International Journal of Evaluation and Research in Education (IJERE)
Vol. 14, No. 5, October 2025, pp. 3824~3837
ISSN: 2252-8822, DOI: 10.11591/ijere.v14i5.32369

The PERMA well-being scale assessment in undergraduate students: confirmatory factor analysis and network analysis

Phamornpun Yurayat[1], Bovornpot Choomphunuch[1], Wipanee Suk-erb[1], Dussadee Lebkhao[1], Khanitin Jornkokgoud[2]
[1]Department of Educational Psychology and Guidance, Faculty of Education, Mahasarakham University, Maha Sarakham, Thailand
[2]Department of Psychology and Cognitive Science, University of Trento, Rovereto, Italy

Article Info

Article history:

Received Aug 8, 2024
Revised Jun 23, 2025
Accepted Jul 11, 2025

Keywords:

Confirmatory factor analysis
Happiness
Network analysis
PERMA
Structural validity
Well-being

ABSTRACT

The mental health issues among undergraduate students have become increasingly recognized as a pressing concern, often impacting their overall well-being over time. Despite escalating scholarly attention to students' well-being, a significant gap persists in theoretical frameworks and measurement instruments with established benchmarks, remarkably those applicable to the Thai context. This study aims to develop and validate a contextually appropriate well-being instrument for Thai university students, grounded in the PERMA model, which examines five dimensions: positive emotion, engagement, relationships, meaning, and accomplishment. A multistage sampling approach was utilized to enlist 1,080 participants for an online questionnaire incorporating the PERMA well-being scale. The data were examined through confirmatory factor analysis (CFA) and network analysis to assess the structural validity and inter-item correlations. Results from the second-order CFA yielded an excellent model fit with a root mean square error of approximation (RMSEA) of 0.013, with all the constructs significant at $p<0.001$. In addition, network analysis showed the centrality within constructs. The findings revealed that the PERMA model was indicative of Thai university students' well-being exhibited robust internal consistency, and significant intra-construct correlations. This contextually relevant instrument yielded valuable insightful information for educators and policymakers in Thailand. This could thus help shape strategies to evaluate and improve student well-being.

Corresponding Author:

Bovornpot Choomphunuch
Department of Educational Psychology and Guidance, Faculty of Education, Mahasarakham University
Talad, Muang, Maha Sarakham 44000, Thailand
Email: bovornpot.c@msu.ac.th

1. INTRODUCTION

Well-being constitutes a multidimensional construct encompassing various aspects of an individual's mental, physical, and social health. In educational contexts, it profoundly impacts students' academic performance and social engagement [1]. Enhanced well-being among students is strongly linked to superior academic outcomes, personal growth, and an elevated quality of life [2], [3]. Furthermore, heightened levels of well-being are closely associated with increased resilience to stress, improved mental health, and the formation of more robust social connections [4]–[7]. Nonetheless, attaining optimal well-being presents significant challenges, particularly for undergraduate students who frequently contend with mental health issues, including anxiety, stress, and depression. Students exhibiting higher levels of well-being tend to demonstrate greater engagement and motivation, which, in turn, substantially contributes to their academic success [8], [9].

To gain deeper insight into these advantages, well-being is often divided into two key categories: hedonic and eudaimonic dimensions, each reflecting distinct dimensions of human flourishing. Hedonic and eudaimonic well-being represent the two fundamental dimensions through which well-being is traditionally conceptualized. Hedonic well-being prioritizes pleasure, satisfaction, and the absence of discomfort, while eudaimonic well-being emphasizes the pursuit of a meaningful life aligned with one's values and potential. The global interest in well-being has precipitated the development of frameworks such as PERMA, which integrates both hedonic and eudaimonic aspects to present a holistic model for understanding well-being through five essential components: positive emotion (PE), engagement (EN), relationships (RL), meaning (MN), and accomplishment (AC) [3], [10], [11]. The application of the PERMA model within university settings highlights the need for institutions to nurture well-being across critical areas—classroom, social networks, faculty, and the local community—by promoting the core elements of PERMA [12].

Although PERMA-based instruments have been validated across various cultural contexts [2], [13]–[15], a plurality of research has been confined to Western settings [10], [12], [14], [16], with relatively limited exploration in Eastern contexts [15], [17]. There remains a critical need to investigate well-being through a culturally nuanced lens, particularly in Asian contexts, where collectivist values underscore the significance of relationships, family bonds, and social support. Previous research has highlighted that Asian Americans typically foster strong familial connections, shaped by collectivist cultural principles and a dedication to meeting familial expectations—particularly a pronounced focus on educational success and upward social mobility [18]. There remains an urgent need to examine well-being through a culturally informed perspective, especially in Asian contexts, where collectivist ideals emphasize the importance of relationships, familial ties, and social networks [18]. A noteworthy gap persists in the creation of a culturally tailored instrument designed to address the unique experiences of Thai university students. Thai students encounter distinctive cultural and academic challenges, underscoring the necessity for a context-sensitive measure of well-being [19]. Therefore, this study aims to develop and validate a PERMA-based well-being scale customized for this demographic, capturing both hedonic and eudaimonic aspects of well-being within the Thai cultural framework [20].

This study sets out to develop and validate a culturally tailored well-being instrument for Thai university students, rooted in the PERMA framework. By utilizing confirmatory factor analysis (CFA), we aim to establish the structural validity of the theoretical foundations of PERMA—an approach that has consistently demonstrated robustness in assessing well-being among students in prior studies [10], [14]–[16]. These studies employ CFA in PERMA measurements, reinforcing its validity. Moreover, network analysis serves as an innovative alternative, which provided critical insights into the interconnections and centrality of individual components within the comprehensive framework of well-being [21], [22]. This method presents a unique strength by revealing data patterns through distinctive visualization techniques. Unlike conventional factor analysis, which primarily interprets factor loadings and correlations, the network approach calculates supplementary summary indices, such as centrality indices derived from partial correlations, thereby simplifying and enhancing the interpretation of relationships among variables [23].

This study addresses a critical gap in the literature by developing and validating a well-being assessment framework designed for Thai students. It incorporated cultural values and contextual factors distinct to Thailand. It seeks to answer two key questions:

i) Does the hypothesized PERMA model effectively reflect the Thai sociocultural context?
ii) What are the interconnections among its components within this demographic?

The distinctiveness of this research lies in its dual methodological approach, utilizing both CFA to validate the PERMA constructs and network analysis to examine their interconnections, thereby ensuring greater robustness in measurement. The potential of this research to assist educators and policymakers in developing culturally appropriate measures to improve student well-being underscores its importance. The findings aim to contribute to sustainable educational and societal benefits by fostering a more inclusive and supportive learning environment, ensuring that interventions better address the needs and life experiences of Thai students.

2. METHOD

2.1. Research design

This study employed a survey research approach as articulated by Creswell [24]. A cross-sectional survey design was chosen as it is a quantitative research method that involves collecting data from a representative sample or the entire population, aligning effectively with the study's aim.

2.2. Participants and procedures

The study utilized a survey design to examine the PERMA well-being framework among undergraduate students in Northeastern Thailand. The sample comprised students from higher education

institutions under the Commission on Higher Education in the Northeastern Region. A multistage sampling technique was employed to recruit participants. In the first stage, six universities in the Northeastern region were randomly selected: i) Mahasarakham University; ii) Khon Kaen University; iii) Ubon Ratchathani University; iv) Nakhon Ratchasima Rajabhat University; v) Roi Et Rajabhat University; and vi) College of Asian Scholars. In the second stage, individual participants from these universities were randomly drawn.

A sample of 1,080 students was deemed sufficient for reliable results in the CFA, aligning with Comrey and Lee [25] assertion that a sample size of 1,000 or more is considered exceptional. This sample included a diverse demographic of first- to fourth-year bachelor's degree students during the 2024 (BE 2567) academic year. Among the participants, 818 were female (75.7%), and 262 were male (24.3%). The academic year distribution included 374 first-year students (34.6%), 515 second-year students (47.7%), 125 third-year students (11.6%), and 66 fourth-year students (6.1%), as shown in Table 1. This diversity ensures a comprehensive view of students at various stages in their academic journey.

To encourage voluntary participation, data collection was conducted during lecture hours to minimize interference with students' schedules. The researcher personally visited each university to distribute the PERMA well-being scale to students. Comprehensive instructions on completing the questionnaire were provided, and the researcher was available to address any questions, ensuring clear comprehension. Students were informed of their right to withdraw at any time to prioritize their comfort and autonomy.

Table 1. Participant demographic profile (n=1,080)

Variables	Category	No.	%
University	Mahasarakham University	180	16.67
	Khon Kaen University	180	16.67
	Ubon Ratchathani University	180	16.67
	Nakhon Ratchasima Rajabhat University	180	16.67
	Roi Et Rajabhat University	180	16.67
	College of Asian Scholars	180	16.67
Gender	Male	262	24.3
	Female	818	75.7
Year	First-year	374	34.6
	Second-year	515	47.7
	Third-year	125	11.6
	Fourth-year	66	6.1

2.3. Research instrument

The instrument used in this study was the PERMA well-being scale as mentioned earlier. In this study, the researcher further designed for higher education institutions in Northeastern Thailand, following Seligman's PERMA model. This scale of this PERMA model evaluates five multifaceted dimensions of well-being, which are PE, EN, RL, MN, and AC. The PERMA well-being scale comprised 15 items overall, with each dimension consisting of three items. The scale employs a five-point Likert scale, ranging from strongly disagree (1) to strongly agree (5). The questionnaire also incorporated some further details; there are two parts: i) part 1, demographic information questions aimed at collecting demographic data of the participants; and ii) part 2, PERMA well-being questions assessing students' well-being across the five domains of the PERMA model. In addition, the number of items for each factor in the PERMA well-being scale is detailed in Table 2.

2.4. Data collection

The researchers secured formal authorization from the respective institutions to proceed with data collection. Data collection was performed following the receipt of authorization from the educational institutions. Regarding the selection criteria, participants were required to be at least 18 years old and currently enrolled as undergraduate students. The survey was administered through Google Forms, where participants were provided with detailed information about the objectives and significance of the research, alongside clear explanations of the ethical considerations and the process for obtaining informed consent. Those who fully understood and agreed to these conditions provided their consent and proceeded to complete the PERMA well-being questionnaire.

The data collection was conducted between March 2024 and July 2024. The survey required approximately 15 to 20 minutes to complete. Initially, responses were gathered from 1,301 participants. Following a thorough data verification process to ensure the accuracy of responses and the removal of any anomalous data points, the final dataset comprised 1,080 participants.

2.5. Statistical analyses

To suit the research design, the proper statistical tools were carefully chosen. The researcher thus conducted the data analysis using CFA to assess the fit of the structural model of the PERMA well-being scale for students, based on the conceptual framework and empirical data. The parameter estimation was performed using the maximum likelihood (ML) method. The model fit was evaluated according to several criteria: a non-significant chi-square value ($p>0.05$), comparative fit index (CFI), goodness-of-fit index (GFI), Tucker-Lewis's index (TLI), and adjusted goodness-of-fit index (AGFI) greater than 0.90, as well as a root mean square residual (SRMR) and root mean square error of approximation (RMSEA) less than 0.05 [26]. Descriptive analytics and CFA were performed using the Lavaan R package (version 0.6–18) in RStudio (version 2023.2.1) [27].

In addition to CFA, network analysis was employed to further examine the PERMA well-being structure. The analysis was conducted using Jeffreys' Amazing Statistics Program (JASP) version 0.16.2 [28]. JASP is a freely available statistics software that is designed for ease of use. Network analysis allows researchers to visually explore the structural composition of variables within a network. The observed entities (in this case, objects) are referred to as nodes, while the inferred connections between these nodes are referred to as edges [28]. The estimator, a partial correlation (concentration graph), shows edges as connections between nodes, reflecting correlations not explained by other variables in the system, as suggested by Leme *et al.* [29]. Network plots, weight matrices, centrality plots, and centrality tables are among the key outputs required for analysis [28]. The centrality option generates a network structure as a visual plot and numerical table, providing three key metrics: betweenness (a node's role in information flow), closeness (a node's reachability within the network), and strength (a node's direct influence based on edge weight) [30].

3. RESULTS AND DISCUSSION

3.1. Factors of the PERMA well-being scale for students

The descriptive statistics, including the mean and standard deviation (SD) for the latent variables and indicators outlined in the study, are presented in Table 2. Among participants, the highest mean score was observed for MN, with EN closely following, reflecting strong agreement on its importance. The other variables—PE, RL, and AC—along with the total mean score of PERMA well-being, were all classified as "agree".

Table 2. Factors of the PERMA well-being scale for students

Constructs	Items	Indicators	Mean	SD	Level
PE	3		3.853	0.697	Agree
		PE1-Happiness	3.932	0.856	
		PE2-Life satisfaction	3.817	0.846	
		PE5-Optimism	3.810	0.830	
EN	3		4.332	0.597	SA
		EN10-Absorption	4.217	0.803	
		EN11-Flow experience	4.579	0.626	
		EN12-Dedication	4.201	0.786	
RL	3		3.678	0.672	Agree
		RL16-Being entrusted	3.523	0.855	
		RL17-Being loved	3.858	0.859	
		RL18-Being supported	3.654	0.758	
MN	3		4.410	0.597	SA
		MN21-Self-esteem	3.887	0.972	
		MN22-Value in life	3.983	0.867	
		MN23-Altruism	3.553	1.005	
AC	3		3.808	0.813	Agree
		AC27-Goal progress	4.209	0.798	
		AC28-A sense of competence	4.477	0.687	
		AC29-Goal achievement	4.543	0.695	
PERMA well-being	15		4.016	0.502	Agree

The interpretation of mean scores: 4.21-5.00: strongly agree (SA), 3.41-4.20: agree, 2.61-3.40: neutral, 1.81-2.60: disagree, 1.00-1.80: strongly disagree

3.2. Reliability and validity

The PERMA model, comprising 15 items equally distributed across five dimensions, was found to be highly suitable for factor analysis with a Kaiser-Meyer-Olkin (KMO) measure of 0.89, indicating high sampling adequacy. Bartlett's test of sphericity ($\chi^2(105)=6{,}069.61$, $p<0.001$) validated that the variables were sufficiently interrelated for meaningful factor analysis. Reliability analyses produced satisfactory results

across all dimensions. Cronbach's alpha values, which assess internal consistency, were as: PE=0.767, EN=0.725, RL=0.745, MN=0.756, and AC=0.818. These values demonstrate acceptable to good reliability, supporting the internal consistency of items within each dimension. Composite reliability, which considers the reliability of latent variables, also reflected appropriate levels: PE=0.748, EG=0.733, RL=0.711, MN=0.783, and AC=0.832. These results confirm that the items robustly measure their respective dimensions, ensuring a strong representation of the PERMA model's structure.

The PERMA scale exhibited strong validity across multiple measures. Convergent validity was affirmed for most dimensions, with the average variance extracted (AVE) values for PE, MN, and AC meeting the threshold of 0.50, although EN and RL fell slightly below this benchmark. Discriminant validity was confirmed, as the square root of AVE for each dimension exceeded its correlations with other dimensions (0.672–0.789), indicating clear construct distinctions.

3.3. PERMA well-being scale validation with structural equation models

The researchers conducted a verification process to assess the consistency between the researcher-generated PERMA well-being model for students and the empirical data collected. For so doing, this evaluation was critical in determining whether the hypothesized model accurately represented the well-being dimensions as experienced by students. In this study, structural equation modeling (SEM) was employed. The researchers analyzed the indicators for each PERMA dimension, including PE, EN, RL, MN, and AC, so as to affirm alignment with the observed data. The results of this analysis are reported in Table 3, which notes the level of agreement between the model and the empirical findings.

As shown in Table 3, the model exhibited an excellent fit with $\chi^2/df=1.217$, CFI=0.998>0.9, TLI=0.997>0.9, GFI=0.991>0.9, AGFI=0.983>0.9, RMSEA=0.013<0.05, and SRMR=0.016<0.05. These values satisfied the specified criteria as outlined in the study by McDonald and Ho [26]. Not only did they meet these criteria, but the results of the CFA also validated that the PERMA model is a valid and reliable framework for assessing the well-being of university students. The strong fit indices indicate that the dataset adequately captures the five elements of the PERMA model, as illustrated in Table 4 and Figure 1.

Table 3. Conformity and comparative index of the PERMA well-being model of students (n=1,080)

Index	Criterion	Statistical values in the model
χ^2	Not statistically significant, or proportion of χ^2/df not more than 2.000	χ^2=71.401, df=60, p=0.149 χ^2/df 71.401/60=1.217
CFI	Greater than 0.900	0.998
GFI	Greater than 0.900	0.991
TLI	Greater than 0.900	0.997
AGFI	Greater than 0.900	0.983
SRMR	Less than 0.050	0.016
RMSEA	Less than 0.050	0.013

Table 4. Analysis of the confirmative elements of the PERMA well-being model of students (n=1,080)

The PERMA well-being model of students	Element weight value			t
	b	B	SE	
AC	1	0.794	-	-
MN	0.854	0.777	0.074	11.498**
PE	0.968	0.782	0.076	12.694**
RL	0.896	0.746	0.072	12.389**
EN	0.497	0.513	0.067	7.437**
PE5	1	0.791	-	-
PE2	0.855	0.686	0.052	16.353**
PE1	0.776	0.634	0.051	15.33**
EN12	1	0.676	-	-
EN11	0.864	0.736	0.053	16.255**
EN10	0.994	0.659	0.063	15.658**
RL17	1	0.771	-	-
RL18	0.825	0.633	0.064	12.975**
RL16	0.732	0.638	0.039	18.77**
MN21	1	0.756	-	-
MN22	0.68	0.589	0.052	13.197**
MN23	0.792	0.695	0.047	16.95**
AC29	1	0.686	-	-
AC28	1.099	0.778	0.077	14.292**
AC27	1.049	0.833	0.073	14.427**

χ2=71.401, df=60, p=0.149, CFI=0.998, TLI=0.997, GFI=0.991, AGFI=0.983, RMSEA=0.013, SRMR=0.016, **p<0.01

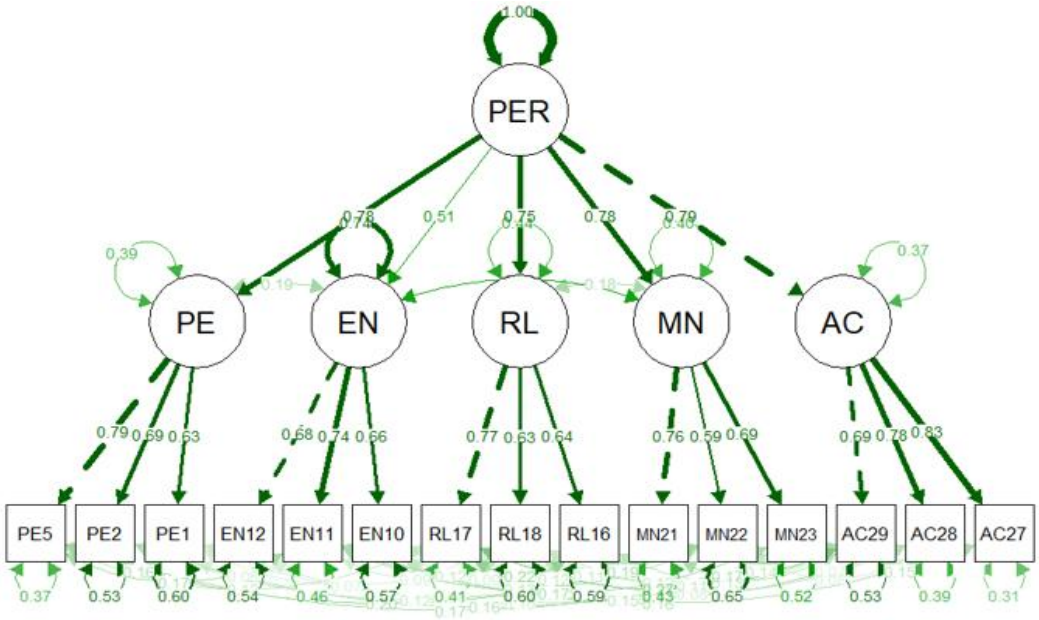


Figure 1. The PERMA well-being model of undergraduate students ($\chi 2$=71.401, df=60, p=0.149, CFI=0.998, TLI=0.997, GFI=0.991, AGFI=0.983, RMSEA=0.013, SRMR=0.016)

The CFA analysis further demonstrated that the PERMA well-being model of students had standardized component weights ranging from 0.51 to 0.79, with all elements and indicators being statistically significant at the 0.01 level. First, the AC dimension showed the highest standardized component weight of 0.79, indicating a high level of variation with the PERMA well-being model of students (98.00%). Second, both PE and MN exhibited a standardized component weight of 0.78, reflecting a high variation with the model (95.40%). The next component, RL, had a standardized component weight of 0.75, indicating moderate variation (75.60%) with the PERMA well-being model. Finally, EN registered the lowest standardized component weight of 0.51, representing moderate variation (34.30%) with the well-being model of students.

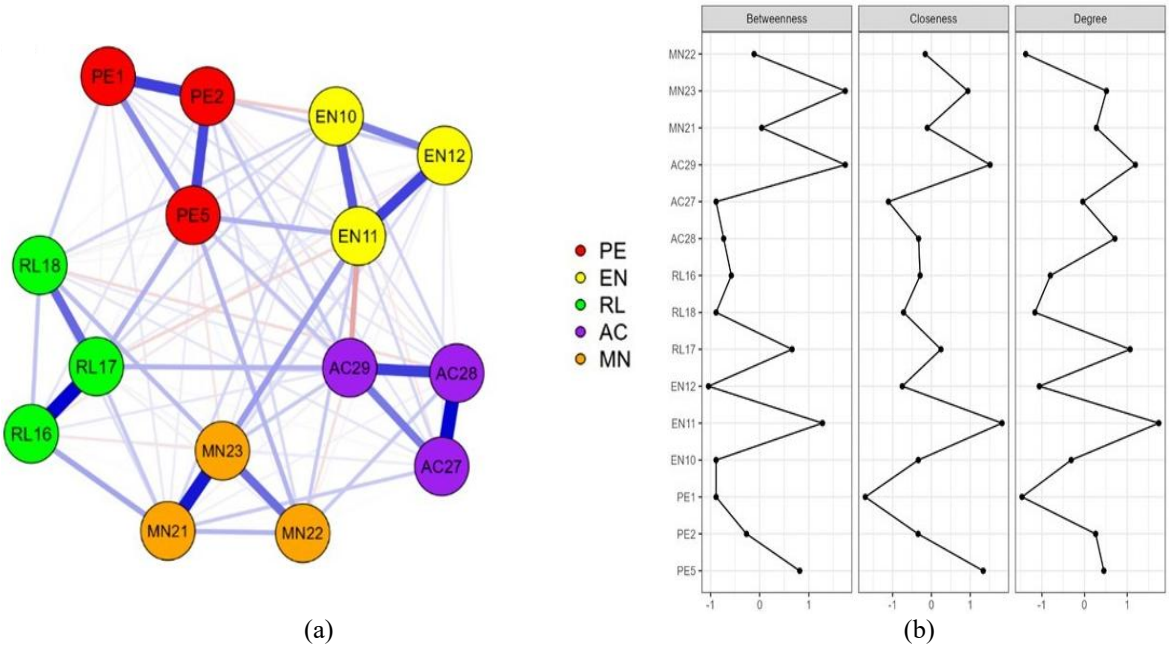
3.4. PERMA well-being scale measurement with a network model

The network analysis of the PERMA well-being model, as visualized in the provided figure, highlights the partial correlations among the items within each construct. The network graph uses node colors to differentiate the constructs and edge thickness to indicate the strength of correlations. The weight matrix between items in the network underscores significant partial correlations. The strongest correlations are observed within the same constructs, such as PE2 with PE1 (0.320), EN11 with EN12 (0.310), and RL16 with RL17 (0.420). Additionally, there are notable inter-construct relationships, such as AC28 with AC29 (0.320) and MN23 with MN22 (0.240). These correlations reflect strong internal consistency within constructs and meaningful connections between specific items across different constructs, as seen in Figure 2.

As shown in Figure 2(a), the network diagram consists of nodes representing various observed variables, grouped into five latent constructs. These constructs are differentiated by distinct colors for clarity. Each node represents an observed variable within its respective latent construct. The edges (lines connecting the nodes) represent partial correlations between the variables. The thickness and color intensity of the edges indicate the strength and direction of the correlations. Thicker edges denote stronger correlations. Blue edges indicate positive correlations, while red edges indicate negative correlations.

The centrality measures, including betweenness, closeness, and strength, for each variable within the network provide valuable insights into the importance and influence of each node. In the PE construct, PE5 stands out with high betweenness (0.810) and closeness (1.330), indicating its pivotal role as a mediator and its strong connections within the network. In contrast, PE1 and PE2 exhibit lower centrality values, suggesting they are more peripheral. The EN construct shows a clear distinction, with EN11 having exceptionally high centrality measures (betweenness: 1.280, closeness: 1.820, strength: 1.740), underscoring their critical role within the construct, while EN10 and EN12 have negative values, indicating lesser influence. Within the RL construct, RL17 is highly central, demonstrating significant betweenness (0.660), closeness (0.250), and strength (1.070), making it a key node, while RL18 and RL16 show lower centrality,

indicating a more peripheral position. In the AC construct, AC29 emerges as a crucial node with high centrality values (betweenness: 1.740, closeness: 1.510, strength: 1.190), whereas AC27 and AC28 have moderate to low centrality, reporting varied roles within the network. For the MN construct, MN23 displays higher centrality (betweenness: 1.740, closeness: 0.940, strength: 0.510), indicating its significant role, while MN21 and MN22 exhibit lower centrality values, pointing to a less influential position. High centrality nodes such as PE5, EN11, RL17, AC29, and MN23 are essential for maintaining the network's structure and are pivotal in their respective constructs. These nodes act as pivotal connectors, are well-integrated, and maintain robust relationships with other nodes, making them essential focal points for interventions aimed at supporting overall student well-being. Conversely, nodes with lower centrality, such as PE1, PE2, EN10, EN12, RL18, RL16, and MN22, are more peripheral and may require different strategies to improve their connectivity and influence within the network, as shown in Figure 2(b).



(a) (b)

Figure 2. Network structure and node centrality measures in the PERMA well-being model: (a) network diagram showing inter-item connections across five PERMA domains and (b) centrality plots indicating betweenness, closeness, and degree centralities for each node

3.5. Discussion

Mental health issues have long been prevalent among undergraduates, and evidence suggests that they can profoundly influence their overall well-being. Despite growing academic interest in these challenges, a significant gap remains in validated theoretical frameworks and measurement instruments specifically tailored to evaluate university student well-being, particularly within Thai culture. Employing both CFA and network analysis could allow us to validate the model and gain deeper insights into the indicators associated with each construct. Thus, our findings are further elaborated in the following sections.

The CFA of the PERMA well-being scale among Thai undergraduate students demonstrated that the model is consistent with empirical data, confirming the presence of five key components of student well-being: positive emotion, engagement, relationships, meaning, and accomplishment. The fit indices indicated an excellent model fit, validating the PERMA model as a valid and reliable framework for assessing university students' well-being. This finding aligns with previous research from various countries, including Italy [10], sub-Saharan Africa [13], China [15], Indonesia [17], Singapore [20], Turkey [31], Egypt [32], and Greece [33].

The findings indicate that AC holds the highest standardized component weight, underscoring its pivotal role within the well-being framework. This prominence likely originates from the inherent nature of AC, which encapsulates the ongoing motivation to achieve personal goals and attain a sense of fulfillment in life [34]. Rather than focusing solely on tangible successes, AC emphasizes intrinsic motivation and the cultivation of a resilient mindset [3]. This intrinsic drive is vital, as it not only fosters the achievement of

objectives but also motivates individuals to lead a fulfilling and prosperous life [35]. These findings are echoed by previous studies that have repeatedly identified AC as a significant predictor of well-being in both adult and student cohorts [12], [36]. A sense of achievement is closely tied to PE and life satisfaction, which highlights fundamental aspects of both subjective and psychological well-being [37]. By the same token, research conducted on students in the United Arab Emirates during the COVID-19 lockdown revealed a positive correlation between happiness and academic success [38].

Conversely, the EN factor within the PERMA model demonstrated weaker psychometric properties relative to other well-being indicators. In the realm of positive psychology, EN is defined by profound involvement and concentration in daily activities, commonly known as the "flow" state [3], [34]. This state allows individuals to maximize their interests and capabilities, as psychological EN is associated with heightened commitment and increased participation in academic activities [39]. Despite its theoretical importance, this study found low factor loadings for the EN component, a result consistent with prior research across diverse cultural settings, including Italy [10], Germany [11], Australia [40], Indonesia [41], the United States [42], [43], Greece [44], and Australia [45]. Such consistent results across both Western and Eastern contexts imply that the psychometric difficulties related to the EN dimension may be inherent to the construct itself, rather than shaped by cultural variations.

Nonetheless, the existing metrics within the PERMA model may not adequately capture the intricate and multifaceted nature of EN. In the context of positive psychology, EN encompasses psychological dimensions such as sustained attention, cognitive mechanisms like goal-setting and self-regulation, as well as behavioral aspects like active social participation [39]. The multidimensional nature of EN indicates that a more refined measurement approach is necessary. The current items may not fully reflect this complexity, potentially contributing to the lower reliability reported in both this study and previous research. In terms of future research, the researchers should further shed light on developing and validating more comprehensive EN metrics that include its various dimensions, together with improving the overall assessment of well-being [34], [46]. This could entail incorporating a wider landscape of indicators to cover both qualitative and quantitative measures and offer a more holistic and nuanced understanding of EN.

Regarding these observations, there is an evident need for deeper investigation into the conceptualization and measurement of EN within the PERMA framework. Future research should examine whether expanding the number of items or revising the current ones could improve the reliability and validity of the EN dimension. This could involve integrating elements that better reflect the various facets of EN, such as cognitive and behavioral components, to offer a more thorough understanding of this dimension concerning overall well-being.

The PERMA well-being network analysis confirmed the validity of each node, with the strongest correlations observed among variables within the same constructs. These correlations suggest robust internal consistency within the constructs. As a result, the correlation between life satisfaction (PE2) and happiness (PE1) illustrates the close connection between happiness and psychological well-being, underpinned by PE and life satisfaction, which play a pivotal role in fostering well-being and nurturing positive relationships and personal development [47], [48]. Moreover, the link between flow experience (EN11) and dedication (EN12) is vital for students' well-being [49]. Flow experiences boost intrinsic motivation, elevate PE, and foster psychological well-being by fully immersing students in challenging yet manageable tasks. Conversely, dedication promotes resilience, perseverance, and a sense of AC, effectively reducing stress. These elements collectively contribute to improved academic performance and enhanced well-being of students [49]. Lastly, trust (RL16) and love (RL17) are strongly correlated, with prior studies demonstrating that trust mediates various relationship types. For instance, research on adult attachment indicates that individuals with secure attachment styles, marked by high trust, report higher relationship satisfaction and emotional closeness, both key components of love [50], [51]. Moreover, perceiving oneself as unloved is associated with numerous negative outcomes, such as anxiety, insecurity, emotional unresponsiveness, low self-esteem, emotional instability, and the development of a defensive or dependent personality, leading to a negative worldview [52].

Moreover, our findings highlight that each node in the network displays significant inter-construct relationships. Furthermore, the results underscore that each node within the network exhibits notable inter-construct relationships. In line with Heshmati *et al.* [53], this study revealed that the nodes representing each PERMA element showed the highest intercorrelations, thereby affirming the distinctiveness of each well-being dimension. This network analysis further validated the exclusivity of the PERMA elements, consistent with recent studies emphasizing the unique yet interrelated nature of these well-being constructs [12], [54]. Specifically, the relationship between competence (AC28) and goal achievement (AC29) is closely connected, with competence acting as a strong predictor of academic success across diverse educational settings. Within higher education, students who view themselves as competent tend to demonstrate improved goal-setting behaviors, ultimately resulting in enhanced academic performance [55]. Academic competence is a significant predictor of approach goals, encompassing both mastery and performance goals [56]. Notably, approach goals, particularly mastery-approach goals, are positively

associated with student well-being. Mastery-approach goals, centered around personal growth and learning, consistently foster positive impacts on students' psychological and emotional well-being. Similarly, performance-approach goals, although focused on outperforming peers, also contribute to overall student well-being, albeit via distinct mechanisms [57]. Regarding altruism (MN23) and life value (MN22), previous research demonstrates that individuals who engage in altruistic behaviors experience greater social integration, heightened life satisfaction, and amplified PE. They also report an increased sense of self-efficacy and competence, as well as a deeper sense of meaning and purpose—all of which are strongly associated with overall well-being [58], [59].

The findings offer insights for identifying central nodes within each construct. Our findings provide valuable insights into identifying central nodes within each construct. Optimism (PE5), flow (EN11), being loved (RL17), goal achievement (AC29), and altruism (MN23) were identified as highly central nodes, underscoring their crucial roles as mediators within the network. These nodes function as key connectors, sustaining the network's structure and playing a pivotal role within the broader framework of well-being. Their centrality suggests that they are essential to the functioning and interconnectedness of the PERMA model. Supporting this, resilience and adaptive coping strategies help individuals sustain hope in adversity, while optimism enhances psychological well-being, life satisfaction, and persistence in academic pursuits [60]. Specifically, flow (or deep EN in activities) has been demonstrated to enhance intrinsic motivation and elevate overall life satisfaction through sustained personal growth and enjoyment [61]. Similarly, goal achievement is positively correlated with life satisfaction, self-efficacy, and personal development [12], [62]. Moreover, being loved significantly contributes to well-being, with research indicating that receiving love from a caregiver profoundly affects adolescent well-being and psychological health [63]. According to the broaden-and-build theory, this sense of love fosters PE such as joy and gratitude, which, in turn, promote social EN and personal growth [64]. Additionally, altruism represents a core aspect of the MN dimension of well-being, underscoring its role in fostering belongingness and overall well-being [65]. Acts of kindness, including helping others at personal risk, enhance an individual's sense of meaning and are frequently linked to prosocial behavior [66]. Previous research indicates that engaging in altruistic behaviors enhances subjective well-being, associating higher levels of altruism with greater self-esteem, well-being, and reduced anxiety and depression [67]. These elements are vital in promoting a more balanced and fulfilling life. By acting as mediators and connectors, these central nodes uphold the structure of the well-being network, rendering them essential to a comprehensive sense of well-being.

The network analysis emphasized the distinct roles played by various items within the network. In particular, items like value in life, altruism, and self-esteem within the MN construct were identified as central, indicating their critical roles as key connectors, bridging other elements within the network. The centrality metrics (i.e., betweenness, closeness, and degree) offered a detailed understanding of the role each item plays within the well-being network. These metrics are essential for pinpointing the key components that significantly influence the network's overall structure and functionality. This result highlights the vital role of MN in fostering overall well-being, echoing previous research that underscores the significance of finding purpose and meaning in life as crucial to psychological health, resilience, and leading a fulfilling life [64], [67].

Moreover, our findings, derived from aggregated centrality metrics, indicate that the AC construct demonstrates the strongest performance overall, particularly due to its high strength and expected influence scores [65]. Furthermore, it can be elaborated that individuals who perceive their work as meaningful tend to achieve more [54]. This insight is particularly relevant for crafting targeted interventions aimed at enhancing students' sense of meaning and purpose. The notion of meaning acts as a guiding force in life, fostering a connection to a higher purpose and infusing daily activities with significance. MN is closely linked to enhanced physical health, reduced mortality risk, higher life satisfaction, happiness, self-actualization, and fulfillment in various life domains [31], [34]. Therefore, discovering a sense of meaning in life significantly contributes to adolescents' subjective and psychological well-being [68], [69].

Collectively, MN and AC emerged as the most impactful components of well-being within the network. Conversely, in the CFA, AC displayed the highest factor loading, trailed by ME and PE, underscoring its primary role in explaining well-being. This consistency emphasizes that although AC offers a direct sense of fulfillment, MN serves a broader, more integrative function by connecting various dimensions of well-being. While PE are significant in the CFA, they appear less central in the network analysis, suggesting they operate more as outcomes rather than as core connectors. In conclusion, both AC and MN are critical for well-being, with AC driving goal attainment and MN uniting different well-being dimensions, highlighting the importance of fostering both in well-being interventions.

The findings of this study present significant implications for educational practice and policy in Thailand. Educators can leverage this instrument to identify areas demanding targeted support, such as enhancing student EN or fostering meaningful relationships. Student EN serves as a critical component of

academic success and well-being. The results highlight the importance of creating learning environments that are both stimulating and inclusive, aligning with recent research that emphasizes EN as a primary driver of educational outcomes [70]. Educators can design curricula that integrate active learning strategies, such as collaborative projects, experiential learning, and technology-enhanced activities. These methods not only enhance academic performance but also foster PE and a sense of AC, which are key principles of the PERMA framework [54]. In addition to this, the validated instrument employed in this study can inform targeted interventions, such as mindfulness programs for reducing psychological distress and promoting well-being [71]. Institutions can adopt it for regular well-being audits to identify deficiencies and monitor progress [72]. Moreover, integrating well-being approaches into university strategies aligns with the holistic development framework for students, encompassing physical, emotional, and social dimensions. This approach is supported by research indicating that promoting student well-being is positively correlated with improved academic outcomes and higher life satisfaction. Institutional support and academic EN significantly contribute to fostering students' psychological well-being [73]. Furthermore, integrating well-being modules into academic curricula aligns with the sustainable development goals (SDGs), particularly goal 4, which prioritizes quality education. Such integration also corresponds with goal 3 of the SDGs, which aims to promote health and well-being for all individuals [74]. Therefore, such integration not only supports national policies but also adheres to international standards for sustainable educational development.

4. CONCLUSION

Regarding the findings of the study, it can be concluded that the PERMA model yields a valid and reliable framework for evaluating the well-being of Thai undergraduate students. In this regard, the present study puts an emphasis on AC significant contribution to overall well-being, suggesting that supporting students in achieving both academic and personal goals could tremendously enhance their quality of life. Subsequently, the network analysis demonstrated robust internal consistency within each construct, along with significant inter-construct linkages. The network analysis yielded critical insights, pinpointing central nodes within each construct. Given these findings, interventions aimed at these central nodes could significantly enhance overall well-being. The findings of this study carry significant implications for educational practice and policy in Thailand. By addressing key dimensions of the PERMA model, this study provides a foundational framework for future research and practical interventions aimed at improving student well-being.

FUNDING INFORMATION

This research project was financially supported by Thailand Science Research and Innovation (TSRI), Project Code FF-66089.

AUTHOR CONTRIBUTIONS STATEMENT

This journal uses the Contributor Roles Taxonomy (CRediT) to recognize individual author contributions, reduce authorship disputes, and facilitate collaboration.

Name of Author	C	M	So	Va	Fo	I	R	D	O	E	Vi	Su	P	Fu
Phamornpun Yurayat	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓
Bovornpot Choomphunuch	✓	✓				✓		✓	✓	✓				
Wipanee Suk-erb	✓								✓	✓	✓	✓		
Dussadee Lebkhao	✓								✓	✓	✓	✓		
Khanitin Jornkokgoud				✓	✓		✓	✓		✓				

C : **C**onceptualization
M : **M**ethodology
So : **So**ftware
Va : **Va**lidation
Fo : **Fo**rmal analysis
I : **I**nvestigation
R : **R**esources
D : **D**ata Curation
O : Writing - **O**riginal Draft
E : Writing - Review & **E**diting
Vi : **Vi**sualization
Su : **Su**pervision
P : **P**roject administration
Fu : **Fu**nding acquisition

CONFLICT OF INTEREST STATEMENT

Authors state no conflict of interest.

INFORMED CONSENT

We have obtained informed consent from all individuals included in this study.

ETHICAL APPROVAL

The research related to human use has been complied with all the relevant national regulations and institutional policies in accordance with the tenets of the Helsinki Declaration and has been approved by the authors' institutional review board or equivalent committee. Approval for the study was specifically granted by the Human Research Ethics Committee of Mahasarakham University (Reference number: 231-249/2024).

DATA AVAILABILITY

The data presented in this study are available on request from the corresponding author [BC]. The data is not publicly available due to the risk of identification of study participants.

REFERENCES

[1] T. Frazier and S. L. Doyle Fosco, "Nurturing positive mental health and wellbeing in educational settings – the PRICES model," *Frontiers in Public Health*, vol. 11, p. 1287532, Jan. 2024, doi: 10.3389/fpubh.2023.1287532.

[2] M. Al-Hendawi, A. Alodat, S. Al-Zoubi, and S. Bulut, "A PERMA model approach to well-being: a psychometric properties study," *BMC Psychology*, vol. 12, no. 1, p. 414, Jul. 2024, doi: 10.1186/s40359-024-01909-0.

[3] M. E. P. Seligman, *Flourish: a visionary new understanding of happiness and well-being*. New York: Simon and Schuster, 2011.

[4] S. Bücker, S. Nuraydin, B. A. Simonsmeier, M. Schneider, and M. Luhmann, "Subjective well-being and academic achievement: A meta-analysis," *Journal of Research in Personality*, vol. 74, pp. 83–94, Jun. 2018, doi: 10.1016/j.jrp.2018.02.007.

[5] T. Klapp, A. Klapp, and J.-E. Gustafsson, "Relations between students' well-being and academic achievement: evidence from Swedish compulsory school," *European Journal of Psychology of Education*, vol. 39, no. 1, pp. 275–296, Mar. 2024, doi: 10.1007/s10212-023-00690-9.

[6] M. B. Ott, K. M. Meusburger, and G. Quenzel, "Adolescents' participation opportunities and student well-being in school," *Frontiers in Education*, vol. 8, p. 1111981, Dec. 2023, doi: 10.3389/feduc.2023.1111981.

[7] T. L. Trolian, G. C. Archibald, and E. A. Jach, "Well-being and student–faculty interactions in higher education," *Higher Education Research & Development*, vol. 41, no. 2, pp. 562–576, Feb. 2022, doi: 10.1080/07294360.2020.1839023.

[8] L. Yu, D. T. L. Shek, and X. Zhu, "The Influence of Personal Well-Being on Learning Achievement in University Students Over Time: Mediating or Moderating Effects of Internal and External University Engagement," *Frontiers in Psychology*, vol. 8, p. 2287, Jan. 2018, doi: 10.3389/fpsyg.2017.02287.

[9] M. A. Mikaelian and N. M. Hakobyan, "Relationship between subjective well-being and commitment to success of students," *Modern Psychology*, vol. 5, no. 1(10), pp. 73–82, Jan. 2022, doi: 10.46991/SBMP/2022.5.1.073.

[10] B. Giangrasso, "Psychometric properties of the PERMA-Profiler as hedonic and eudaimonic well-being measure in an Italian context," *Current Psychology*, vol. 40, no. 3, pp. 1175–1184, Mar. 2021, doi: 10.1007/s12144-018-0040-3.

[11] M. Wammerl, J. Jaunig, T. Mairunteregger, and P. Streit, "The German Version of the PERMA-Profiler: Evidence for Construct and Convergent Validity of the PERMA Theory of Well-Being in German Speaking Countries," *Journal of Well-Being Assessment*, vol. 3, no. 2–3, pp. 75–96, Dec. 2019, doi: 10.1007/s41543-019-00021-0.

[12] M. K. Kovich, V. L. Simpson, K. J. Foli, Z. Hass, and R. G. Phillips, "Application of the PERMA Model of Well-being in Undergraduate Students," *International Journal of Community Well-Being*, vol. 6, no. 1, pp. 1–20, Mar. 2023, doi: 10.1007/s42413-022-00184-4.

[13] I. Magare, M. A. Graham, and I. Eloff, "An Assessment of the Reliability and Validity of the PERMA Well-Being Scale for Adult Undergraduate Students in an Open and Distance Learning Context," *International Journal of Environmental Research and Public Health*, vol. 19, no. 24, p. 16886, Dec. 2022, doi: 10.3390/ijerph192416886.

[14] E. Umucu *et al.*, "Relationships Between Positive Human Traits and PERMA (Positive Emotion, Engagement, Relationships, Meaning, and Accomplishments) in Student Veterans With and Without Disabilities: A Canonical Correlation Analysis," *Rehabilitation Research, Policy, and Education*, vol. 35, no. 3, pp. 238–247, Sep. 2021, doi: 10.1891/RE-21-09.

[15] L. Yang and R. B. S. Mohd, "Exploratory and Confirmatory Factor Analysis of PERMA for Chinese University EFL Students in Higher Education," *International Journal of Language Education*, vol. 5, no. 2, pp. 51–62, Jun. 2021, doi: 10.26858/ijole.v5i2.16837.

[16] C. Chaves, R. Ballesteros-Valdés, E. Madridejos, and H. Charles-Leija, "PERMA-Profiler for the Evaluation of well-being: Adaptation and Validation in a Sample of University Students and Employees in the Mexican Educational Context," *Applied Research in Quality of Life*, vol. 18, no. 3, pp. 1225–1247, Jun. 2023, doi: 10.1007/s11482-022-10132-1.

[17] R. Hidayat, A. Habibi, M. R. M. Saad, A. Mukminin, and W. I. bin W. Idris, "Exploratory and confirmatory factor analysis of PERMA for Indonesian students in mathematics education programmes," *Pedagogika*, vol. 132, no. 4, pp. 147–165, May 2019, doi: 10.15823/p.2018.132.9.

[18] A. L. Ai, H. B. Appel, J. Lee, and F. Fincham, "Family Factors Related to Three Major Mental Health Issues Among Asian-Americans Nationwide," *The Journal of Behavioral Health Services & Research*, vol. 49, no. 1, pp. 4–21, Jan. 2022, doi: 10.1007/s11414-021-09760-6.

[19] P. Suavansri *et al.*, "Well-being in Thailand: A Culturally Driven Grounded Inquiry Exploration of a Complex Construct," *Applied Research in Quality of Life*, vol. 17, no. 6, pp. 3327–3347, Dec. 2022, doi: 10.1007/s11482-022-10067-7.

[20] K. L. Chue, A. Yeo, Y. Nie, and L. C. Chew, "Modifying the PERMA profiler to assess student well-being," *Current Psychology*, vol. 43, no. 4, pp. 3749–3760, Jan. 2024, doi: 10.1007/s12144-023-04550-z.

[21] S. Epskamp, D. Borsboom, and E. I. Fried, "Estimating psychological networks and their accuracy: A tutorial paper," *Behavior Research Methods*, vol. 50, no. 1, pp. 195–212, Feb. 2018, doi: 10.3758/s13428-017-0862-1.

[22] D. Hevey, "Network analysis: a brief overview and tutorial," *Health Psychology and Behavioral Medicine*, vol. 6, no. 1, pp. 301–328, Jan. 2018, doi: 10.1080/21642850.2018.1521283.
[23] J. Starr and C. F. Falk, "Comparison of latent variable and psychological network models in PROMIS data: output metrics and factor structure," *Quality of Life Research*, vol. 32, no. 11, pp. 3247–3255, Nov. 2023, doi: 10.1007/s11136-023-03471-5.
[24] J. W. Creswell, *Educational Research: Planning, Conducting, and Evaluating Quantitative and Qualitative Research, Enhanced Pearson eText with Loose-Leaf Version--Access Card Package*, 5th ed. London: Pearson Education, 2015.
[25] A. L. Comrey and H. B. Lee, *A First Course in Factor Analysis*, 2nd ed. Hillsdale, NJ: Lawrence Erlbaum, 1992.
[26] R. P. McDonald and M.-H. R. Ho, "Principles and practice in reporting structural equation analyses.," *Psychological Methods*, vol. 7, no. 1, pp. 64–82, 2002, doi: 10.1037/1082-989X.7.1.64.
[27] Y. Rosseel, "Lavaan: An R Package for Structural Equation Modeling," *Journal of Statistical Software*, vol. 48, no. 2, pp. 1–36, 2012, doi: 10.18637/jss.v048.i02.
[28] M. G. Sampson, *Statistical Analysis in JASP: A Students Guide*, 5th ed. London: Centre for Science and Medicine in Sport and Exercise (University of Greenwich), 2022.
[29] D. E. da C. Leme, E. V. da C. Alves, V. do C. O. Lemos, and A. Fattori, "Network analysis: A multivariate statistical approach for health science research," *Geriatrics, Gerontology and Aging*, vol. 14, no. 1, pp. 43–51, 2020, doi: 10.5327/Z2447-212320201900073.
[30] J. Dalege, D. Borsboom, F. van Harreveld, L. J. Waldorp, and H. L. J. van der Maas, "Network Structure Explains the Impact of Attitudes on Voting Decisions," *Scientific Reports*, vol. 7, no. 1, p. 4909, Jul. 2017, doi: 10.1038/s41598-017-05048-y.
[31] B. A. Eliüşük, "Adaptation of the PERMA well-being scale into Turkish: Validity and reliability studies," *Educational Research and Reviews*, vol. 13, no. 4, pp. 129–135, Feb. 2018, doi: 10.5897/ERR2017.3435.
[32] M. Faran and F. Malik, "Translation of linguistic validation of PERMA profiler in music engagers context," *PalArch's Journal of Archaeology of Egypt/Egyptology*, vol. 18, no. 3, pp. 4102–4120, 2021.
[33] S. Leontopoulou, "Measuring well-being in emerging adults: Exploring the PERMA framework for positive youth development," *Psychology: The Journal of the Hellenic Psychological Society*, vol. 25, no. 1, pp. 72–93, Nov. 2020, doi: 10.12681/psy_hps.25337.
[34] J. Butler and M. L. Kern, "The PERMA-Profiler: A brief multidimensional measure of flourishing," *International Journal of Wellbeing*, vol. 6, no. 3, pp. 1–48, Oct. 2016, doi: 10.5502/ijw.v6i3.526.
[35] C. – C. Bentea, "Approaches of happiness and well-being in psychology," in *International Multidisciplinary Scientific Conference on the Dialogue between Sciences & Arts, Religion & Education*, Aug. 2019, pp. 257–264, doi: 10.26520/mcdsare.2019.3.257-264.
[36] J. K. Coffey, L. Wray-Lake, D. Mashek, and B. Branand, "A Multi-Study Examination of Well-Being Theory in College and Community Samples," *Journal of Happiness Studies*, vol. 17, no. 1, pp. 187–211, Feb. 2016, doi: 10.1007/s10902-014-9590-8.
[37] Z. T. Bloch-Jorgensen, P. J. Cilione, W. W. H. Yeung, and J. M. Gatt, "Centeredness Theory: Understanding and Measuring Well-Being Across Core Life Domains," *Frontiers in Psychology*, vol. 9, p. 610, May 2018, doi: 10.3389/fpsyg.2018.00610.
[38] N. M. Moussa and W. F. Ali, "Exploring the Relationship Between Students' Academic Success and Happiness Levels in the Higher Education Settings During the Lockdown Period of COVID-19," *Psychological Reports*, vol. 125, no. 2, pp. 986–1010, Apr. 2022, doi: 10.1177/0033294121994568.
[39] M. L. Kern, L. E. Waters, A. Adler, and M. A. White, "A multidimensional approach to measuring well-being in students: Application of the PERMA framework," *The Journal of Positive Psychology*, vol. 10, no. 3, pp. 262–271, May 2015, doi: 10.1080/17439760.2014.936962.
[40] J. D. Bartholomaeus, M. P. Iasiello, A. Jarden, K. J. Burke, and J. van Agteren, "Evaluating the Psychometric Properties of the PERMA Profiler," *Journal of Well-Being Assessment*, vol. 4, no. 2, pp. 163–180, Jul. 2020, doi: 10.1007/s41543-020-00031-3.
[41] D. Elfida, W. W. D. Mansoer, M. N. Milla, and B. Takwin, "The Meaning of Happy Experiences in Muslims," (in Indonesian), *Psympathic: Jurnal Ilmiah Psikologi*, vol. 8, no. 2, pp. 165–182, Jan. 2022, doi: 10.15575/psy.v8i2.12496.
[42] E. Umucu *et al.*, "Psychometric validation of the PERMA-profiler as a well-being measure for student veterans," *Journal of American College Health*, vol. 68, no. 3, pp. 271–277, Apr. 2020, doi: 10.1080/07448481.2018.1546182.
[43] T. A. Grenawalt *et al.*, "Psychometric Validation of the PERMA-Profiler as a Well-Being Measure for Young Adult Survivors of Pediatric Central Nervous System Tumor," *Rehabilitation Counseling Bulletin*, vol. 65, no. 4, pp. 255–265, Jul. 2022, doi: 10.1177/00343552211025509.
[44] C. Pezirkianidis, A. Stalikas, A. Lakioti, and V. Yotsidi, "Validating a multidimensional measure of wellbeing in Greece: Translation, factor structure, and measurement invariance of the PERMA Profiler," *Current Psychology*, vol. 40, no. 6, pp. 3030–3047, Jun. 2021, doi: 10.1007/s12144-019-00236-7.
[45] J. Ryan *et al.*, "Psychometric properties of the PERMA Profiler for measuring wellbeing in Australian adults," *PLOS ONE*, vol. 14, no. 12, p. e0225932, Dec. 2019, doi: 10.1371/journal.pone.0225932.
[46] F. R. Goodman, D. J. Disabato, T. B. Kashdan, and S. B. Kauffman, "Measuring well-being: A comparison of subjective well-being and PERMA," *The Journal of Positive Psychology*, vol. 13, no. 4, pp. 321–332, Jul. 2018, doi: 10.1080/17439760.2017.1388434.
[47] C. L. Park *et al.*, "Emotional Well-Being: What It Is and Why It Matters," *Affective Science*, vol. 4, no. 1, pp. 10–20, Mar. 2023, doi: 10.1007/s42761-022-00163-0.
[48] J. Tian, M. Zhang, H. Zhou, and J. Wu, "College Satisfaction, Sense of Achievement, Student Happiness and Sense of Belonging of Freshmen in Chinese Private Colleges: Mediation Effect of Emotion Regulation," *International Journal of Environmental Research and Public Health*, vol. 18, no. 22, p. 11736, Nov. 2021, doi: 10.3390/ijerph182211736.
[49] Y. Mao, X. Luo, S. Wang, Z. Mao, M. Xie, and M. Bonaiuto, "Flow experience fosters university students' well-being through psychological resilience: A longitudinal design with cross-lagged analysis," *British Journal of Educational Psychology*, vol. 94, no. 2, pp. 518–538, Jun. 2024, doi: 10.1111/bjep.12661.
[50] R. J. Marrero-Quevedo, P. J. Blanco-Hernández, and J. A. Hernández-Cabrera, "Adult Attachment and Psychological Well-Being: The Mediating Role of Personality," *Journal of Adult Development*, vol. 26, no. 1, pp. 41–56, Mar. 2019, doi: 10.1007/s10804-018-9297-x.
[51] I. H. M. Hatamleh *et al.*, "Trust in Social Media: Enhancing Social Relationships," *Social Sciences*, vol. 12, no. 7, p. 416, Jul. 2023, doi: 10.3390/socsci12070416.
[52] S. Ali, R. P. Rohner, P. A. Britner, and A. Jahn, "Longing for belonging: Feeling loved (or not) and why it matters," *Family Relations*, vol. 73, no. 4, pp. 2639–2654, Oct. 2024, doi: 10.1111/fare.13029.
[53] S. Heshmati, Z. Oravecz, T. R. Brick, and R. W. Roeser, "Assessing psychological well-being in early adulthood: Empirical evidence for the structure of daily well-being via network analysis," *Applied Developmental Science*, vol. 26, no. 2, pp. 207–225, Apr. 2022, doi: 10.1080/10888691.2020.1766356.

[54] M. Seligman, "PERMA and the building blocks of well-being," *The Journal of Positive Psychology*, vol. 13, no. 4, pp. 333–335, Jul. 2018, doi: 10.1080/17439760.2018.1437466.
[55] M. Y. Afrashteh and P. Janjani, "The mediating role of goal orientation in the relationship between formative assessment with academic engagement and procrastination in medical students," *BMC Medical Education*, vol. 24, no. 1, p. 1036, Sep. 2024, doi: 10.1186/s12909-024-05965-3.
[56] S. Duchesne and S. Larose, "Academic competence and achievement goals: Self-pressure and disruptive behaviors as mediators," *Learning and Individual Differences*, vol. 68, pp. 41–50, Dec. 2018, doi: 10.1016/j.lindif.2018.09.008.
[57] D. W. Ariani, "How achievement goals affect students' well-being and the relationship model between achievement goals, academic self-efficacy and affect at school," *Journal of Applied Research in Higher Education*, vol. 14, no. 1, pp. 111–134, Jan. 2022, doi: 10.1108/JARHE-08-2020-0273.
[58] A. Hoffman, A. Mehrpour, and C. Staerklé, "The Many Faces of Social Connectedness and Their Impact on Well-being," in *Withstanding Vulnerability throughout Adult Life: Dynamics of Stressors, Resources, and Reserves*, D. Spini and E. Widmer, Eds., Singapore: Springer Nature Singapore, 2023, pp. 169–187, doi: 10.1007/978-981-19-4567-0_11.
[59] S. A. Rhoads and A. A. Marsh, "Doing Good and Feeling Good: Relationships Between Altruism and Well-being for Altruists, Beneficiaries, and Observers," *World Happiness Report*, 2023. [Online]. Available: https://www.worldhappiness.report/ed/2023/doing-good-and-feeling-good-relationships-between-altruism-and-well-being-for-altruists-beneficiaries-and-observers/
[60] F. Kong, K. Ding, and J. Zhao, "The Relationships Among Gratitude, Self-esteem, Social Support and Life Satisfaction Among Undergraduate Students," *Journal of Happiness Studies*, vol. 16, no. 2, pp. 477–489, Apr. 2015, doi: 10.1007/s10902-014-9519-2.
[61] M. Csikszentmihalyi, *Applications of flow in human development and education: The collected works of Mihaly Csikszentmihaly*. Dordrecht: Springer, 2014, doi: 10.1007/978-94-017-9094-9.
[62] W. Wang, J. Li, G. Sun, Z. Cheng, and X. Zhang, "Achievement goals and life satisfaction: the mediating role of perception of successful agency and the moderating role of emotion reappraisal," *Psicologia: Reflexão e Crítica*, vol. 30, no. 1, p. 25, Dec. 2017, doi: 10.1186/s41155-017-0078-4.
[63] M. Xia, J. K. Coffey, and G. M. Fosco, "Daily dynamics of feeling loved by parents and their prospective implications for adolescent flourishing," *Developmental Science*, vol. 27, no. 6, p. e13495, Nov. 2024, doi: 10.1111/desc.13495.
[64] M. F. Steger, "Meaning in Life and Wellbeing," in *Wellbeing, Recovery and Mental Health*, M. Slade, L. Oades, and A. Jarden, Eds., Cambridge: Cambridge University Press, 2017, pp. 75–85, doi: 10.1017/9781316339275.008.
[65] D. J. Robinaugh, A. J. Millner, and R. J. McNally, "Identifying highly influential nodes in the complicated grief network.," *Journal of Abnormal Psychology*, vol. 125, no. 6, pp. 747–757, Aug. 2016, doi: 10.1037/abn0000181.
[66] J. Bala, M. Sneha, S. Prizila, P. Dharshini, A. A. R. Rashmi, and J. I. J. Sheela, "A Study on Altruism and Subjective Well-Being among Emerging Adults," *International Journal of Indian Psychology*, vol. 9, no. 3, pp. 1354–1361, Dec. 2013, doi: 10.25215/0903.126.
[67] F. Martela and R. M. Ryan, "Prosocial behavior increases well-being and vitality even without contact with the beneficiary: Causal and behavioral evidence," *Motivation and Emotion*, vol. 40, no. 3, pp. 351–357, Jun. 2016, doi: 10.1007/s11031-016-9552-z.
[68] A. Brouzos, S. P. Vassilopoulos, and C. Boumpouli, "Adolescents' subjective and psychological well-being: The role of meaning in life," *Hellenic Journal of Psychology*, vol. 13, no. 3, pp. 153–169, 2016.
[69] F. Casas and M. González-Carrasco, "Satisfaction with Meaning in Life: a metric with Strong Correlations to the Hedonic and Eudaimonic Well-Being of Adolescents," *Child Indicators Research*, vol. 14, no. 5, pp. 1781–1807, Oct. 2021, doi: 10.1007/s12187-021-09826-z.
[70] J. A. Fredricks, M. Filsecker, and M. A. Lawson, "Student engagement, context, and adjustment: Addressing definitional, measurement, and methodological issues," *Learning and Instruction*, vol. 43, pp. 1–4, Jun. 2016, doi: 10.1016/j.learninstruc.2016.02.002.
[71] C. C. G. da Silva, C. V. Bolognani, F. F. Amorim, and A. M. Imoto, "Effectiveness of training programs based on mindfulness in reducing psychological distress and promoting well-being in medical students: a systematic review and meta-analysis," *Systematic Reviews*, vol. 12, no. 1, p. 79, May 2023, doi: 10.1186/s13643-023-02244-y.
[72] Organisation for Economic Co-operation and Development (OECD), *How's Life? 2020: Measuring well-being*. Paris: OECD Publishing, 2020.
[73] S. Chaudhry, A. Tandon, S. Shinde, and A. Bhattacharya, "Student psychological well-being in higher education: The role of internal team environment, institutional, friends and family support and academic engagement," *PLOS ONE*, vol. 19, no. 1, p. e0297508, Jan. 2024, doi: 10.1371/journal.pone.0297508.
[74] N. Khumsiri and M. Wannachai, "Studying the guidelines for curriculum improvement in alignment with sustainable development goals (SDGs): A case study of Khon Kaen University," (in Thai), *Mekong Journal of Arts and Science Research*, vol. 32, no. 2, pp. 26–39, 2024.

BIOGRAPHIES OF AUTHORS

Phamornpun Yurayat is an associate professor and psychology lecturer in the Faculty of Education at Mahasarakham University, located in Mahasarakham Province, Thailand. She specializes in clinical psychology, educational psychology, and counseling. Her research focuses on psychological well-being, online counseling, mindfulness-based therapy, and positive psychology. She can be contacted at email: phamornpun.y@msu.ac.th.

Bovornpot Choomphunuch is a psychology lecturer in the Department of Educational Psychology and Guidance, Faculty of Education at Mahasarakham University, Thailand. He specializes in clinical psychology, health psychology, applied psychology, counseling, and early intervention for student with special needs. His research focuses on health psychology, counseling, health promotion, exceptional psychology, and multicultural psychology. He can be contacted at email: bovornpot.c@msu.ac.th.

Wipanee Suk-erb is a lecturer in the Department of Educational Psychology and Guidance, Faculty of Education at Mahasarakham University, located in Mahasarakham Province, Thailand. She specializes in counseling psychology. Her research focuses on counseling competency, resilience and coping, integrative and alternative therapy, positive psychology, wellness, and Buddhist psychology. She can be contacted at email: wipanee.s@msu.ac.th.

Dussadee Lebkhao is a lecturer in the Department of Educational Psychology and Guidance at the Faculty of Education, Mahasarakham University, Thailand. She obtained her Ph.D. degree in Counseling Psychology from Burapha University, Chonburi, Thailand. Her research interests focus on counseling psychology, applied psychology, health psychology, and forensic psychology in juvenile delinquency, particularly developing integrative counseling/psychotherapy models to enhance client well-being and employing mixed-method research. She can be contacted at email: Dussadee.l@msu.ac.th.

Khanitin Jornkokgoud is a Ph.D. student researcher at the Clinical and Affective Neuroscience lab, Department of Psychology and Cognitive Science, University of Trento, Rovereto, Italy. He has a background in cognitive psychology, and his research interest relies on narcissistic personality disorder and its neural bases. He can be contacted at email: khanitin.jornkokgoud@unitn.it.