Article

Examining Predictors of Psychological Well-being among University Students: A Descriptive Comparative Study across Two Samples

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Abstract: *Purpose:* Using an identical experimental structure with both Thai and Singaporean undergraduates, we investigated relationships (interactions) among social support, stress, resilience, mindfulness, and self-efficacy on psychological well-being (PWB). Stress indicated a negative influence on PWB, but mindfulness, resilience, self-efficacy, and social support indicated positive influences. ***Methods:*** A cross-sectional predictive design was used with 966 Thai and 673 Singaporean university students. After calculating an adequate sample size and performing convenience sampling, we administered the following six standard scales: the Perceived Stress Scale, the Connor–Davidson Resilience Scale, the Mindfulness Awareness Scale, the General Self-Efficacy Scale, the Multi-dimensional Scale of Perceived Social Support, and the Psychological Well-being Scale—along with a demographic questionnaire. Descriptive statistics, correlation analysis, and structural equation modeling were performed for participants' PWB. ***Results:*** **Mindfulness** had significant effects for both factors of PWB, including autonomy and growth, and cognitive triad, across two samples. In the Thai sample, **resilience** most strongly predicted autonomy and growth and **perceived stress** did so the cognitive triad, whereas in the Singaporean sample, **perceived control** most strongly predicted autonomy and growth and **support from friends** did so the cognitive triad. ***Conclusion:*** These findings provide specific knowledge toward enhancing psychosocial interventions and toward promoting PWB to strengthen mindfulness, resilience, perceived control of stress, and social support.

Keywords: stress; resilience; mindfulness; psychological well-being; university students

1. Introduction

The prevalence of mental health problems, such as depression, anxiety, bipolar disorders, eating disorders, alcohol consumption, and marijuana use, in adolescents is an undesirable reality [1–3] that may affect their psychological well-being (PWB). Adolescents are at high risk of developing schizophrenia, given that its onset commonly occurs during late adolescence and early adulthood [4]. To promote PWB among adolescents, identifying possible risks (e.g., academic stress) for mental problems, strengthening internal and external protective factors, and developing necessary prevention interventions are all imperative.

While pursuing education in schools, colleges, and universities, adolescents in Asian countries commonly experience academic stress [5] that might affect their PWB. Thai students are often under substantial pressure from their parents and teachers to demonstrate good performance in school and achieve excellent grades [6]. Among university students, moreover, academic pressure is higher because of the following: transitioning to university life, earning academic excellence, living away from family leading to independent life, challenges with interpersonal and romantic relationships, and career indecisiveness. Academic excellence plays a significant role in determining students' career success, and

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thus, university students with high stress are more likely to develop mental health problems such as anxiety, depression, substance abuse, aggression, sleep problems, suicidal ideation, and other behavioral problems [7–10]. Thus, assessing university students' PWB or mental health is an important issue for mental health professionals.

Background

PWB, a significant indicator of positive psychology, focuses on two main factors—the absence of mental health problems and the presence of positive psychology, which consists of subjective well-being (e.g., happiness, positive affect, and life satisfaction [11] and eudaemonic well-being (e.g., autonomy, self-acceptance, purpose in life, personal growth, positive relations with others, and environmental mastery [12,13]. Even so, studies have revealed PWB and depressive symptoms as negatively correlated [14,15].

However, prior to establishing interventions for the prevention of potential mental health problems, one must fully understand the relationships among PWB and related variables. Thus, studies have examined factors related to university students' PWB, for instance, perceived stress, resilience, mindfulness, perceived self-efficacy, and social support [10,16–18]. However, most studies were conducted in Western countries and emphasized negative variables (e.g., stress) rather than positive aspects (e.g., resilience and self-efficacy). According to positive psychology, disease prevention, mental health promotion, positive emotions, and optimal functioning are tantamount to pathology, dysfunction, and treatment [19] in importance. Therefore, given the effort that goes into exploring the negative variables related to mental health, exploring positive is nonetheless necessary.

Stress is conceptualized as a relationship between individuals and their environment, occurring when persons appraise a situation as a threat exceeding their available coping resources [20]. Several studies have shown stress as being an important variable influencing psychological problems [10,21,22] and PWB [23,67]. For example, Sood et al. investigated the effectiveness of stress management and resilience training among medical students [67]. That pilot randomized clinical trial revealed significant improvements in resilience, perceived stress, anxiety, and quality of life at 8 weeks post-intervention in an intervention group over a wait-list control group for the same period.

Self-Efficacy is defined as "individuals' beliefs in their capabilities to produce designated levels of performance that exercise influence over events that affect their lives" [24]. During transitions in higher education, university students might experience feelings of vulnerability and lack of control over their academic lives, leading to negative consequences for their self-efficacy. Nevertheless, several studies have found self-efficacy a significant variable related to PWB (the absence of psychological problems) [23,25,26]. Studying self-efficacy and resilience, Taylor and Reyes [25] found a manner of self-efficacy and resiliency possessed by baccalaureate nursing students as possibly leading to academic success, an indicator of well-being.

Resilience reflects individuals' ability to change and deal with stressful events and adversity [27] or positive environmental adaptation despite risky situations and difficulties [28] that varies depending on the individuals' context, age, gender, time, and original culture [27]. Resilience has been related to emotional problems (e.g., anxiety, depression, and hopelessness) [10,29]. During the past decade, moreover, several studies have indicated that resilience significantly predicts PWB [30–32]. He et al. examined the predicting effect on resilience, stress, mindfulness, and self-efficacy in PWB among Australian undergraduate nursing students at a regional university. Eventually, they found resilience to be the strongest predictor [32].

Mindfulness, also called "cautious attention," refers to individuals' ability to self-regulate attention to the present moment and/or activities and to orientate toward acceptance, openness, and curiosity[33]. Some studies have shown mindfulness as strongly predicting PWB [23,32,34,35]. Falkenström [34] implemented quasi-experimental research on mindfulness with 76 experienced meditators separated into two groups: 48 who participated in an intensive meditation (Vipassana or insight meditation) tradition and 28

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who did not. Correlational analysis in the pre-intervention group revealed that mindfulness related significantly to well-being and that enhancing mindfulness correlated with increased well-being in both groups.

Social Support, an external protective factor, is defined as individuals' perception of adequate and valuable support influencing adjustment [36] and received from significant others, such as family members, friends, and teachers [37]. These studies have demonstrated social support as being significantly associated with PWB [23,31,38]. In the Philippines, Klainin-Yobas et al. [23] examined PWB's predicting factors among university students and found that social support from family and friends significantly predicted positive individual PWB.

The Current Study

Although previous studies have examined factors influencing PWB among undergraduate students [23,32], little is known about the magnitude of relationships among those predicting factors. In addition, only a few studies have explored cross-cultural differences in PWB predictors, particularly in Asian countries. Therefore, this research study examined associations among stress, self-efficacy, resilience, mindfulness, social support, and PWB in Thai and Singaporean undergraduates, based on the following research questions. (a) What patterns of relationships exist among stress, self-efficacy, resilience, mindfulness, social support, and PWB among undergraduate university students in Thailand? b) What similarities and differences in patterns of relationships exist between Thai and Singaporean samples?

This study was conducted at two government-supported, both similar and different, universities in Thailand and Singapore. First, the two are each country's leading universities, with high standards of learning environments, curriculums, faculty members, and schools of medicine, nursing, law, and art. Second, both universities' students must maintain high academic performance, possibly leading to academic stress. Because of differences in culture, sociology, the economy, and the environment between Thailand and Singapore and the approach to the ASEAN Economic Community in 2015, undergraduates at both universities could be affected by high stress in daily living, particularly by high competition in the Asian Economic Community for successful career paths. Third, although the two settings' educational and health support systems provided by the mental health nurse profession are effective, system improvements will be developed accordingly. Finally, this study's results contribute to the literature on PWB relationships among Thai and Singaporean university students and establish a foundation for the promotion of PWB and prevention interventions targeting these university students.

2. Materials and Methods

Research Design

In what is appropriate to exploring naturally occurring phenomenon across assessment points, this study employed a cross-sectional descriptive predictive design to answer the research questions [39].

Participants and Setting

Target populations were Thai and Singaporean undergraduate university students, regardless of academic year or sociological background. Potential participants were excluded if they were diagnosed with medical and mental illnesses by physicians and/or psychiatrists. Convenience sampling was employed to recruit potential participants from all faculties separated into six groups: (1) Environment and Natural Resources, (2) Linguistics, Culture, and Education, (3) Medical Science (4) Public Health (5) Science and Technology (6) Social Science, Humanities and Liberal Arts. In each of the six groups, ten of the same faculties were sampled for recruiting in both Thailand and Singapore duringacademic year 2016.

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The appropriateness of sample size was determined through online power analyses for structural equation modeling [40]. An effect size of 0.88 was calculated on the basis of findings from a study investigating stress, self-efficacy, and PWB among nursing students [41]. Using the effect size of 0.88, with the number of latent variables = 6, the number of observed variables = 8, power = 80%, and significance level = 0.05, an appropriate sample size for this study was determined to be at least 589 participants [40].

Procedure

After receiving ethical approval from the Human Rights Committee Related to Human Experimentation from the two universities, researchers initially contacted faculty deans selected by the sampling method, described the study, and requested permission to administer the survey. Invited to participate by convenience sampling, students voluntarily signed an informed consent form after researchers provided full explanation of all the study's aspects, including risks of uncomfortable feelings because of some items' sensitive nature and fatigue from completing pencil-and-paper forms (Thai university) and online forms (Singaporean university) to potential participants. Participants were informed that they had the right to refuse to answer any items or to withdraw from the study at any time. Responses to questionnaires were fully anonymous, and findings were reported as group data, thus maintaining confidentiality.

Measures

Data collection occurred through anonymous self-report questionnaires, Singapore's online and Thailand's on hard-copy. Questionnaires contained the following measurement tools: the Connor–Davidson Resilience Scale [27]; the Perceived Stress Scale [68]; General Self-Efficacy [42]; the Multi-dimensional Scale of Perceived Social Support [69]; the Psychological Well-being Scale [12], and participants' demographic information. Most had been translated into Thai versions and then validated by the back-translation method. The Connor–Davidson Resilience Scale and the Psychological Well-being Scale were translated by the back-translation method in this study. In addition, demographic information included gender, age, nationality, religion, ethnic group, faculty and school, academic year, and annual family income.

Perceived Stress

The 10-item Perceived Stress Scale (PSS: [68]) was used to measure the degree of individuals' thoughts and feelings about current events during the previous month. Each item was rated on a 5-item scale, 0 (never) to 4 (very often). The total score ranged from 0 to 40, with higher scores suggesting higher stress. The scale's Cronbach alphas ranged from .84 to .86 for American graduate students [68]. With Thai adult participants, its test–retest reliability was .82 and the Cronbach alpha was .88 [43]. In this study, factor analyses revealed that PSS had two factors, perceived stress and perceived control, and the Cronbach alphas were .81 and .75 in Thailand and .85 and .77 in Singapore.

Self-Efficacy

The Generalized Self-Efficacy Scale (GSES: [42]) consists of 10 items rated on a 4-point scale ranging from 1 (Not at all true) to 4 (Exactly true). GSES's Cronbach alphas ranged from .76 to .90; in the Thai version, the value was .84, suggesting good internal consistency [70]. This study suggested that for both samples, GSES contained one factor. The Cronbach alphas in the Thai and Singaporean samples were .86 and .89, respectively.

Resilience

The 10-item Connor–Davidson Resilience Scale [44] was used to assess resilience by rating items on a 5-point scale from 0 (not true at all) to 4 (true all the time). Total scores from one component vary from 0 to 40, with higher scores indicating higher resilience levels. With American undergraduates, the Cronbach alpha was .95 [44]. Using the back-

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translation method, researchers had translated and validated the Thai CD-RISC version. In this study, factor analysis indicated that CD-RISC encompassed one structure, and the Cronbach alpha values of Thai and Singaporean university students were .86 [45] and .89, respectively, signifying good reliability.

Mindfulness

Mindfulness was measured by the 15-item Mindful Attention Awareness Scale (MAAS) [46] using a 6-point scale ranging from 1 (almost always) to 6 (almost never). Total scores range from 15 to 90, with higher scores reflecting higher levels of mindfulness. MAAS is psychometrically sound, given its good range of internal consistency across several samples (œ = 0.80–0.87) and excellent test–retest reliability over a 1-month period (r = 0.81) [46]. The Thai version of MAAS was validated with 385 Thai college students, and the results from confirmatory factor analysis suggested a single-factor structure and the scale's validity [46]. This study showed that MAAS had one factor for both samples, and the Cronbach alpha values were .88 and .97, respectively, indicating good reliability.

Social Support

The 12-item Multi-dimensional Scale of Perceived Social Support (MSPSS; [69]) was used to assess an individual's perceived social support by rating items on a 7-point scale, from very strongly disagree (1) to very strongly agree (7). It entails three factors of support—friends, family, and significant others. Total scores range from 1 to 84, with higher scores signifying greater perceived social support. MSPSS's reliability was tested with American university students, and the Cronbach alphas were in the range of .84–.92 for total scores, .81–.98 for the "family" subscale, .90–.94 for the "friends" subscale, and .83–.98 for the "significant others" subscale [69]. In 2005, Boonyamalik translated the Thai version of MSPSS with the back-translation method. It showed good reliability, with the Cronbach alpha in the range of .88–.89 [48,49]. This study's internal consistency regarding the two samples' three factors was as follows. Cronbach alphas for social support from friends = .88; family = .90; and significant others =.91 for Thai university students; those for Singaporean university students were .89, .92, and .86, respectively.

Psychological Well-being

The 18-item Psychological Well-being Scale (PWBS) [12] with six dimensions was used to assess university students' psychological well-being on a 6-point scale from (1) strongly disagree to (6) strongly agree. Possible scores range from 18–108, with higher scores signifying better PWB. Based on 321 adult respondents, the English version reported Cronbach alphas ranging from .83–.91 for each dimension, suggesting good reliability. The researchers had translated this measurement tool into Thai using the back-translation method. For Thai university students, the Cronbach alpha for total items was .80. In addition, the current study's exploratory and confirmatory factor analyses revealed that PWB encompassed two factors: autonomy and growth, and the negative triad. Cronbach alphas were .85 and .70, respectively, in Thai and .85 and .56, respectively, in Singaporean university students [50].

Data Analysis

Data analysis was performed in two phases using IBM SPSS Statistics version 18.0. **The first phase** involved entering the data and checking entry accuracy. Descriptive statistics (i.e., frequency, mean, standard deviation, and graphical displays) was carried out to describe participants' characteristics and study variables. Psychometric properties of all measurements were tested by factor analysis, internal consistency reliability (Cronbach alpha) and item analysis [51] before implementing the instrument with 30 adolescents attending the university. **The second phase of data analysis** involved correlational analysis and structural equation modeling (SEM) [51] to compare PWB models between Thai and Singaporean undergraduates. These analyses required the following: a) a desirable power

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of 0.80; b) statistical significance at $\alpha = 0.05$; c) confirmatory fit index (CFI), Tucker-Lewis Index (TLI), and incremental fit index (IFT) > 0.90; and d) root mean square error of approximation (RMSEA) < 0.08 [51].

3. Results

Demographic Information and Study Variables

In the Thai sample, 966 students (average age 20.21 [SD = 1.51]; female 67.30%, n = 650; male 31.80%, n = 307) responded on paper-and-pencil questionnaires. Missing data numbered 9 (0.90%). Most Thai students were Buddhist (94.50%, n = 913), followed by Christian (2.10%, n = 20), and Islamic (1.30%, n = 13). In the Singaporean sample, 673 students (average age 22.39 [SD = 5.18]; female 59.10%, n = 411; male 27.70%, n = 193) completed online questionnaires. Missing data numbered 92 (13.20%). Most were Christian (24.70%, n = 172), followed by Buddhist (18.20%, n = 127), Islamic (7.90%, n = 55), and others (49.20%, n = 342).

For both Thai and Singaporean students, all study variables—perceived stress, perceived control, resilience, self-efficacy, and mindfulness, all support the variables autonomy and growth as well as negative triad—display approximately normal distribution (Tables 1 and 2, respectively).

Table 1. Description of study variables for Thai sample (n=966).

	Minimum	Maximum	Mean	Standard Deviation	Skewness	Kurtosis	Cronbach's Alpha
Perceived stress	0	22	11.21	3.67	-0.00	0.32	0.81
perceived control	0	16	6.19	2.24	0.29	1.31	0.75
Resilience	7	40	27.69	5.17	-0.41	0.74	0.86
Self-efficacy	12	40	27.51	4.25	-0.02	0.44	0.86
Mindfulness	24	89	62.33	10.92	-0.15	-.16	0.88
Support from family	6	28	23.64	4.32	-1.24	1.29	0.89
Support from friend	5	28	21.86	4.30	-0.82	0.69	0.91
Support from others	4	28	21.74	5.13	-0.92	0.68	0.91
Autonomy & growth of PWB	17	60	43.63	6.58	-0.66	0.91	0.85
Negative triad factor of PWB	6	36	25.25	4.637	-0.23	0.30	0.72

Note: PWB = Psychological well-being

Table 2. Description of study variables for Singaporean sample (n=696).

	Minimum	Maximum	Mean	Stdardard Deviation	Skewness	Kurtosis	Cronbach's Alpha
Perceived stress	0	24	11.93	4.12	0.12	0.40	0.85
Perceive control	0	16	6.88	2.43	-0.03	0.84	0.77
Resilience	14	50	35.30	5.89	-0.04	0.49	0.89
Self-efficacy	10	40	29.30	3.81	-0.23	2.37	0.89
Mindfulness	17	89	61.62	10.13	-0.29	0.74	0.87
Support from family	4	28	20.05	5.05	-0.79	0.72	0.89
Support from friend	4	28	21.16	4.43	-1.29	2.85	0.92
Support from others	4	28	20.25	6.02	-0.73	-0.00	0.96
Autonomy & Growth of PWB	9	54	40.32	6.37	-0.64	1.64	0.83
Negative Triad of PWB	8	34	22.27	4.43	-0.29	0.02	0.56

Note: PWB = Psychological well-being

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Predictors of Psychological Well-being

Thai Sample

Figure 1 displays predictors of PWB among Thai youths, with solid lines representing predictors achieving statistical significance and broken lines representing insignificant regression paths. The findings suggested that the hypothesized model had adequate fit to the data. Chi-square per degree of freedom (χ^2/df) = 2.46, CFI =.90, TLI =.90, IFI =.90, RMSEA =.04, 90% confidence interval of RMSEA =.038,.041. Furthermore, resilience (β =.62, p <.001), perceived control (β =.29, p <.001), mindfulness (β =.17, p <.001), support from significant others (β =.17, p <.001), and support from family (β =.17, p <.001) significantly predicted the PWB autonomy and growth factor, with about 60.90% of variance explained by all independent variables.

In addition, mindfulness (β = −.24, p <.001), perceived stress (β =.32, p <.001), and support from family (β =.11, p =.03) significantly affected the cognitive triad factor of PWB, with all independent variables explaining 31.30% of variance.

Singaporean Sample

Figure 2 suggests that the Singaporean sample's hypothesized model displayed acceptable sample data: χ^2/df = 2.14, CFI =.90, TLI =.90, IFI =.90, RMSEA =.04, 90% confidence interval of RMSEA =.039,.042. Note that these fit indices are comparable with those in the Thai sample. Furthermore, the autonomy and growth factor of PWB was significantly predicted by resilience (β =.29, p =.005), perceived stress (β = −.15, p =.02), perceived control (β =.43, p <.001), mindfulness (β =.18, p <.001), support from friends (β =.11, p =.004), and support from family (β =.12, p =.001).

The cognitive triad factor was significantly predicted by resilience (β = −.29, p =.006), perceived stress (β =.36, p <.001), mindfulness (β = −.20, p <.001), and support from friends (β = −.40, p <.001). All independent variables explained 65.90% and 69.90% of variance on autonomy and growth and the cognitive triad, respectively.

Altogether, findings from both Thai and Singapore samples demonstrated that **mindfulness** had significant effects on PWB factors. In the Thai sample, **resilience** most strongly predicted autonomy and PWB growth, while **percievd stress** most strongly predicted the cognitive triad. **In the Singaporian sample, perceived control** and **support from friends** most strongly predicted autonomy and growth and the cognitive triad.

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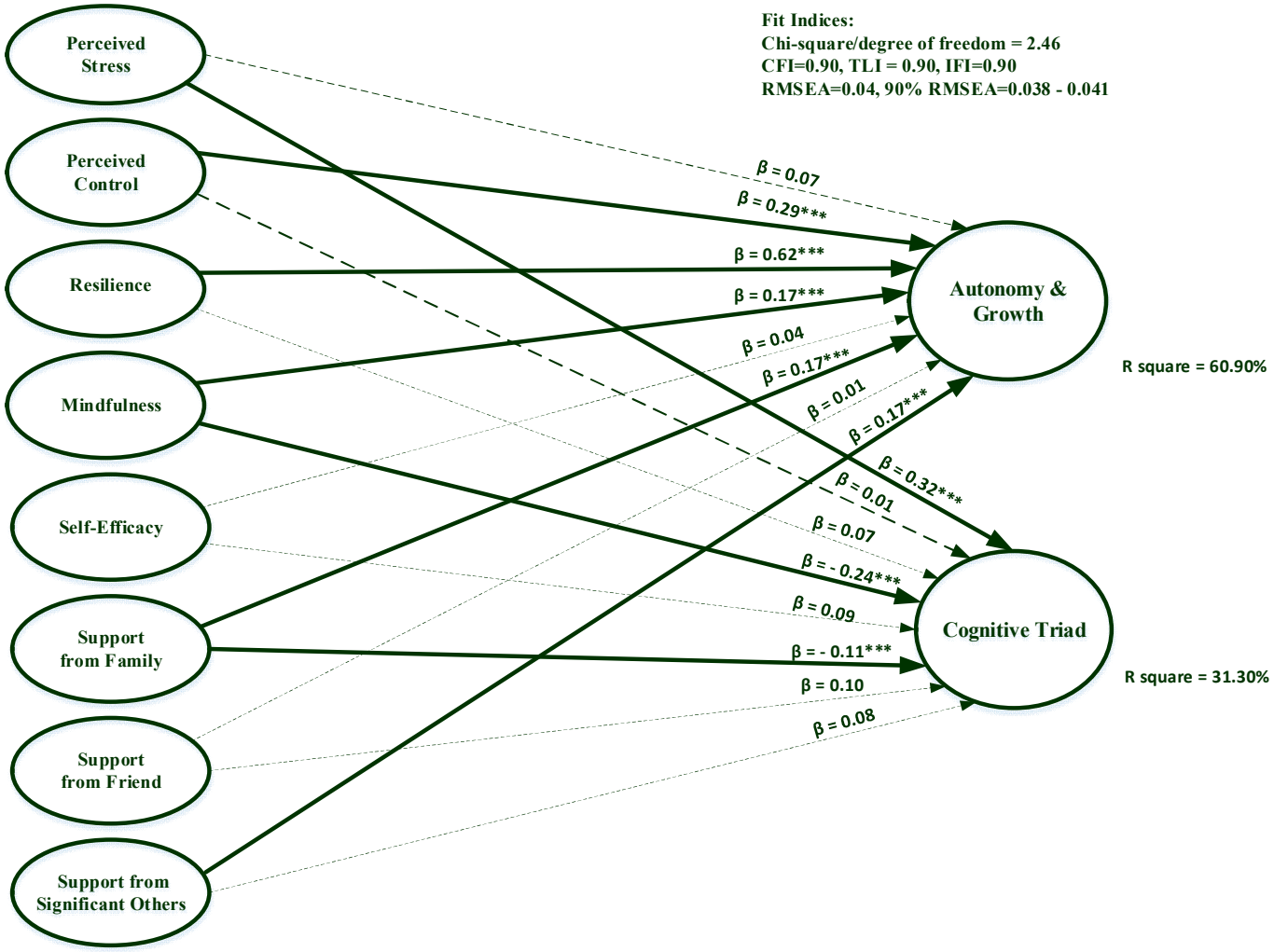

Figure 1. Predictors of psychological well-being among university students in Thailand.

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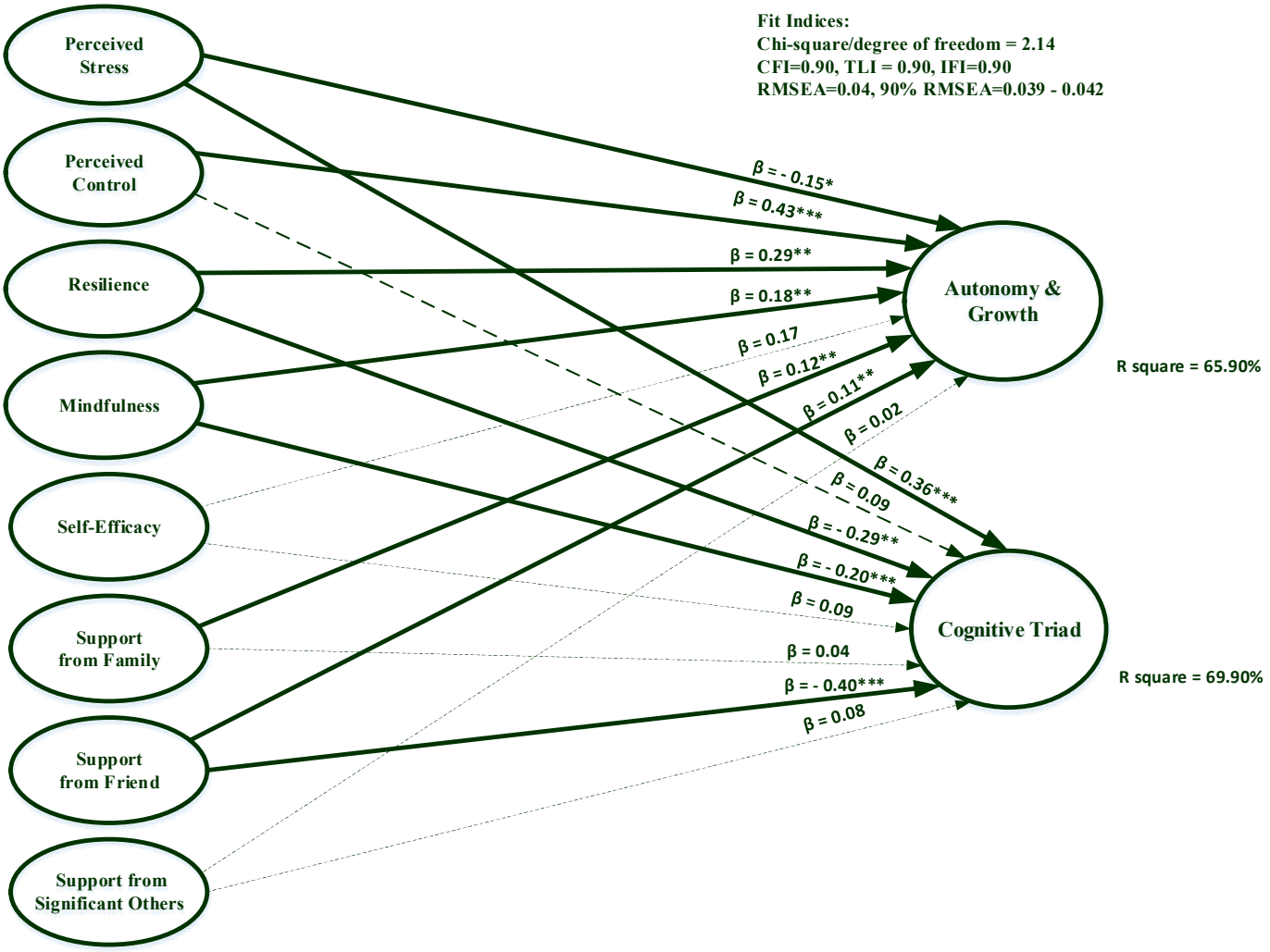

Figure 2. Predictors of psychological well-being among university students in Singapore.

4. Discussion

Based on the mean score, this study's results demonstrated that Thai and Singaporean university students had a medium level of autonomy and PWB growth, negative triad factors of PWB, and a high level of PWB. In the following variables, these students' PWB models differed slightly: perceived stress, perceived control, resilience, social support from family, friends, and significant others. Other variables were similar, specifically mindfulness and self-efficacy.

In this study, stress was separated into two components: perceived stress and perceived control. In the Thai sample, perceived stress correlated negatively with the negative triad PWB factor, while the significant level of the relationship between perceived control and autonomy and growth of PWB was positive. Individuals who perceive their stress as threatening or harmful refer such potentiality to damage, thus provoking negative emotions. If they perceive stress as challenges that they can control with sufficient coping resources, they refer potential rewards and growth to positive emotions [52]. Thai university students who perceived their stress as a life-threatening situation or as stressful life events might manifest the negative triad of PWB. In contrast, university students who interpreted their stressful life events positively and believed in their ability to control stress had correspondingly greater autonomy and PWB growth. However, the finding of perceived control revealed that university students could handle stress effectively and that individuals with effective coping strategies might have greater PWB, in congruence with the literature [53,54]. In comparison with Singaporean university students, the PWB

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model showed perceived stress as not only significantly negatively correlated with autonomy and growth but also significantly positively correlated with the cognitive triad PWB factor. Simultaneously, the relationship between perceived control and both PWB components was similar in the Thai sample. A previous study also supported perceived stress's negative correlation with positive PWB and positive correlation with negative PWB [32]. Hence, promoting an intervention program of PWB in each sample should be considered its difference.

Mindfulness significantly predicted PWB among both samples, congruent with previous studies [23,32,55,56]. In addition, studies have suggested that mindfulness would reduce negative emotions: depression, rumination, stress, anxiety, somatization, aggression,; and avoidance behavior [56]. Indeed, all previous studies indicated that mindfulness might reduce negative emotions and correspondingly increase PWB. Consistent with this study's result showing a higher level of mindfulness, university students tended to mention higher autonomy and PWB growth and a lower negative triad PWB factor. This tendency is congruent with the literature describing "mindfulness"—conceptualized as promoting individuals' well-being—as awareness of the present moment and non-judgment [45]. Individuals with elevated mindfulness would be aware of their surroundings, thoughts, and feelings without fixating or labeling things as good or bad [45]. Instead, they would promote their attitudes of curiosity, patience, and non-judgment toward distress because they better attend to the present, reduce rumination, have greater ability to control their emotions and behaviors, and use more and better adaptive coping and management of undesirable stressors. All of these lead to greater PWB [57–59]. Importantly, these findings revealed that cultural differences between Thai and Singaporean students did not influence mindfulness in promoting PWB.

Resilience most strongly predicted autonomy and PWB growth in the Thai sample and in both components of PWB in the Singaporean sample. Supported by previous studies finding resilience significantly associated with PWB, students who possessed greater resilience in this study reported higher levels of PWB [32]. The literature also revealed that more highly resilient individuals could better recover from adverse events and adjust to stressful situations [72]. Resilience buffers them from the stress of life events, so they perceive stress as a challenge that helps them develop environmental mastery, positive relationships, growth, and self-determination—in this study, principal elements of PWB [60] or autonomy and growth of PWB. Resilient university students could reappraise negative experience as a positive episode, for instance, a challenging situation that includes stressful events [61], thus reducing the risk of maladaptive outcomes [62]. Resilient Thai university students could effectively develop their autonomy and growth to deal with stress, while Singaporean university students could develop both PWB components. Therefore, among university students, resilience seems well established in the literature as linked to PWB.

In both this study's samples, self-efficacy had no significant effect on PWB. Even though self-efficacy might be enhanced by accomplishment, and well-being might be enhanced by beliefs about capabilities [63], both samples might use self-efficacy slightly in developing PWB although these findings were incongruent with those of Bandura and Klainin-Yobas et al. [23]. Because of other variables' (e.g., mindfulness, resilience, social support, or effect of self-efficacy) stronger effects on PWB in the testing model, these might have no significant effect on autonomy and growth or the negative triad of PWB.

Following previous studies [23,32,64], support by family, friends, and significant others related meaningfully to PWB, indicating that social support could enhance a person's ability to handle stress effectively and promote PWB [65]. Thai university students could apply perceived support from family and significant others to their autonomy and PWB growth and to the reduction of the PWB negative triad. Family social support essentially contributed to PWB in Thai university students because although some had moved away to study, family connectedness was still profound. According to self-determination theory (SDT), adolescents perceiving their parents as a supportive resource could develop their autonomy, that is, their natural desire to experience a sense of personal decision, volition,

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and psychological freedom [66]. For Singaporean students, support from friends contributed to both PWB components, while support from family promoted only PWB autonomy and growth. Especially because of the competitive, international environment at the Singaporean university, perceived support from friends influenced PWB, and this result corresponded to a previous study of Filipino university students [23]. These findings support cultural differences between Thai and Singaporean students as influences in their daily living.

Last, findings showed slight differences between Thai and Singaporean students because of diverse cultural and academic environments. For instance, most university students in Singapore had come from foreign countries and manifested a wide range of skills and abilities; thus, international competition and high education qualifications became inherently tense for them. Moreover, Singapore's average cost of living is quite high and leads university students to strive diligently for the highest-paying careers and to become financially independent.

Like most studies, this one had some limitations. First, the cross-sectional research had limited time to provide deep understanding of individuals' PWB development. Therefore, longitudinal research is needed in future studies. Second, both paper and online questionnaires that collected self-reports probably reflect the influence of social desirability. For a more accurate reflection of PWB, longitudinal research should be implemented.

Study results further suggested several important factors for recommendations. To improve university students' PWB, implementing intervention programs, for example, mindfulness-based stress-reduction programs, resilience programs, and social support programs as part of university policy would promote PWB and help prevent students' mental health problems. Of course, such intervention programs' effectiveness—concentrating on mindfulness, resilience, perceived control of stress, and social support—should be carefully and regularly evaluated.

5. Conclusions

Finally, a comparison of the two samples' PWB indicated the following. Both Thai and Singaporean samples' **mindfulness** had significant effects for both PWB factors. In the Thai sample, **resilience** most strongly predicted autonomy and growth and **perceived stress** did so the cognitive triad, whereas in the Singaporean sample, **perceived control** most strongly predicted autonomy and growth and **support from friends** did so the cognitive triad. Future research should test this hypothesized model in other university samples and implement effective intervention programs to enhance PWB in undergraduate university students.

Authors' contributions: Wareerat and Piyanes planned the study and drafted the manuscript. Nopporn and Piyanee planned study, analyzed data and drafted the manuscript. Nopporn, Wareerat, Yajai, Piyanee recruited participants and performed data collection. All authors reviewed and approved the manuscript

Ethics approval and consent to participate: This research has conformed to the Declaration of Helsinki. It received approval and ethical clearance from the Institutional Review Board (IRB) of Mahidol University, Thailand (COA.No. IRB-NS2014/059.0805) before data collection. All procedures were conducted according to the IRB guideline and regulations. Written informed consent was obtained from all participants involved in this study. A statement concerning ethics approval is included in this manuscript

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References

1. Caldeira KM, Kasperski SJ, Sharma E et al. College Students Rarely Seek Help despite Serious Substance Abuse Problems. J Subst Abuse Treat. 2009;37(4):368–378. doi: 10.1016/j.jsat.2009.04.005. 19553064.
2. Eisenberg D, Gollust SE, Golberstein E, et al. Prevalence and Correlates of Depression, Anxiety, and Suicidality among University Students. Am J Orthopsychiatry. 2007;77(4):534–42. doi: 10.1037/0002-9432.77.4.534. 18194033.
3. MacCabe JH, Lambe MP, Cnattingius S, et al. Excellent School Performance at Age 16 and Risk of Adult Bipolar Disorder: National Cohort Study. Br J Psychiatry. 2010;196(2):109–15. doi: 10.1192/bjp.bp.108.060368. 20118454.
4. American Psychological Association. Diagnostic and Statistical Manual of Mental Disorders. 5th ed DSM-IV- (American Psychological Association, Trs.): Author; 2010.
5. Tan JB, Yates S. Academic Expectations as Sources of Stress in Asian Students. Soc Psychol Educ. 2011;14(3):389–407.doi: 10.1007/s11218-010-9146-7.
6. Thanoi W, Phancharoenworakul K, Thompson E et al. Thai Adolescent Suicide Risk Behaviors: Testing a Model of Negative Life Events, Rumination, Emotional Distress, Resilience and Social Support. Pac Rim Int J Nurs Res. 2010;14(3):187–202.
7. Ang RP, Huan VS. Relationship between Academic Stress and Suicidal Ideation: Testing for Depression as a Mediator Using Multiple Regression. Child Psychiatry Hum Dev. 2006;37(2):133–43. doi: 10.1007/s10578-006-0023-8. 16858641.
8. Kraag G, Zeegers MP, Kok G et al. School Programs Targeting Stress Management in Children and Adolescents: A Meta-Analysis. J Sch Psychol. 2006;44(6):449–72. doi: 10.1016/j.jsp.2006.07.001.
9. Roberts RE, Roberts CR, Xing Y. Restricted Sleep among Adolescents: Prevalence, Incidence, Persistence, and Associated Factors. Behav Sleep Med. 2011;9(1):18–30. doi: 10.1080/15402002.2011.533991. 21218291.
10. 10. Thanoi W, Pornchaikate Au-Yeong A, Ondee P. Factor Influencing Mental Health of Nursing Students, Faculty of Nursing, Mahidol University. Thai J Nurs Council. 2012;27;Special Issue:60–76.
11. Diener E. Subjective Well-Being. Psychol Bull. 1984;95(3):542–575. doi: 10.1037/0033-2909.95.3.542. 6399758.
12. Ryff CD. Happiness Is Everything, or Is It? Explorations on the Meaning of Psychological Well-Being. J Pers Soc Psychol. 1989;57(6):1069−1081. doi: 10.1037/0022-3514.57.6.1069.
13. Ryan RM, Deci EL. On Happiness and Human Potentials: A Review of Research on Hedonic and Eudemonic Well-Being. Annu Rev Psychol. 2001;52:141−66. doi: 10.1146/annurev.psych.52.1.141. 11148302.
14. Clarke A, Friede T, Putz R et al. Warwick Edinburgh Mental Well-Being Scale (WEMWBS): Validated for Teenage School Students in England and Scotland. A Mixed Methods Assessment. BMC Public Health. 2011;11:487. doi: 10.1186/1471-2458-11-487. 21693055.
15. Zadow C, Houghton S, Hunter SC et al. Associations between Positive Mental Well-Being and Depressive Symptoms in Australian Adolescents. Educ Dev Psychol. 2017;34(2):95–105. doi: 10.1017/edp.2017.6.
16. Schoormans D, Nyklíček I. Mindfulness and Psychological Well-Being: Are They Related to Type of Meditation Technique Practiced? J Altern Complement Med. 2011;17(7):629–34. doi: 10.1089/acm.2010.0332. 21711203.
17. Green M, DeCourville N, Sadava S. Positive Affect, Negative Affect, Stress, and Social Support as Mediators of the Forgiveness-Health Relationship. J Soc Psychol. 2012;152(3):288–307. doi: 10.1080/00224545.2011.603767. 22558825.
18. Peng L, Zhang J, Li M, et al.. Negative Life Events and Mental Health of Chinese Medical Students: the Effect of Resilience, Personality and Social Support. J Psychiatr Res. 2012;196(1):138–41. doi: 10.1016/j.psychres.2011.12.006.
19. Kobau R, Seligman ME, Peterson C et al. Mental Health Promotion in Public Health: Perspectives and Strategies from Positive Psychology. Am J Public Health. 2011;101(8):e1-9. doi: 10.2105/AJPH.2010.300083. 21680918.
20. Lazarus RS, Folkman S. Stress, Appraisal, and Coping. New York: Springer Publishing Company; 1984.
21. Murberg TA, Bru E. School-Related Stress and Psychosomatic Symptoms among Norwegian Adolescents. Sch Psychol Int. 2004;25(3):317–32. doi: 10.1177/0143034304046904.
22. Konick LC, Gutierrez PM. Testing a Model of Suicide Ideation in College Students. Suicide Life Threat Behav. 2005;35(2):181–92. doi: 10.1521/suli.35.2.181.62875. 15843335.
23. Klainin-Yobas P, Ramirez D, Fernandez Z et al. Examining the Predicting Effect of Mindfulness on Psychological Well-Being among Undergraduate Students: a Structural Equation Modelling Approach. Personality and Individual Differences. 2016;91:63–8. doi: 10.1016/j.paid.2015.11.034.
24. Bandura A; 1994. Self-Efficacy. In:. (Reprinted in Ramachaudran VS, editor, Encyclopedia of Human Behavior (Vol. 4. p. 71–81). New York: Academic PressH. Friedman [Ed.], Encyclopedia of mental health.) San Diego: Academic Press.
25. Taylor H, Reyes H. Self-Efficacy and Resilience in Baccalaureate Nursing Students. Int J Nurs Educ Scholarsh. 2012;9(1):Article 2. doi: 10