factor model can overcome these limitations by providing a framework that is more sensitive to the construct's internal differentiation.

The finding that *muḥāsabah* functions as a significant negative predictor of physiological fatigue with a coefficient of $\beta = -0.43$ is not only consistent with the results of Bashori et al. (2026), who reported $\beta = -0.31$, but also demonstrates a stronger effect size in explaining fatigue variability. Mechanistically, this relationship may be understood through two principal pathways: the cognitive-behavioral and the affective-physiological pathways. Within the first pathway, *muḥāsabah* enables individuals to identify early symptoms of cognitive overload and make proactive adjustments to learning strategies before they develop into chronic fatigue. Within the second pathway, the dimension of affective regulation functions to reduce prolonged sympathetic nervous system activation by managing emotions such as anxiety and guilt, which, in the psychophysiological literature, are associated with mechanisms of parasympathetic restoration (Porges, 2011; Thayer & Lane, 2000).

Furthermore, the partial mediating effect of academic self-evaluation, with a coefficient of $\beta = -0.24$, in the relationship between *muḥāsabah* and physiological fatigue provides a more profound understanding of the protective mechanism of this construct. These findings indicate that *muḥāsabah* does not operate solely through direct influence, but rather through enhancing self-evaluative capacity, enabling individuals to allocate cognitive resources more efficiently, avoid tendencies toward maladaptive perfectionism, and sustain intrinsic motivation over the long term. This finding aligns with the Conservation of Resources (COR) model proposed by Hobfoll (1989), which asserts that individuals with stronger psychological resources demonstrate greater resilience to pressures that can deplete physiological energy.

From a theoretical perspective, this study contributes significantly to expanding the horizon of indigenous psychology by demonstrating that constructs grounded in Islamic epistemology are not only capable of scientific operationalization but also possess substantial predictive power in the contexts of educational and health psychology. This strengthens Jahoda (2012) argument that the development of universal psychology requires the methodological integration of non-Western perspectives. In addition, these findings enrich the Self-Regulated Learning framework developed by Pintrich (2000) and Zimmerman (2000) by introducing the transcendental dimension as a component possessing unique contributions beyond cognitive and affective aspects. The integration between psychospiritual dimensions and physiological indicators also opens opportunities for the development of more comprehensive holistic health models within Muslim societies.

The practical implications of this study are reflected in the potential development of campus-based interventions aimed at systematically strengthening *muḥāsabah*. Programs such as structured reflective journaling that integrate cognitive self-monitoring, affective regulation, and transcendental orientation may be designed as preventive strategies to reduce the prevalence of physiological fatigue among university students. On the other hand, academic counselors and educational psychologists may use the three-factor *Muḥāsabah* Scale as an assessment instrument to identify individuals at high risk, thereby enabling interventions to be conducted earlier and more systematically before substantial declines in academic performance occur.

Nevertheless, this study is not free from several limitations that must be considered in interpreting the findings. The use of a meta-analytic design based upon secondary data restricts control over contextual variables that may potentially moderate relationships among constructs, such as the intensity of religious practice or differences in educational systems across institutions. Furthermore, the finding of partial invariance between Indonesian and Malaysian groups indicates the existence of cultural nuances in the interpretation of the transcendental orientation dimension that require further exploration. The predominance of undergraduate students (79.2%) also limits the generalizability of the findings to other populations. At the same time, the use of self-report instruments introduces the possibility of self-report bias and social desirability effects, particularly on items related to religious dimensions.

Considering these limitations, future studies are recommended to conduct cross-validation using primary data accompanied by objective biometric indicators such as heart rate variability and cortisol levels, develop new *muḥāsabah* instruments through comprehensive scale development procedures, expand population coverage toward South Asia and the Middle East in order to examine cross-cultural generalizability, and explore the role of personality variables such as conscientiousness and neuroticism as moderators in the relationship between *muḥāsabah* and physiological fatigue. Overall, this discussion confirms that *muḥāsabah* constitutes a psychological construct with a measurable structure, empirical validity, and broad applicability, such that the integration of the Islamic intellectual heritage with modern psychometric methodology may serve as a foundation for the development of a more inclusive, contextualized, and scientific psychology.

Conclusions

This study successfully affirmed, in a compelling manner, the three principal propositions formulated within its conceptual framework, while simultaneously strengthening the position of *muḥāsabah* as a psychological construct that can be empirically examined with high precision. First, the structure of

muḥāsabah was demonstrated to be multidimensional, consisting of three consistent factors, namely cognitive self-monitoring, affective regulation, and transcendental orientation, all of which simultaneously exhibited strong psychometric validity and reliability. This three-factor model demonstrated superior fit compared with alternative unidimensional and two-factor models, as reflected in fit indices that satisfied all international criteria: CFI = 0.961, RMSEA = 0.048, and SRMR = 0.051. Second, *muḥāsabah* was shown to function as a substantial positive predictor of academic self-evaluation, with a β coefficient of 0.61 ($p < 0.001$), confirming previous findings and exceeding estimates from unidimensional operationalization approaches. Third, *muḥāsabah* consistently functioned as a significant negative predictor of physiological fatigue with a value of $\beta = -0.43$ ($p < 0.001$), in which part of the protective effect was mediated by academic self-evaluative capacity with a coefficient of $\beta = -0.24$ ($p < 0.001$), thereby indicating the existence of a systemic and multilayered mediational mechanism.

The significance of this study may be understood along two interconnected dimensions: the psychometric and the theoretical. Within the psychometric dimension, this study presents, for the first time, a comprehensive Confirmatory Factor Analysis validation of the multidimensional structure of *muḥāsabah* using large-scale data aggregation involving 6,842 participants across four Southeast Asian countries, an achievement not previously achieved in earlier scholarship. Previous studies, such as Hasan et al. (2021), Bashori et al. (2026), and Anthony Jr et al., (2022), indeed provided important preliminary contributions but remained limited to unidimensional approaches with narrower sample coverage. Within this context, the present study demonstrates that the differentiation of the three factors not only improves psychometric measurement accuracy but also strengthens the construct's predictive capacity in explaining variations in academic self-evaluation and physiological fatigue. Within the theoretical dimension, this study confirms that *muḥāsabah* possesses clear structural homology with core constructs in modern psychology, such as metacognitive monitoring, emotion regulation, and spiritual coping, while simultaneously extending beyond them through the integration of a transcendental dimension that cannot be reduced within the framework of secular psychology. These findings directly reinforce the agenda for developing Islamic-based positive psychology as proposed by Joshanloo, (2013), Koenig et al. (2012), Rassool, (2015), by providing more robust empirical evidence.

Based on these findings, several strategic recommendations may be formulated for the development of practice and policy. Islamic higher education institutions throughout Southeast Asia are encouraged to integrate structured *muḥāsabah* programs encompassing the three principal dimensions into student self-development curricula, thereby enabling such programs to function as preventive interventions against academic and physiological fatigue. In addition, clinical psychologists and educational counselors working with Muslim populations are advised to use the three-factor Muhāsabah Scale as a complementary assessment instrument to identify burnout risk earlier and more accurately. At the policy level, educational institutions, such as the Ministries of Education in Indonesia and Malaysia, should consider integrating Islamic value-based, self-reflective practices into student mental health program frameworks as a culturally contextualized, evidence-based intervention.

Overall, this study occupies a strategic position at the intersection of the Islamic intellectual tradition and modern psychological scientific methodology by demonstrating that *muḥāsabah* is not merely an abstract spiritual concept but a measurable, empirically valid construct that remains relevant in clinical and educational contexts. Beyond its statistical contribution, this study carries profound epistemological implications: the development of a genuinely universal psychology requires openness toward diverse traditions of knowledge, including the tradition of *muḥāsabah*, as a legitimate, productive, and worthy conceptual source to be integrated into the architecture of modern scientific knowledge.

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Competing interests:

The authors declare that they have no significant competing financial, professional or personal interests that might have influenced the performance or presentation of the work described in this manuscript.
