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Item Development for Measuring Stress Management Competencies of Secondary School Principals in Sarawak: Teachers' Perceptions and Exploratory Factor Analysis

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Abstract

Stress management competencies in school leadership have become increasingly critical as secondary school principals face escalating administrative, instructional, and psychosocial demands. Despite growing evidence that leadership competencies play a vital role in mitigating teacher work stress, empirical studies examining principals' stress management competencies—particularly within the Malaysian educational context—remain limited. This study aims to develop and validate a survey instrument to measure stress management competencies among secondary school principals in Sarawak based on teachers' perceptions using an Exploratory Factor Analysis (EFA) approach. The instrument was adapted from the Stress Management Competency Indicator Tool (SMCIT) developed by Yarker et al. (2008) and initially consisted of 66 items. Data were collected from 200 secondary school teachers across five government daily secondary schools in Sarawak. Data analysis was conducted using IBM SPSS version 27.0, employing Principal Component Analysis (PCA) with Varimax rotation. The EFA results led to the removal of 29 items due to low factor loadings and cross-loadings, yielding a final instrument comprising 37 items across three underlying dimensions of principals' stress management competencies. All retained dimensions demonstrated strong

construct validity and excellent internal consistency reliability. The findings provide empirical support for a psychometrically sound and contextually relevant instrument for assessing principals' stress management competencies from teachers' perspectives. This study contributes to educational leadership research by offering a validated measurement tool to support evidence-based leadership development, policy formulation, and targeted stress management interventions in Malaysian secondary schools.
Keywords: Stress Management Competencies, Secondary School Principals, Item Develepment, Exploratory Factor Analysis, Educational Leadership .

Perpose of the Study

The purpose of this study is to develop and validate a reliable and valid survey instrument for measuring stress management competencies among secondary school principals in Sarawak based on teachers' perceptions. Using an Exploratory Factor Analysis (EFA) approach, the study seeks to identify the underlying factor structure of principals' stress management competencies and evaluate the psychometric properties of the adapted instrument. Specifically, the instrument captures multiple competency dimensions related to principals' ability to manage work-related stress, support teachers' well-being, and foster a healthy school environment. By establishing a validated measurement framework, this study aims to support evidence-based leadership development initiatives, inform educational policy, and facilitate targeted stress management interventions within Malaysian secondary schools.

Background

Stress management in school leadership has gained increasing scholarly attention due to the growing complexity of principals' roles and escalating demands within contemporary education systems. Secondary school principals are expected not only to oversee administrative and instructional processes but also to manage teachers' workload, emotional well-being, and interpersonal dynamics within the school. When school leaders lack effective stress management competencies, teachers may experience heightened work stress, leading to reduced job satisfaction, impaired instructional quality, and declining school performance (Shamsuddin & Abdullah, 2022; Choi et al., 2023).

From an organisational and theoretical perspective, stress management competencies function as critical leadership resources that help buffer the negative effects of excessive job demands. Models such as the Job Demands–Resources (JDR) framework suggest that leadership behaviours can mitigate stress by enhancing organisational support, clarity, and psychological safety. In school settings, principals' ability to regulate emotions, communicate effectively, manage conflict, and provide social support plays a central role in shaping teachers' stress experiences and coping mechanisms.

Despite the recognised importance of stress management competencies in leadership, empirical research examining this construct within the Malaysian educational context remains limited, particularly in East Malaysia and Sarawak. Existing studies have largely focused on teacher stress outcomes or general leadership styles, with limited attention given to systematically measuring principals' competencies in managing stress at the organisational level. Furthermore, the absence of contextually validated measurement instruments constrains the development of data-driven leadership training and intervention programmes.

Addressing this gap, the present study aims to develop and validate a psychometrically sound instrument for assessing secondary school principals' stress management competencies based on teachers' perceptions using Exploratory Factor Analysis (EFA). By providing a validated measurement tool tailored to the Sarawak context, this study contributes to educational leadership research and supports more effective leadership development, policy formulation, and stress management strategies in Malaysian secondary schools.

Methodology

The methodology employed in this study plays a critical role in achieving the research objectives. This study adopted a cross-sectional research design, which is appropriate for examining teachers' perceptions of secondary school principals' stress management competencies at a single point in time. A quantitative research approach was utilized, with data collected through a self-administered questionnaire. The instrument was adapted from the Stress Management Competency Indicator Tool (SMCIT) developed by Yarker et al. (2008) and modified to ensure contextual relevance within the Malaysian secondary school setting, particularly in Sarawak. The study sample comprised 200 secondary school teachers selected from five government daily secondary schools in Sarawak. Teachers were chosen as respondents because they are directly exposed to principals' leadership behaviours and are therefore well positioned to evaluate principals' stress management competencies. A stratified random sampling technique was employed to ensure adequate representation across relevant demographic characteristics, including years of teaching experience and subject specialization. Data analysis was conducted using IBM SPSS version 27.0. Exploratory Factor Analysis (EFA) was employed to examine the underlying factor structure of the stress management competency instrument. The suitability of the data for factor analysis was assessed using the Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy and Bartlett's Test of Sphericity. Principal Component Analysis (PCA) with Varimax rotation was applied to identify the latent dimensions of principals' stress management competencies and to refine the instrument by retaining items with acceptable factor loadings and clear factor structure.

Instrument

Stress management competency refers to a leader's ability to recognize, manage, and respond effectively to work-related stress while maintaining a positive and productive work environment (Yarker et al., 2008; Hassi & Storti, 2021). In this study, principals' stress management competencies were assessed using the *Stress Management Competency Indicator Tool* (SMCIT) developed by Yarker et al. (2008), based on teachers' perceptions. The instrument comprises four core dimensions: respectful and responsible behavior, managing and communicating current and future work, reasoning and managing difficult situations, and managing individuals within the team, which collectively represent key leadership behaviors associated with effective stress management in organizations (Yarker et al., 2008).

To ensure contextual relevance, selected items and terminology in the SMCIT were adapted to reflect the socio-cultural context and organizational realities of Malaysian secondary schools in Sarawak. Contextual adaptation of established psychometric instruments is essential to enhance cultural appropriateness, content validity, and the accuracy of data interpretation (Rubio et al., 2003; Hassi & Storti, 2021).

The content validity of the adapted instrument was evaluated by seven experts using the Item Content Validity Index (I-CVI) and the Scale Content Validity Index/Average (S-CVI/Ave),

following the procedures recommended by Lynn (1986) and Polit, Beck, and Owen (2007). The I-CVI values for all items ranged from 0.71 to 1.00, with ten items scoring below the recommended threshold of 0.83 revised based on expert feedback. The S-CVI/Ave values for each dimension ranged from 0.84 to 0.97, while the overall S-CVI/Ave of the instrument was 0.92, exceeding the minimum recommended value of 0.80. These findings indicate that the instrument demonstrates strong content validity and is suitable for use in subsequent analyses and field studies (Polit et al., 2007).

Exploratory Factor Analysis (EFA) Procedure

Exploratory Factor Analysis (EFA) was employed to examine the underlying factor structure of the questionnaire items and to assess the relationships among items measuring the studied construct (Al-Edenat, 2018; Wesam Ali, 2018). The primary purpose of EFA is to determine whether the items cluster into meaningful, valid, and reliable factors representing the intended construct. This technique also facilitates the identification of the most appropriate items for each factor and the elimination of items that do not adequately measure the construct under investigation (Sekaran & Bougie, 2009). In this study, EFA was conducted through a series of systematic procedures to ensure construct validity and reliability. Prior to factor extraction, the suitability of the data for factor analysis was assessed using Bartlett's Test of Sphericity and the Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy. A statistically significant Bartlett's Test ($p < 0.05$) indicates that the correlation matrix is appropriate for factor analysis, while KMO values exceeding 0.60 suggest acceptable sampling adequacy, with values above 0.80 indicating very good adequacy (Hair et al., 2015). Factor extraction was performed using Principal Component Analysis (PCA) to identify the number of underlying factors. Factors were retained based on the eigenvalue-greater-than-one criterion, indicating that the factor accounted for a meaningful proportion of variance in the data. To enhance the interpretability of the factor structure, Varimax rotation was applied. This orthogonal rotation method maximizes the variance of factor loadings, thereby producing a clearer pattern of item–factor relationships and minimizing cross-loadings among factors. Item retention was determined based on a minimum factor loading of 0.50, as items with lower loadings may not contribute sufficiently to the measurement of the construct. Items exhibiting low factor loadings or substantial cross-loadings across multiple factors were considered for removal. Following factor extraction and item refinement, the resulting factor structure was evaluated for construct validity and internal consistency reliability, ensuring the suitability of the instrument for assessing stress management competencies among secondary school principals in Malaysian daily secondary schools (SMK Harian) in Sarawak.

Results

The measurement of principals' stress management competencies in this study employed an interval scale ranging from 1 (strongly disagree) to 10 (strongly agree) for each questionnaire item. This scale was selected to provide greater variability in participants' responses, thereby enhancing the instrument's sensitivity in capturing teachers' perceptions of their principals' stress management competencies (Majid et al., 2019; Zainudin, 2015; Awang & Baharu, 2018).

Descriptive statistics were used to summarize and examine the distribution of teachers' responses for each item. The mean scores and standard deviations for all items are presented in Table 1, providing an overview of the perceived levels of principals' stress management

competencies across the sampled schools. These descriptive results served as a preliminary assessment of the data and informed subsequent Exploratory Factor Analysis (EFA) for construct validation.

Table 1
Descriptive Statistics for Items Measuring Principals' Stress Management Competencies

Dimension / Category	Item Statement	Mean	Std. Deviation
Integrity	Serves as a good role model	8.20	1.352
	Treats teachers with respect	8.39	1.355
	Honest	8.35	1.325
	Fulfills promises made	8.21	1.332
	Does not speak negatively about teachers	8.14	1.427
Managing Emotions	Acts calmly under pressure	8.12	1.429
	Consistent in management approach	8.07	1.409
	Emotional changes are predictable	7.38	1.792
	Does not release stress onto teachers	7.86	1.629
	Completes tasks calmly approaching deadlines	7.94	1.499
	Welcomes improvement suggestions from teachers	8.11	1.476
Work Planning & Autonomy	Allows teachers to plan their workload	7.85	1.562
	Sets realistic deadlines for task submission	8.37	1.281
	Provides positive feedback/input	8.18	1.295
	Handles problems independently	7.81	1.383
	Allows teachers to perform tasks in their own way	7.91	1.368
	Shows concern for teachers' work-life balance	8.07	1.317
Work Communication & Monitoring	Communicates task objectives clearly to teachers	8.36	1.252
	Develops school action plans systematically	8.28	1.315
	Monitors teachers' workload continuously	7.88	1.366
	Encourages teachers to review/improve their work processes	8.20	1.276
	Stops additional tasks assigned to teachers when necessary	7.51	1.510
	Works proactively	8.29	1.277
	Monitors school activities until completion	8.35	1.282
	Reviews work processes to identify areas for improvement	8.15	1.298
	Concerned about current teacher workload	7.81	1.424
Problem-Solving & Decision Making	Acts rationally in problem situations	8.07	1.352
	Follows up on teacher-related issues	8.07	1.328
	Handles problems promptly	8.16	1.347
	Makes firm decisions	8.39	1.310
Teacher Support & Mentorship	Assigns appropriate responsibility levels	7.97	1.387
	Determines suitable time to discuss with teachers	8.02	1.367

	Ensures teachers are aware of school activities	8.27	1.279
	Acts as a mentor to teachers	8.10	1.425
	Assigns tasks/positions fairly	7.78	1.484
	Provides guidance to help teachers perform optimally	8.01	1.330
	Encourages teachers to participate in all school activities	8.30	1.291
	Holds regular meetings/briefings with teachers	8.51	1.382
	Disseminates school goals, mission, and vision thoroughly	8.48	1.318
Communication Preference	Prefers face-to-face communication over phone/WhatsApp/email	8.24	1.338
	Provides opportunities for teachers to share ideas regularly	8.07	1.345
	Responds promptly to teachers' messages	8.20	1.384
	Willing to discuss with teachers when needed	8.38	1.358
Social Interaction	Shares snacks (potluck) to build camaraderie	7.36	1.698
	Spends time with teachers to build quality relationships	7.69	1.499
	Friendly personality	8.28	1.411
Teacher Engagement & Motivation	Welcomes teachers' opinions in discussions/meetings	8.15	1.495
	Listens to teachers' problems requiring assistance	8.15	1.432
	Motivates teachers in fulfilling responsibilities	8.25	1.377
	Attempts to see things from teachers' perspective	8.04	1.454
	Aware of teachers' activities outside school hours	7.38	1.709
	Regularly asks about teachers' well-being	7.68	1.616
	Treats all teachers fairly	7.87	1.577
	Cares about teachers' health and safety	7.97	1.513
Conflict Management	Acts as mediator in teacher conflicts	7.69	1.468
	Resolves misunderstandings before escalating	7.76	1.468
	Handles teacher conflicts objectively	7.81	1.447
	Continuously manages teacher conflicts	7.79	1.420
	Resolves issues to maintain harmony	7.94	1.379
External Support	Seeks advice from senior staff when needed	8.32	1.458
	Refers to authorities (PPD/JPN/KPM) for assistance	8.36	1.393
	Seeks help from health professionals when needed	8.10	1.430
Follow-up & Responsibility	Follows up on conflict resolution	7.84	1.459
	Supports teachers with personal/family/health issues	8.07	1.375
	Clearly takes full responsibility for mistakes	7.56	1.625
	Continuously manages bullying issues	8.05	1.431

Bartlett's Test and KMO Value

The analysis results presented in Table 2 indicate that Bartlett's Test of Sphericity is highly significant (sig. = 0.000), demonstrating that the data exhibit sufficient correlations for factor analysis to be conducted. Additionally, the Kaiser-Meyer-Olkin (KMO) sampling adequacy test recorded a value of 0.916, which is categorized as excellent, as it exceeds the minimum recommended threshold of 0.6 in the literature (Mahadzirah et al., 2019; Bahkia, Awang, Afthanorhan, Ghazali, & Foziah, 2019; Hoque et al., 2018). These two key findings indicate that the collected data are adequate for proceeding with the EFA procedure, thereby allowing for a more systematic and effective data reduction process. Consequently, each factor identified through EFA can more accurately represent the dimensions of teacher work stress within the context of this study (A. Hoque et al., 2017; Hoque et al., 2018; Noor, Aziz, Mostapa, & Awang, 2015; Yahaya, Idris, Suandi, & Ismail, 2018).

Table 2
Bartlett's Test and KMO Value

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.969
Bartlett's Test of Sphericity	Approx. Chi-Square	10523.585
	df	703
	Sig.	.000

The Components and Total Variance Explained

Table 3 presents the results of the Principal Component Analysis (PCA) for the construct under study. Based on the Kaiser criterion (eigenvalues greater than 1.0), three components were retained. The eigenvalues for these components were 26.036, 1.976, and 1.611, respectively. The first component accounted for 68.517% of the total variance, followed by the second component which explained 5.201%, and the third component which contributed 4.240%. Collectively, these three components explained 77.958% of the total variance, indicating a substantial amount of shared variance among the items. This cumulative variance exceeds the minimum threshold of 60% recommended for social science research (Bahkia et al., 2019; Hoque et al., 2017; Yahaya et al., 2018), thereby demonstrating that the construct possesses adequate factorial structure, stability, and construct validity. The high proportion of variance explained further suggests that the extracted components effectively represent the underlying dimensions of the construct.

Table 3
The Total Variance Explained

Total Variance Explained									
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	26.036	68.517	68.517	26.036	68.517	68.517	10.850	28.552	28.552
2	1.976	5.201	73.718	1.976	5.201	73.718	10.015	26.356	54.908
3	1.611	4.240	77.958	1.611	4.240	77.958	8.759	23.050	77.958
4	.826	2.174	80.133						
5	.711	1.870	82.003						
6	.585	1.539	83.541						
7	.521	1.371	84.912						
8	.479	1.261	86.173						
9	.408	1.074	87.247						
10	.378	.996	88.243						
Extraction Method: Principal Component Analysis									

Table 4 presents the results of the rotated component matrix obtained through Principal Component Analysis (PCA) using Varimax rotation with Kaiser normalization. Based on the extraction results, three components were retained, consistent with the eigenvalue criterion (eigenvalues > 1.0) reported in Table 3. To ensure the validity and effectiveness of the measurement items, only items with factor loadings of 0.50 and above were retained for interpretation. This threshold is widely recommended in multivariate analysis literature to ensure a clear factor structure and adequate construct representation (Hair et al., 2022; Tabachnick & Fidell, 2019; Zainudin, 2021). The rotated solution demonstrates a clean and interpretable component structure, where all retained items load strongly onto a single component without substantial cross-loadings. Specifically, factor loadings range from 0.581 to 0.829, exceeding the minimum acceptable threshold and indicating strong associations between the items and their respective components. Overall, the findings suggest that the retained components exhibit good factorial validity, and the item distribution supports the underlying dimensional structure of the construct. Therefore, all items presented in Table 4 are considered suitable for further analysis.

Table 4
The Number of Components

Rotated Component Matrix[a]			
	Component		
	1	2	3
KPTi1			.725
KPTi2			.765
KPTi3			.803
KPTi4			.737
KPTi5			.703
KPTme1			.725
KPTme2			.581
KPTme4			.728
KPTme5			.618
KPTme6			.642
KPTpkp1	.677		
KPTpkp2	.708		
KPTpkp4	.604		
KPTpkp6	.745		
KPTpkp7	.759		
KPTpkp8	.704		
KPTpm2	.614		
KPTpm3	.692		
KPTpm4	.768		
KPTpk1	.614		
KPTpk3	.741		
KPTpk4	.609		
KPTpk6	.607		
KPTpk7	.740		
KPTpk8	.768		
KPTpk9	.767		
KPTpe6		.717	
KPTpe7		.718	
KPTpe8		.724	
KPTmk1		.773	
KPTmk2		.829	
KPTmk3		.782	
KPTmk4		.781	
KPTmk5		.747	
KPTmtmi1		.729	
KPTmtmi2		.636	
KPTmtmi3		.699	

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.[a]
a. Rotation converged in 8 iterations.

Figure 1 presents the scree plot derived from the Principal Component Analysis (PCA), illustrating the eigenvalues associated with each component. The plot shows that the first component has a very large eigenvalue (approximately 26), followed by a steep decline to the second and third components, whose eigenvalues are slightly above 1.0. After the third component, the curve begins to flatten considerably, with subsequent components exhibiting

eigenvalues below 1.0 and contributing minimal additional variance. This clear change in slope indicates the presence of an "elbow" at the third component, beyond which the eigenvalues level off and form a relatively straight line. According to Kaiser's criterion (Kaiser, 1960), only components with eigenvalues greater than 1.0 should be retained. In line with this criterion and supported by the elbow method, the scree plot provides strong empirical justification for retaining three components. Therefore, the scree plot confirms that three principal components are sufficient to explain the underlying structure of the data, while additional components contribute negligibly and are not retained for further analysis.

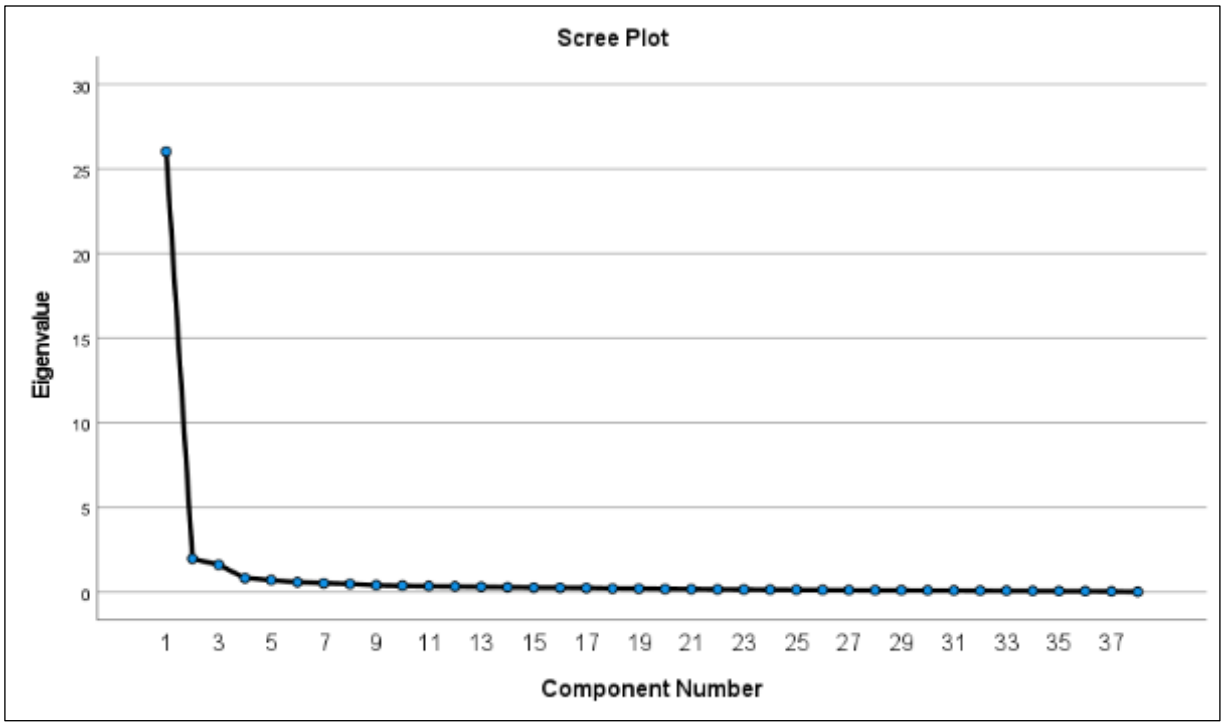

Figure 1: Three Components Extraction

Internal Reliability

To ensure the reliability of the instrument in measuring the construct of Stress Management Competencies, this study assessed internal consistency using Cronbach's Alpha for each extracted component. Internal reliability is a crucial indicator of the consistency of items within a construct, and a Cronbach's Alpha value of 0.70 or higher is generally considered acceptable for social science research (Rahlin et al., 2019). As shown in Table 5, the reliability analysis was conducted for the three components extracted through Principal Component Analysis. The Cronbach's Alpha values for the three components range from 0.967 to 0.979, indicating excellent internal consistency for each component. Specifically, Component 1 recorded a Cronbach's Alpha of 0.979, followed by Component 2 (0.974) and Component 3 (0.967).

In addition, the overall Cronbach's Alpha value for the full set of 37 items measuring Stress Management Competencies is 0.987, reflecting a very high level of internal reliability. These findings indicate that the items within each component consistently measure the same underlying dimensions of stress management competencies.

Table 5
The Cronbach' Alpha for Internal Reliability

Nilai Kebolehpercayaan (*Cronbach*)		
Komponen	Bil. Item	Cronbach
1	16	0.979
2	11	0.974
3	10	0.967
Total	37	0.987

Conclusion

The present study aimed to develop and validate an instrument for measuring stress management competencies among secondary school principals in Sarawak based on teachers' perceptions. The Exploratory Factor Analysis (EFA) results supported a three-factor structure comprising 37 items, demonstrating strong construct validity and excellent internal consistency reliability. These findings provide important theoretical and practical insights into stress management competencies as a core leadership capability in school settings, particularly in contexts characterised by high job demands and increasing psychosocial pressures on teachers (Skaalvik & Skaalvik, 2023; Choi et al., 2023).

From a theoretical standpoint, the extracted dimensions align closely with the Job Demands–Resources (JDR) model, which conceptualises leadership behaviours as critical organisational resources that buffer the negative effects of excessive job demands on employees' well-being and performance (Bakker & Demerouti, 2017; Lesener et al., 2020). The high proportion of variance explained by the three components indicates that principals' stress management competencies represent a coherent and meaningful construct that captures how leadership behaviours shape teachers' stress experiences. Principals who demonstrate emotional regulation, effective communication, problem-solving skills, and supportive interpersonal behaviours can mitigate stressors related to workload, role ambiguity, and interpersonal conflict, thereby enhancing teachers' psychological well-being and work engagement (Harms et al., 2021; Wang et al., 2023).

The findings also resonate strongly with Social Cognitive Theory (SCT), which emphasises the role of leaders as social models who influence employees' beliefs, coping strategies, and emotional responses through observational learning and social interaction (Bandura, 2001; Luthans & Youssef-Morgan, 2022). Principals who manage stress effectively model adaptive coping behaviours, fostering teachers' self-efficacy in handling work-related challenges. Prior studies have shown that leadership behaviours characterised by emotional stability and supportive communication positively influence teachers' coping capacity and resilience, reinforcing the socially transmitted nature of stress management competence within schools (Avolio et al., 2021; Burić & Kim, 2021).

Limitations and Future Studies

The emergence of three distinct yet interrelated dimensions suggests that stress management competence in school leadership is a multidimensional construct, rather than a single behavioural domain. This finding extends existing leadership literature, which has predominantly examined leadership styles such as transformational or authentic leadership without explicitly isolating stress management as a measurable competency (Gardner et al.,

2021; Alilyyani et al., 2022). By validating a dedicated instrument, this study contributes to educational leadership theory by positioning stress management competence as a distinct yet complementary construct that enhances existing leadership frameworks.

Importantly, the high internal consistency values obtained in this study indicate strong conceptual coherence among the retained items. While very high reliability coefficients may raise concerns regarding item redundancy, previous instrument validation research suggests that such values are acceptable when items capture closely related leadership behaviours within complex organisational environments such as schools (Hair et al., 2022; Kline, 2023). In this context, the high reliability reflects the integrated nature of leadership behaviours required to manage stress effectively rather than measurement overlap.

Empirically, this study addresses a significant gap in the Malaysian educational leadership literature, particularly in Sarawak, where contextual challenges such as geographical dispersion, diverse school environments, and resource constraints may intensify leadership demands and teacher stress (Shamsuddin & Abdullah, 2022; Hassan et al., 2023). Most existing Malaysian studies have focused on teacher stress outcomes or general leadership practices, with limited attention given to principals' stress management competencies as an organisational-level construct. The validated instrument therefore offers a contextually relevant tool for assessing principals' stress management competencies in daily secondary schools (SMK Harian), supporting more systematic leadership evaluation and development.

Practically, the validated instrument can be utilised by policymakers, school administrators, and leadership training providers to diagnose strengths and gaps in principals' stress management competencies, inform targeted leadership development programmes, and support early intervention strategies to mitigate teacher work stress. Evidence-based leadership development initiatives grounded in validated measurement tools have been shown to enhance school climate, teacher well-being, and organisational sustainability (Kelloway et al., 2021; Inceoglu et al., 2022). By providing a psychometrically sound measurement framework, this study supports the development of healthier and more sustainable school leadership practices within Malaysian secondary schools.

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Authors' Contribution
1. Mohd Rosdan Mohamed: Investigation, Data Collection, Data management, Conceptualization, Methodology, Formal Analysis, Writing - Original Draft, Project Administration.
2. Marinah Awang: Supervision, Project Administration, Writing - Review & Editing.

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