Development of Positive Mental Health Measurement for Gender-Diverse Students in Thailand

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Abstract

Gender-diverse students experience elevated rates of anxiety, depression, suicidal thoughts, and self-harm compared to their heterosexual peers. This study aims to develop a Positive Mental Health Measurement for gender-diverse students in Thailand. Employing a mixed methods research approach, specifically utilizing an exploratory sequential research design, the study began with a qualitative phase to explore the dimensions and meaning of positive mental health through in-depth interviews with 10 participants. Subsequently, a quantitative phase involved a second-order confirmatory factor analysis. The sample comprised 800 participants, divided equally between the exploratory factor analysis (EFA = 400) and second-order confirmatory factor analysis (CFA = 400). The Cronbach's alpha coefficient for the scale was calculated as 0.927, indicating high internal consistency reliability. Results identified seven key components of positive mental health: 1) self-acceptance, 2) prosocial behavior, 3) interpersonal relationships, 4) autonomy, 5) coping ability, 6) self-esteem, and 7) problem-solving. The second-order confirmatory factor analysis confirmed the structure of the positive mental health model, with fit indices meeting standard thresholds (χ^2 = 278.40, p = 0.076, GFI = 0.95, AGFI = 0.92, CFI = 1.00, SRMR = 0.04, RMR = 0.04, RMSEA = 0.01, NFI = 0.99). Standardized loadings of the seven factors onto the higher-order factor were robust, ranging from 0.70 to 0.96. The implication of this study underscores the importance of employing positive mental health measurement to proactively address mental health challenges among undergraduate students with diverse sexual orientations.

Keywords

Gender-diverse; positive mental health; undergraduate students

Introduction

The number of people identifying as gender diverse is increasing, especially among younger generations. Studies indicate that the percentage of gender-diverse students grew from 11.2% in 2015 (Kann et al., 2016) to 15.6% in 2019 (Redfield et al., 2020). Significant advancements in negative attitudes towards the gender-diverse community continue to exist worldwide, resulting in discrimination, sexual violence, and employment difficulties. These adverse attitudes hinder the gender-diverse community from attaining an improved quality of life (Wiwattarangkul & Wainipitapong, 2023).

One significant factor impacting the mental health of gender-diverse students in Thailand is the adherence to traditional values and beliefs that enforce rigid gender norms. Heteronormativity, which posits that only male and female genders are natural and correct, plays a substantial role in this context (Ojanen et al., 2020). This cultural mindset contributes to high levels of stress and mental health issues among gender-diverse students. For instance, 39.1% of gender-diverse students exhibit depressive symptoms. Additionally, 70.3% of those with low psychosocial well-being also experience depressive symptoms. Physical symptoms and anxiety are also prevalent in this population, underscoring the profound impact of societal norms on their overall mental health (Singsatid & Nimnuan, 2023)

A review of the literature reveals that gender-diverse students face significant challenges and barriers impacting their mental health. For example, a study in Nigeria found that gender-diverse students are at a higher risk of experiencing violence in educational institutions and are more likely to develop mental health disorders compared to the general student population. Additionally, the severity of discrimination and prejudice against gender-diverse students vary significantly between schools and universities, often intensifying in higher education settings (Okanlawon, 2021). This situation is consistent with the context in Thailand. Khantharot et al. (2022) examined the mental health of gender-diverse students in Thailand. They found that 32.4% of their sample, primarily women who love women or lesbians, had lower mental health than the general population, especially among students aged 20–30 years. The most common experiences among the sample were physical and psychological abuse, discrimination, anonymity, family/national origin issues, and social exclusion. These experiences significantly impact the mental health of gender-diverse students.

Initially conceptualized by Marie Jahoda, positive mental health extends beyond the absence of mental illness to encompass a state of well-being where individuals can actualize their abilities, manage life's ordinary challenges effectively, maintain productive work, and contribute meaningfully to their communities (Jahoda, 1958). This comprehensive perspective emphasizes psychological resilience, self-acceptance, and the capacity to sustain fulfilling relationships while pursuing personal goals. In the context of gender-diverse students, positive mental health assumes particular significance and specificity compared to other demographic groups, owing to distinct stressors and protective factors. Gender-diverse students frequently confront minority stressors such as prejudice, discrimination, and societal stigma related to their sexual orientation or gender identity (Meyer, 2003). These stressors often contribute to heightened rates of mental health difficulties, including anxiety and depression (Hatzenbuehler, 2009). Despite these challenges, the research underscores the pivotal role of gender-diverse student environments, communal support networks, and resilience in fostering positive mental health outcomes (Layland et al., 2021). Studies

demonstrate that access to supportive healthcare services and inclusive institutional policies can effectively mitigate the adverse effects of minority stress on the mental health of gender-diverse students (Coulter et al., 2016).

A comprehensive review of the literature from 2011 to 2023 reveals significant progress in developing and validating positive mental health scales across diverse populations. However, there is a notable lack of empirical evidence and specific measures tailored to the unique experiences and challenges faced by gender-diverse students. Vaingankar et al. (2011) developed a culturally sensitive positive mental health measurement for Asian adults in Singapore, employing both exploratory and confirmatory factor analyses. The instrument demonstrated good psychometric properties, but its generalizability to other populations may be limited. Similarly, Vaingankar et al. (2016) tested this positive mental health instrument among 360 outpatients with mental disorders in Singapore, showing a good fit with a six-factor model, high internal consistency ($\alpha = 0.85$), and adequate convergent and discriminant validity.

However, the focus on individuals with mental disorders limits its generalizability. Lukat et al. (2016) evaluated a positive mental health scale among students aged 18 and above, confirming its reliability and validity across various samples. However, the study did not specifically focus on gender-diverse individuals, limiting its applicability to this group. Orpana et al. (2016) adapted the Mental Health Continuum-Short Form (MHC-SF) for use in Canada, confirming its structural validity and internal consistency. This adaptation demonstrated the need to tailor positive mental health measures to fit the cultural context of different populations. Still, again, it did not address the needs of gender-diverse individuals. Özpulat et al. (2022) developed a positive mental health scale for Turkish adolescents based on the self-determination theory, emphasizing autonomy, competence, and relatedness.

The scale showed strong psychometric properties, including reliability and validity, yet it did not specifically consider gender diversity. Velten et al. (2022) investigated the measurement invariance and stability of a positive mental health scale across eight countries, affirming its suitability for diverse populations. While this research underscores the global applicability of positive mental health scales, it does not directly address the unique challenges faced by gender-diverse students. Luijten et al. (2019) evaluated the MHC-SF among Dutch adolescents, finding a satisfactory-to-good fit for the three-factor model, good internal consistency ($\alpha = .91$), and support for convergent and divergent validity. The MHC-SF also showed gender and age factorial invariance, making it a promising tool for assessing adolescents' PMH. However, this study did not specifically focus on gender-diverse individuals.

Aldridge et al. (2023) conducted a longitudinal study exploring the role of mental health symptoms and social support in life satisfaction among individuals undergoing gender-affirming hormone treatment (GAHT) in the United Kingdom. While the study provides valuable insights into the experiences of gender-diverse individuals, it did not focus on developing or validating a positive mental health measure. These studies highlight the growing interest in assessing positive mental health across various populations. However, there remains a significant gap in validated positive mental health measures specifically tailored to gender-diverse students, particularly within the cultural context of Thailand. The unique challenges faced by this population, such as discrimination, stigma, and lack of social support, necessitate the development of a culturally sensitive and psychometrically sound instrument.

The present study aims to address this gap by developing positive mental health measures for gender-diverse students in Thailand. By considering this population's specific cultural context and distinct experiences, this research seeks to create a reliable and valid tool for assessing their mental well-being. The development of such a measure will contribute to a better understanding of the mental health needs of gender-diverse students in Thailand and inform the design and implementation of evidence-based interventions and support services.

Positive mental health

Theoretical framework

Jahoda (1958) introduced the concept of positive mental health as a persistent trait in an individual's personality and identified six critical ideas related to healthy mental health: self-awareness, self-actualization, psychological integration, autonomy, reality perception, and environmental mastery. Mental health literature focuses on well-being, which involves an individual's subjective life assessment based on their surroundings and emotional states linked to their psychological and social functioning (Hatch et al., 2010). Jahoda's theory emphasizes the importance of self-awareness in developing self-acceptance and self-belief (Coronel-Santos et al., 2022).

Positive mental health is a multifaceted concept that integrates both hedonic and eudaimonic dimensions of well-being. The hedonic perspective focuses on experiencing positive emotions, deriving pleasure from life, and achieving overall life satisfaction. Conversely, the eudaimonic perspective emphasizes personal growth, self-actualization, and fulfilling one's potential (Keyes, 2002; Ryan & Deci, 2001). Positive mental health goes beyond the mere absence of mental illness by encompassing positive psychological functioning and social well-being as integral components (Keyes, 2002). Positive mental health and general mental health are interconnected but distinct concepts. Positive mental health focuses on emotional, psychological, and social well-being, emphasizing the positive dimensions of mental health (Fowler & Dooley, 2023). It is defined by a sense of purpose, fulfillment, and satisfaction with life, characterized by positive functioning and flourishing (Gautam et al., 2024). In contrast, general mental health encompasses a broader spectrum that includes positive and negative aspects of mental well-being. It encompasses the overall mental health status of an individual, considering not only well-being but also symptoms of mental disorders and psychological distress (World Health Organization, 2004).

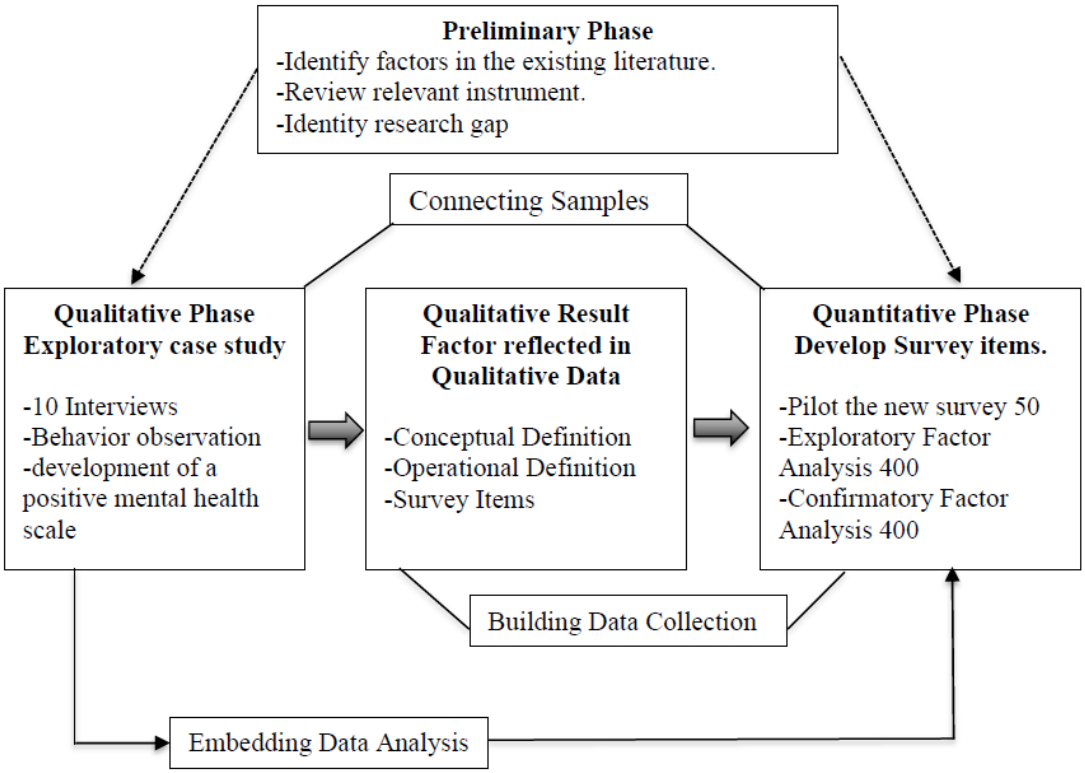
Although Jahoda's (1958) conceptual framework has some limitations, such as the lack of a clear theoretical foundation and potential overlap between components, it is widely regarded as a groundbreaking work that pioneered the study of positive mental health. Jahoda's framework set the stage for subsequent research and pointed to new directions in this field (Lluch, 2002). In 1998, American psychologist Martin Seligman initiated the "Positive Psychology" movement, which focuses on studying the conditions and processes that contribute to the optimal functioning of individuals, communities, and societies (Seligman & Csikszentmihalyi, 2000). Positive psychology has expanded upon and applied the basic concepts of positive mental health from Jahoda's perspective, integrating them into empirical studies, research, and the development of interventions to promote well-being at various levels (Linley et al., 2006).

Despite the concept of positive mental health having evolved and gained broader acceptance, applying it within culturally and socially diverse contexts remains a significant challenge for researchers and practitioners. The components and indicators of positive mental health can vary according to each social group's values, norms, and ways of life (Vaillant, 2012). Therefore, cross-cultural studies are essential to understanding the similarities and differences in perceptions and expressions of positive mental health within different contexts. Such studies will inform the development of measurement scales and intervention programs that are consistent with and suitable for specific cultural contexts.

Research design and methods

Mixed methods research integrates qualitative and quantitative data collection and analysis approaches within a single study (Creswell & Clark, 2018). Furthermore, these methodologies aim to systematically merge qualitative and quantitative findings to comprehensively respond to research inquiries. Data integration, which systematically combines qualitative and quantitative data, can occur at various stages, such as study design, methods (including data collection and analysis), and reporting/data interpretation (Creswell & Clark, 2018). An exploratory sequential design exemplifies a mixed methods approach, where the qualitative phase of data collection and analysis precedes the quantitative phase (Fetters et al., 2013), as depicted in Figure 1.

Figure 1: A Sequential Exploratory Mixed Methods Research Design



Mixed method data integration

In the qualitative phase, purposive sampling was used to select two groups of key informants who met specific inclusion criteria. Group 1 consisted of five psychology professionals with at least a bachelor's degree in psychology, clinical psychology, or a related field and a minimum of three years of experience counseling gender-diverse adolescents. Group 2 comprised five gender-diverse undergraduate students from public universities in Bangkok who were at least 18 years old, provided written informed consent, scored 44 or higher on the Thai Mental Health Screening Test (TMHS-15) (Mongkol et al., 2009), and demonstrated distinct gender identity-related behaviors as evaluated by the Thai version of the Sexual Orientation and Gender Identity (SOGI) Measure (Kittiteerasack et al., 2019). The target sample size was 10 participants, adjusted based on data saturation (Nastasi & Schensul, 2005).

Data were collected through in-depth interviews with the key informants to explore their definitions of positive mental health, focusing on its concept, demonstrable behaviors or characteristics, and key components. The interviews, lasting approximately one hour each, were audio-recorded, transcribed verbatim in Thai, and analyzed using a mixed deductive-inductive approach based on Jahoda's model of Positive Mental Health. This approach combined a systematic literature review with an inductive analysis to allow specific contextual data to emerge. Additionally, behavioral observation was employed to supplement data collection, providing insights into non-verbal cues and behaviors that complemented the qualitative data gathered through interviews (Creswell & Clark, 2018). The findings from the qualitative phase informed the development of the positive mental health measurement tool. Questionnaire items were formulated based on the operational definition of positive mental health derived from the qualitative study. The instrument underwent rigorous quality assurance procedures, including an exploratory factor analysis to assess construct validity and a second-order confirmatory factor analysis to validate its structural integrity further, ensuring its suitability for research applications.

Following the qualitative data collection through interviews, the researchers defined operational definitions and developed questionnaire items. This process involved a comprehensive review of relevant literature and research on positive mental health, which was combined with the qualitative research findings to create items aligned with the established operational definitions. The survey, designed to measure positive mental health among gender-diverse students in Thailand, employed a 5-point Likert scale. To ensure the quality of the measurement tool, the researchers followed a rigorous validation process. First, content validity was assessed through the index of item-objective congruence process. This involved evaluations by five experts in psychometrics, psychology, and behavioral science to ensure the relevance and appropriateness of each item. The index of item-objective congruence values ranged from 0.60 to 1.00, indicating strong content validity (Rovinelli & Hambleton, 1977). After content validation, a pilot study evaluated item discrimination via corrected item-total correlation (CITC), retaining items with values exceeding 0.30 (Boateng et al., 2018). The removal of seven items failing to meet this criterion resulted in a final scale of 53 items with strong discriminatory power. A pilot test involving 50 gender-diverse students yielded a Cronbach's alpha of 0.94, confirming excellent internal consistency reliability (Cortina, 1993) and suitability for assessing positive mental health in this population.

For exploratory factor analysis, data from 400 gender-diverse students were collected, consistent with recommendations for a sufficient sample size (Taherdoost et al., 2022). Data

adequacy was assessed using Kaiser-Meyer-Olkin (KMO) measure (≥ 0.50) and Bartlett's test of sphericity (p < .05) (Field, 2009). Principal axis factoring (PAF) extraction method was employed with eigenvalues ≥ 1.00 and factor loadings ≥ 0.50 commonality values (> 0.40) to retain variables and factors, followed by varimax rotation (Brunt, 2008; Hair et al., 2018). Second-order confirmatory factor analysis involved 400 participants, ensuring robust results (Hair et al., 2010). Model fit indices included degrees of freedom, root mean square error of approximation (RMSEA), root mean square residual (RMR), standardized RMR (SRMR), Comparative Fit Index (CFI), and Goodness of Fit Index (GFI). Recommended thresholds for model fit included χ^2/df within 1–2 or 1–3, CFI and GFI > 0.90, and RMSEA and RMR < 0.08 (Hu & Bentler, 1999; Kline, 2005; Tabachnick & Fidell, 2007).

Results of qualitative data analysis and definition of Positive Mental health

The qualitative analysis revealed six core elements: interpersonal relationships, autonomy, self-esteem, coping ability, self-acceptance, and prosocial behavior. Among these, self-acceptance and prosocial behavior were identified as distinct components. Both psychologists and gender-diverse students emphasized the importance of positive mental health in realizing individual potential and contributing positively to society. Participants commonly conceptualized positive mental health as encompassing cognitive processes, abilities, and behaviors that pertain to self-concept. This includes self-awareness, recognizing personal potential, adept problem-solving, and effective adaptation to evolving circumstances. The study identified six primary components essential to positive mental health: 1) interpersonal skills, 2) autonomy, 3) self-esteem, 4) coping ability, 5) self-acceptance, and 6) prosocial behavior. The research findings highlight the interconnections between cognitive processes, abilities, and behaviors that contribute to the positive mental health of undergraduate students with gender diversity. These six components exhibit significant interconnections, as illustrated in Table 1 below.

Table 1: Building Data from Qualitative

Theme	Example of quotation	Characteristic
1. **Interpersonal relationships** are the capacity for effective interpersonal communication, relationship building, and mutual sharing that fosters positive emotional experiences among individuals.	"As humans, we must learn to communicate and approach one another without imposing barriers based on gender. By integrating into society and overcoming difficulties stemming from gender differences, we can lead more fulfilling lives." "Our mental health greatly benefits from time together with friends, where we can use our talents to support and uplift one another."	**Abilities:** capacity for effective interpersonal communication relationship building. **Behaviors:** sharing that fosters positive emotional experiences among individuals.

Theme	Example of quotation	Characteristic
2. **Autonomy** is characterized as the capacity to independently choose one's life path, navigating societal norms while exercising self-determination and self-control, and acknowledging personal shortcomings.	"The fact that we don't secretly or pretend to be a certain identity without anyone forcing us to know who we are and what kind of identity we have." "I think it will be like freedom that I can have. I think freedom is what I can do. It's that I can do something that's not out of the box, rules of society, but we can choose to do what we decide.	**Cognitive processes**: Navigating societal norms while exercising self-determination **Abilities**: Capacity to independently choose one's life path, exercising self-control **Behaviors**: Acknowledging personal shortcomings
3. **Self-Esteem** is characterized by individuals' recognition of their strengths, developing a positive self-image, and realizing personal worth. It involves a willingness and capability to enhance oneself to accomplish goals.	"By recognizing our personal strengths and developing a realistic, positive self-image, we can nurture healthy self-esteem. This involves utilizing our talents in constructive ways and continually striving for self-improvement". "True confidence comes from appreciating ourselves despite imperfections. Recognizing our inner talents allows for self-improvement and uplifting others. Accepting we are works in progress provides the self-esteem to reach new heights."	**Cognitive processes**: Development of a positive self-image, realization of personal worth **Abilities**: Recognition of their strengths, capability to enhance oneself to accomplish goals **Behaviors**: Willingness to enhance oneself to accomplish goals
4. **Coping Ability** is the capacity to manage cognitive and emotional processes effectively during challenging circumstances.	"Inner fortitude helps me regulate emotions when adversity strikes. By facing troubles with poise and uplifting others, my coping skills and resilience blossom." "When faced with problems, we can manage situations and our emotions by accepting rather than avoiding them. These skills help us persevere."	**Cognitive processes**: Managing cognitive processes effectively during challenging circumstances **Abilities**: Capacity to manage emotional processes effectively during challenging circumstances
5. **Self-Acceptance** is defined as achieving satisfaction and understanding of oneself, including an awareness of personal strengths and weaknesses	"I accept both my strengths and flaws, as well as everything that makes me who I am. Self-understanding leads to the freedom to express my authentic self." "By embracing my whole self compassionately - strengths, flaws and all - I can live my truth openly and act with conviction aligned with my values."	**Cognitive processes**: Achieving understanding of oneself, awareness of personal strengths and weaknesses **Abilities**: Achieving satisfaction with oneself

Theme	Example of quotation	Characteristic
6. **Prosocial Behavior** is the application of knowledge and skills to benefit others without expecting anything in return, driven by a desire to contribute to the welfare of others.	"When we aid others wholeheartedly by sharing our gifts to smooth their path, we spread joy through serving our purpose beyond ourselves." "I find purpose by using my talents to lift up people in my community without seeking anything in return – working to build a more caring world."	**Cognitive processes**: Driven by a desire to contribute to the welfare of others **Abilities**: Application of knowledge and skills to benefit others without expecting anything in return **Behaviors**: Benefiting others without expecting anything in return

Results of quantitative data analysis

Exploratory Factor Analysis

A total of 400 participants completed a questionnaire designed for exploratory factor analysis. Demographically, the sample consisted of 50% non-binary individuals and 72.30% females, with a mean age of 20 years, representing 32.30% of the total sample. The study highlighted notably high scores for positive mental health among gender-diverse students, particularly in dimensions such as self-acceptance, self-esteem, relationships, autonomy, prosocial behavior, and coping ability, with scores ranging from 4.05 to 4.27. Data analysis indicated a distribution approximating normality, with skewness values ranging from -.003 to -.724. However, kurtosis values slightly deviated from the average (-.823 to -2.01), suggesting a broader distribution. According to established norms, skewness and kurtosis values within -2 to +2 and -7 to +7, respectively, are typical for samples exceeding 300 participants (Byrne, 2006; Hair et al., 2010).

To explore the determinants of positive mental health among gender-diverse students, an exploratory factor analysis was employed. The adequacy of the sample for analysis was confirmed by a Kaiser-Meyer-Olkin measure of 0.891, signifying sufficient intercorrelation among variables for factor analysis. Additionally, Bartlett's test of sphericity yielded a highly significant result ($p < .001$), further supporting the suitability of the data for factor analysis. Initially, the analysis focused on six factors based on the conceptual framework: interpersonal relationships, autonomy, self-esteem, coping ability, prosocial behavior, and self-acceptance. However, a seventh factor, problem-solving, emerged during analysis. Principal components analysis with varimax orthogonal rotation was utilized, extracting these seven distinct components that collectively explained 60% of the total variance in the data.

The factor analysis process rigorously refined measurement items, retaining 28 items from the original set of 53. Each of these items met the criterion of factor loadings exceeding 0.50, ensuring the inclusion of the most pertinent and statistically significant items. This meticulous selection process significantly enhanced the validity and reliability of the positive mental health measure for gender-diverse students. Detailed results of this analysis are comprehensively presented in Table 2 and Table 3, providing a clear overview of the factor structure and item loadings.

Table 2: Kaiser-Meyer-Olkin Value and Bartletts' Test of Sphericity

Kaiser-Meyer-Olkin Measure of Sampling Adequacy	0.891
Chi-Square approximation	3875.829
Significance level	$p < .001$**
Degree of freedom (df)	378

Table 3: Initial Eigenvalues, Total Variance Explained, and Cumulative Percentage Factors of Positive Mental Health

Total Variance Explained							
		Initial Eigenvalue			Extraction Sums of Squared Loading		
	Factor	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1.	Self-Acceptance	7.385	26.375	26.375	7.385	26.375	26.375
2.	Prosocial Behaviors	2.790	9.965	36.340	2.790	9.965	36.340
3.	Interpersonal Relationship	1.653	5.905	42.246	1.653	5.905	42.246
4.	Autonomy	1.444	5.157	47.402	1.444	5.157	47.402
5.	Coping Ability	1.349	4.818	52.220	1.349	4.818	52.220
6.	Self-Esteem	1.155	4.126	56.345	1.155	4.126	56.345
7.	Problem-Solving	1.026	3.663	60.009	1.026	3.663	60.009

Table 4 presents the findings from the exploratory factor analysis (EFA) conducted on the positive mental health scale among undergraduate students with gender diversity, revealing a robust seven-factor structure. The identified factors include self-acceptance, prosocial behavior, interpersonal relationships, autonomy, coping ability, self-esteem, and problem-solving. Factor loadings for each item within their respective factors ranged from 0.559 to 0.778, indicating strong associations between them and their underlying factors. Communalities for all items ranged from 0.512 to 0.715, suggesting that the variables maintain strong relationships with the extracted factors. Specifically, the self-acceptance factor comprised six items (1–6) with factor loadings ranging from 0.583 to 0.741 Prosocial behavior included six items (7–12) with factor loadings between 0.584 and 0.778. Interpersonal relationships comprised four items (13–16) with factor loadings ranging from 0.612 to 0.751. Autonomy encompassed three items (17–19) with factor loadings between 0.677 and 0.738. Coping ability comprised three items (20–22) with factor loadings ranging from 0.641 to 0.715. Self-esteem included three items (23–25) with factor loadings between 0.635 and 0.730. Lastly, problem-solving consisted of three items (26–28) with factor loadings ranging from 0.559 to 0.708. All 28 items met the criterion of factor loading ≥ 0.50 for retention.

Table 4: Factor Loading of Positive Mental Health

No	Item	Factor Loading							Communality
		1	2	3	4	5	6	7	
	Self-Acceptance								
1	I feel proud when I accomplish challenging tasks	**0.741**	0.008	.184	-.105	.071	.111	.152	.635
2	I believe I am capable of becoming a better person	**0.712**	064	.074	.128	.169	.271	.112	.648
3	I can identify as my preferred gender	**0.664**	.115	.082	.294	.135	-.123	.086	.588
4	I am accepting of myself	**0.633**	.002	.195	.391	.196	-.161	.180	.688

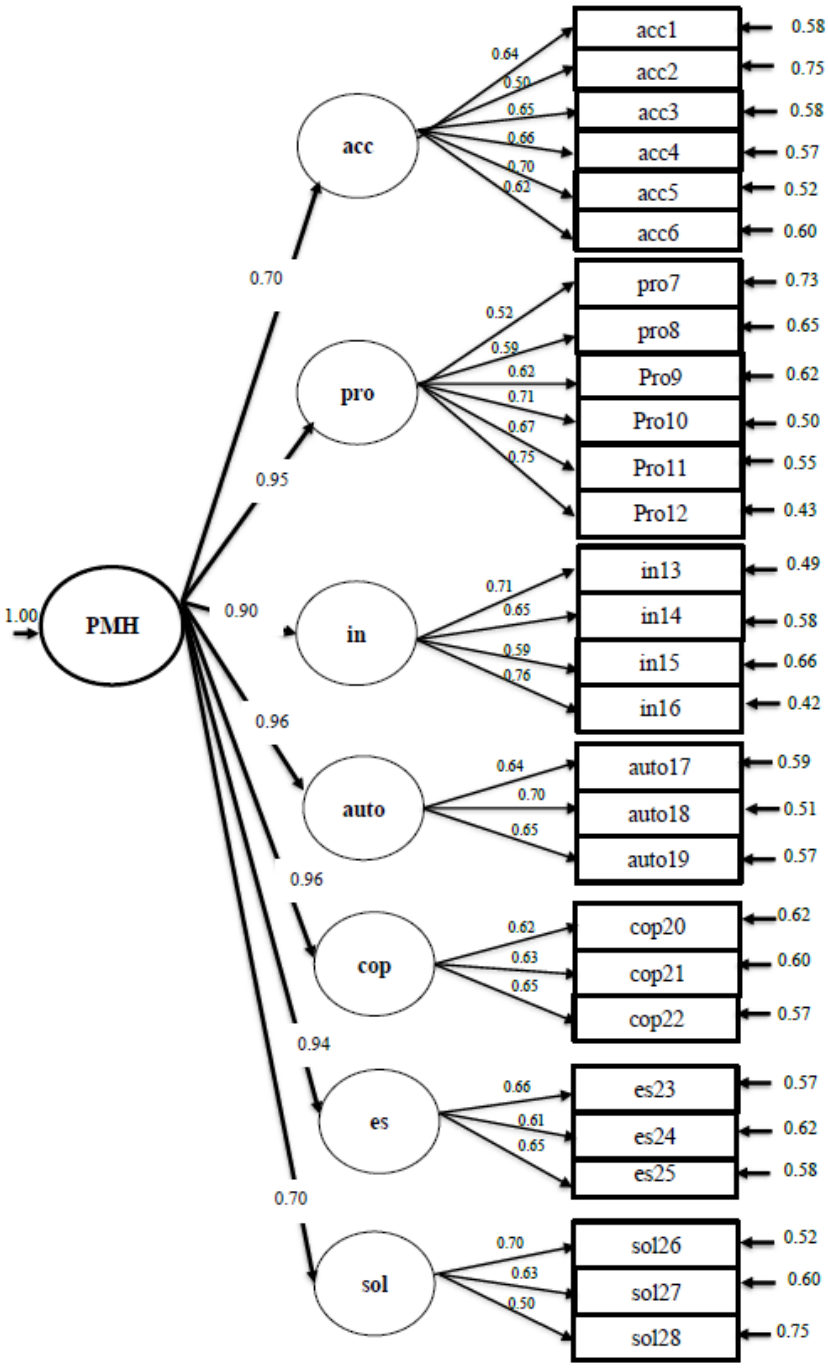
No	Item	Factor Loading							Communality
		1	2	3	4	5	6	7	
	Self-Acceptance								
5	I feel satisfied when I make my own decisions	**0.627**	.125	.079	.201	.186	.205	-.043	.534
6	I embrace my weaknesses and deficiencies	**0.583**	.065	.140	.244	.275	.063	.095	.512
Prosocial Behavior									
7	I brainstorm with peers to advance society	.152	**0.778**	.008	.028	-.028	.066	.037	.636
8	I leverage my leisure for sociable engagements	.014	**0.763**	.006	.003	.045	.042	.131	.604
9	I ideate creative initiatives to advance academia and society	.153	**0.745**	.060	.052	-.054	.047	.009	.589
10	I voluntarily engage in societally beneficial activities without persuasion.	-.129	**0.662**	.047	.168	.202	.182	.015	.559
11	I am consistently engaged in community activities	-.118	**0.598**	.101	.096	.305	.172	-.032	.515
12	I promote collaborative community engagement to identify issues and formulate solutions	.278	**0.584**	.207	-.056	-.116	.002	.202	.519
Interpersonal Relationship									
13	I regularly help others	.100	.087	**0.751**	.041	.165	.080	.037	.619
14	I make people around me happy	.097	.110	**0.689**	.326	-.106	.113	-.005	.626
15	I readily impart the requested knowledge to friends	.225	.181	**0.656**	-.053	.298	-.011	-.086	.613
16	I can get along with others very well	.139	-.029	**0.612**	.007	.025	.099	.238	.642
Autonomy									
17	Friends and family have no influence over my life	.101	.081	-.022	**.738**	.027	.142	.036	.584
18	I will pursue my desired aspirations	.207	.089	.109	**.709**	.231	.023	.140	.639
19	I assert my own identity	.391	.026	.172	**.677**	.131	.040	.055	.663
Coping Ability									
20	I consider what occurs when I'm in difficult situations	.406	.084	.115	.067	**.715**	.103	.066	.715
21	I seek viable solutions when facing adversity	.297	.081	.120	.175	**.676**	.064	.282	.680
22	I consistently reaffirm that every predicament is resolvable	.358	.018	.139	.255	**.641**	.030	.205	.666
Self-Esteem									
23	I believe I have the capacity	.095	.148	.192	.179	.032	**.730**	.128	.649
24	I am willing to display my aptitude	.127	.187	-.067	-.085	.107	**.690**	.002	.550
25	I possess competent proficiency to execute tasks.	.064	.056	.326	.210	-.002	**.635**	.314	.658
Problem-Solving									
26	I can effectively regulate my cognition when facing external pressures	-.027	.180	-.016	.025	.234	.050	**.708**	.592
27	When unjustly treated, I respond rationally over emotionally	.196	-.015	.072	.046	-.008	.129	**.676**	.520
28	When facing environmental changes, I can sufficiently adjust and adapt	.236	.167	.170	.236	.213	.111	**.559**	.539

Confirmatory Factor Analysis of the Second-Order Model

The study included 400 participants who completed the measurement scale—a significant majority identified as bisexual, comprising 52.5% (210 individuals). Moreover, the majority of the sample, 51.7% (207 individuals), were male. In terms of sexual orientation, 61.8% (247 participants). The most prevalent age among the participants was 20 years old, comprising 42.8% (171 individuals) of the sample. The positive mental health components among undergraduate students with gender diversity in public universities in Bangkok, as assessed through second-order confirmatory factor analysis, generally exhibited high levels ($\bar{x}$ = 4.19, 4.16, 4.05, 3.99, 3.97, 3.93). Examination of the data distribution indicated skewness values close to zero, suggesting approximate normality. Regarding kurtosis, most variables demonstrated lower than normal values, primarily negative (-0.890 to 1.612), indicating a wider dispersion of data compared to a normal distribution. However, it is recognized that for sample sizes exceeding 300, skewness values within -2 to +2 and kurtosis values within -7 to +7 are typically considered acceptable indicators of normal distribution (Byrne, 2006; Hair et al., 2010)

The initial findings from the second-order Confirmatory Factor Analysis revealed a discrepancy between the hypothesized model and the empirical data. Subsequently, items with factor loadings below 0.50 were removed based on recommendations by Hair et al. (2010). Utilizing the Modification Index (MI), adjustments were implemented to refine the model, resulting in improved fit indices: (χ^2 = 278.40, p = 0.076, GFI = 0.95, AGFI = 0.92, CFI = 1.00, SRMR = 0.04, RMR = 0.04, RMSEA = 0.01, NFI = 0.99). These modifications culminated in a positive mental health model encompassing seven factors comprising a total of 28 items: self-acceptance (6 items), prosocial behavior (6 items), interpersonal relationships (4 items), autonomy (3 items), coping ability (3 items), self-esteem (3 items), and problem-solving (3 items), as illustrated in Figure 2. Standardized loadings for these factors ranged from 0.70 to 0.96, detailed in Table 5.

Figure 2: Second-Order Confirmatory Factor Analysis of the 28-Item Positive Mental Health for Gender-Diverse Student Scale



Chi-Square = 278.40, df = 246, *p* value = 0.076, RMSEA = 0.01

Table 5: Validity Result of the Positive Mental Health Scale

No	Item	Factor Loading	S.E.	t	R^2	Corrected Item-Total Correlation
First Order confirmatory factor analysis						
Self-Acceptance						
acc1	I feel proud when I accomplish challenging tasks	0.64	-	-	0.42	.480
acc2	I believe I am capable of becoming a better person	0.50**	0.06	8.11	0.25	.429
acc3	I can identify as my preferred gender	0.65**	0.07	9.27	0.42	.482
acc4	I am accepting of myself	0.66**	0.07	9.17	0.43	.526
acc5	I feel satisfied when I make my own decisions	0.70**	0.07	9.56	0.48	.567
acc6	I embrace my weaknesses and deficiencies	0.62*	0.07	9.46	0.40	.512
Prosocial Behavior						
pro7	I brainstorm with peers to advance society	0.52**	-	-	0.27	490
pro8	I leverage my leisure for sociable engagements	0.59**	0.06	9.06	0.35	.492
pro9	I ideate creative initiatives to advance academia and society	0.62**	0.07	8.70	0.38	.555
pro10	I voluntarily engage in societally beneficial activities without persuasion.	0.71**	0.07	9.60	0.50	.646
pro11	I am consistently engaged in community activities	0.67**	0.07	9.33	0.45	.588
pro12	I promote collaborative community engagement to identify issues and formulate solutions	0.75**	0.08	9.89	0.57	.674
Interpersonal Relationship						
in13	I regularly help others	0.71	-	-	0.51	.614
in14	I make people around me happy	0.65**	0.06	11.20	0.42	.592
in15	I readily impart the requested knowledge to friends	0.59**	0.06	9.23	0.34	.540
in16	I can get along with others very well	0.76**	0.06	12.13	0.58	.626
Autonomy						
auto17	Friends and family have no influence over my life	0.64**	-	-	0.41	.541
auto18	I will pursue my desired aspirations	0.70**	0.06	11.39	0.49	.583
auto 19	I assert my own identity	0.65**	0.06	10.89	0.43	.577
Coping Ability						
cop 20	I consider what occurs when I'm in difficult situations	0.62**	-	-	0.38	.580
cop 21	I seek viable solutions when facing adversity	0.63**	0.06	10.34	0.40	.541
cop 22	I consistently reaffirm that every predicament is resolvable	0.65**	0.05	12.58	0.43	.596
Self-Esteem						
es23	I believe I have the capacity	0.66	-	-	0.43	.573
es24	I am willing to display my aptitude	0.61**	0.06	10.42	0.38	.545
es25	I possess competent proficiency to execute tasks.	0.65**	0.06	11.07	0.42	.603
Problem-Solving						
sol26	I can effectively regulate my cognition when facing external pressures	0.70	-	-	0.48	.463
sol27	When unjustly treated, I respond rationally over emotionally	0.63**	0.06	11.07	0.40	.425
sol28	When facing environmental changes, I can sufficiently adjust and adapt	0.50**	0.05	8.79	0.25	.354

No	Item	Factor Loading	S.E.	t	R^2	Corrected Item-Total Correlation
Second Order confirmatory factor analysis						
1	acc	0.70**	0.07	10.27	0.49	
2	pro	0.95**	0.09	10.20	0.91	
3	in	0.90**	0.07	13.70	0.81	
4	auto	0.96**	0.08	12.12	0.93	
5	cop	0.96**	0.08	12.53	0.92	
6	es	0.94**	0.07	13.13	0.89	
7	sol	0.70**	0.06	11.28	0.49	
Chi-Square = 278.40, df = 246, *p* value = 0.076, RMSEA = 0.01						

Internal Consistency Reliability

The Cronbach's alpha (α) coefficients for Factors 1 through 7 were 0.778, 0.859, 0.886, 0.902, 0.916, 0.926, and 0.736, respectively. These coefficients indicate strong internal consistency reliability across the various dimensions of the scale. Furthermore, the overall Cronbach's alpha for the entire scale was 0.927, demonstrating high internal consistency reliability for the positive mental health measurement among undergraduate students with gender diversity. The analysis of the discriminant validity of the positive mental health scale, using the corrected item-total correlation (CITC) method, revealed that all items exhibited corrected item-total correlation values ranging from 0.354 to 0.674. These values surpassed the minimum threshold of 0.3**,** indicating robust associations between each item and the overall score of the scale. This suggests that all items effectively differentiated respondents based on their varying levels of positive mental health. The item with the highest corrected item-total correlation value (0.674) demonstrated superior discriminant ability, while even the item with the lowest corrected item-total correlation value (0.354) maintained an acceptable level of discriminatory power. Thus, these findings affirm the positive mental health scale's reliability in assessing the degree of positive mental health among respondents.

Discussion

The present study aimed to develop and validate a positive mental health scale tailored for gender-diverse students. Employing an exploratory sequential mixed methods design, the research identified seven fundamental components underpinning positive mental health: self-acceptance, prosocial behavior, interpersonal relationships, autonomy, coping ability, self-esteem, and problem-solving skills. These dimensions align conceptually with Jahoda's (1958) seminal theory on positive mental health.

Qualitative inquiry through in-depth interviews sought to explore the components and significance of positive mental health among gender-diverse students. Content analysis revealed six core themes characterizing positive mental health: interpersonal skills, autonomy, self-esteem, coping ability, self-acceptance, and prosocial behavior. These themes partially converge with Jahoda's (1958) criteria for sound mental health, encompassing self-awareness, growth towards self-actualization, integrated personality, self-determination, accurate perception of reality, and environmental mastery. These findings are consistent with previous studies (Gonzales et al., 2022), which identified core facets of positive mental health

encompassing self-worth, positive social connections, distress tolerance, and a sense of purpose.

The second-order confirmatory factor analysis confirmed a seven-component measurement model comprising self-acceptance, prosocial behavior, interpersonal relationships, autonomy, coping ability, self-esteem, and problem-solving skills. These elements correspond to the cardinal criteria of positive mental health articulated in Jahoda's (1958) theoretical framework and align with key dimensions reported in prior empirical research on interpersonal relationships, self-worth, resilience, sociability, and life satisfaction (Keyes, 2002; Vaingankar et al., 2011).

Moreover, the standardized factor loadings (ranging from 0.70 to 0.96) from the first-order factors onto the second-order positive mental health latent variable demonstrated robust structural relationships, consistent with findings by Sequeira et al. (2020) where sub-dimensions of positive mental health strongly loaded onto an overarching wellness construct. These factor analytic results bolster the factorial validity and structural integrity of the measurement model.

Individual convictions and principles are pivotal in fostering self-understanding, while interpersonal reliance forms the bedrock of constructive social connections. As Jahoda (1958) suggested, engaging in creative activities can yield individual and societal benefits. Furthermore, quantitative findings indicated that gender-diverse participants scored highest in autonomy and coping abilities (score = 0.96). Promoting inclusive environments and allowing individuals to express their identities openly can enhance self-confidence and reduce identity-related uncertainties, promoting stability and well-being (Legate & Ryan, 2014). Resilient coping strategies are critical for LGBTQ individuals facing ongoing developmental challenges. Accessing social support, establishing collaborative networks, and employing problem-focused coping strategies have been linked to improved psychological well-being and reduced risks of psychopathology (Juhari et al., 2022; Toomey et al., 2022). Volunteerism has been shown to enhance mental well-being and foster positive attitudes towards the LGBTQ community (Curry et al., 2018; Gates & Dentato, 2020; Layous et al., 2017), possibly due to increased satisfaction and decreased negative affect.

Perceptions of self-worth significantly impact the well-being of LGBTQ individuals (Bridge et al., 2022; Trzesniewski et al., 2013). Positive interpersonal relationships are crucial for optimal functioning, as they mitigate stress and depressive symptoms through supportive interactions (Starks et al., 2015; Szymanski & Gupta, 2009), underpinning long-term well-being and flourishing. Documented evidence suggests that LGBTQ individuals often experience diminished self-acceptance, linked to heightened stress arising from societal and personal non-acceptance of their sexual orientation (Camp et al., 2020; Stevens et al., 2020). Non-disclosure and internalized heteronormativity may contribute to adverse mental health outcomes, such as sadness and reduced well-being. Despite their resilience, LGBTQ adolescents are more susceptible to mood disorders, suicidal ideation, eating disorders, and anxiety compared to their heterosexual counterparts (Lothwell et al., 2020; Sequeira et al., 2020). Addressing these prevalent risks through proactive interventions and preventive strategies could enhance adaptive functioning and bolster resilience in navigating life challenges.

Implications for practice and research

Understanding the specific components of positive mental health pertinent to gender-diverse students is pivotal for devising tailored interventions and support systems. These findings offer practitioners and educators valuable insights to design programs aimed at augmenting self-acceptance, interpersonal skills, and coping strategies within this demographic. Furthermore, recognizing problem-solving as a distinct factor underscores the necessity for targeted skill development initiatives to enhance adaptive capacities across varied academic and social environments. These insights contribute to the scholarly discourse on mental health and provide practical implications for enhancing well-being among gender-diverse individuals in educational settings. By focusing on these critical components, stakeholders can effectively address the unique challenges and strengths associated with gender diversity, thereby fostering a supportive environment conducive to positive mental health outcomes.

Limitations and future directions

This study on positive mental health among gender-diverse students in Thailand has provided valuable insights while highlighting significant limitations for future research. The focus on a specific demographic in Bangkok may restrict the broader applicability of findings, and the cross-sectional design inherently limits the ability to draw causal inferences. Moreover, reliance on self-report measures introduces potential response biases and social desirability effects. Future research endeavors should expand the scope by including diverse populations across various geographical and educational contexts to address these limitations. This approach would enhance the generalizability of results and offer a more comprehensive understanding of positive mental health dynamics among gender-diverse individuals. Longitudinal studies are particularly crucial as they enable researchers to explore developmental trajectories and elucidate the long-term implications of positive mental health factors in this population.

Furthermore, employing multiple assessment methods such as integrating observational data, peer reports, qualitative interviews, and ecological momentary assessments—would enrich the methodological framework. These approaches provide complementary perspectives and deeper insights into the nuanced experiences and fluctuations of positive mental health among gender-diverse students. By pursuing these research directions, the academic rigor of studies in this field can be enhanced, contributing to developing more effective, tailored interventions and support strategies for gender-diverse student populations. This concerted effort will foster a deeper understanding of positive mental health across diverse contexts, ultimately promoting inclusive and supportive educational environments conducive to the well-being of all students.

Recommendations

Based on the study findings, it is evident that self-acceptance and problem-solving exhibit comparatively lower significance relative to other factors. Future research would benefit from conducting a quasi-experimental study to develop a learning management program to promote mental health, specifically targeting enhancements in self-acceptance and problem-

solving skills. Additionally, it is recommended that the Positive Mental Health Scale be utilized in studies involving individuals from the LGBTQ+ community across various age cohorts, including adults, and within educational settings ranging from elementary to secondary schools. Extending the application of this scale will contribute to a broader understanding of positive mental health dynamics across diverse demographic groups and educational contexts.

Conclusion

This study provides crucial insights into the levels of positive mental health among gender-diverse students and lays a foundation for future research. It also underscores the effectiveness of the positive mental health questionnaire as a reliable tool for assessing well-being in this demographic. These contributions are significant as they aid in identifying students who may experience lower levels of functioning, thereby facilitating early interventions aimed at preventing psychological difficulties, academic underachievement, and personal discontent. Understanding the impact of proper functioning on adolescents is paramount. This research introduces a more precise approach to identifying and supporting gender-diverse students in managing challenges and achieving optimal well-being. Such knowledge acquisition not only enhances mental health literacy among these students but also strengthens their ability to navigate and cope with various life stressors effectively. Moving forward, additional measures are imperative to further improve individuals' mental well-being, particularly within the physical and social environments of secondary education institutions. Effective strategies aimed at promoting mental well-being and enhancing corporate social responsibility can play a pivotal role in reducing prejudice and stigma associated with gender diversity. Recognizing and understanding the diverse levels of positive mental health among gender-diverse students is the foundational step toward developing inclusive and supportive educational environments. This understanding lays the groundwork for implementing targeted interventions that foster resilience and promote a positive school experience for all students.

Ethics statements

This study was reviewed and approved by the Institutional Review Board of Srinakharinwirot University (No. SWUEC-G-257/2566X). The participants provided their written informed consent to be interviewed in this study.

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