

DEVELOPMENT OF A PSYCHOLOGICAL RESILIENCE MEASURE FOR THAI HIGH SCHOOL STUDENTS

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ABSTRACT: This research aimed to develop and validate a resilience measure for Thai high school students. The research was conducted in two phases: 1) synthesizing the components and the indicators, and 2) developing and validating the instrument. Using multi-stage sampling, 2,067 students completed the 5-point rating scale. Construct validity was examined with second-order confirmatory factor analysis (CFA), and item quality was analyzed using item response theory (IRT). Findings revealed that the 10 components of resilience, reviewed content validation by experts (CVR=1.00). The CFA confirmed the measurement model had an excellent fit with the empirical data (Chi-Square=221.086, df=190, p=.0607, CFI=.999, TLI=.998, RMSEA=.009, SRMR=.011). The IRT analysis showed all 37 items had discrimination parameters (a) ranging from 0.638 to 2.584 and well-distributed difficulty parameters (b). It is concluded that this instrument possesses high construct validity and item quality according to psychometric standards, making it a reliable tool for measuring and assessing student resilience.

Keywords: Resilience, Scale Development, Confirmatory Factor Analysis, Item Response Theory, High School Students

INTRODUCTION:

In the modern era, the world faces multiple concurrent challenges. The economic globalization that once propelled the world is stalling, while social cohesion is eroding due to rising political unrest. The transition to Industry 4.0 has introduced automation, artificial intelligence, and digital technologies that are completely reshaping the employment landscape (Willis Towers Watson, 2021). Consequently, past work methods and in-demand skills may no longer be sufficient. Education, therefore, plays a crucial role in preparing citizens to navigate these fluctuations. Curricula must shift to focus on building "competence," which extends beyond mere "skill." According to the OECD framework (2019), individuals must be able to integrate knowledge, skills, as well as attitudes and values, to effectively handle complex and uncertain situations. Cultivating the internal attribute of resilience has thus become a foundational pillar, enabling citizens to navigate their lives and careers amidst a rapidly changing world.

For upper secondary school students in Thailand, who are at a pivotal stage of physical, emotional, social, and intellectual development (Srisuda Vanaleesin et al., 2019), the pressures and challenges they face are particularly complex. This group must not only cope with intense academic expectations for university admission but also confront the uncertainty of the future labor market they are preparing to enter. Volatile social conditions and the overwhelming flow of information from digital media also directly impact their mental well-being. The World Health Organization (WHO) has identified depression and anxiety as leading causes of illness and disability among adolescents globally (World Health Organization, 2021), placing many youths under stress and at a high risk for mental health problems. In this context, the attribute of resilience—the ability to recover from adversity—is not merely a supplementary skill but an essential protective factor that helps them manage pressure, maintain emotional equilibrium, and successfully navigate this critical life stage.

A review of the literature reveals that while the components of resilience have been extensively studied (e.g., Grotberg, 1995; Jew, Green & Kroger, 1999; Friberg et al., 2003; Prince-Embury, 2008; Gartland et al.,

2011; Yingping Mai et al., 2021), there is no universal consensus. The composition of resilience often varies according to cultural and social contexts, indicating that no single framework is suitable for all populations (Danielle Patry & Reuben Ford, 2016). Considering the unique context of Thai upper secondary school students—who face specific pressures from a highly competitive educational system, distinct social norms, and family dynamics different from those in Western societies—the assessment of their resilience requires a framework that integrates these dimensions. Therefore, to ensure the validity of the measurement and its accurate reflection of the target population, the researcher reviewed relevant literature and synthesized a new construct of resilience comprising ten components: 1) Flexibility and Adaptability, 2) Coping Process, 3) Hope and Life Purpose, 4) Relationships, 5) Empathy, 6) Emotion Awareness and Control, 7) Self-Efficacy, 8) Autonomy, 9) Self-Esteem, and 10) Positive Attitude. This synthesized framework will guide the development of the resilience instrument.

The researcher aims to develop a rating scale to measure resilience in upper secondary school students. This format was chosen because it effectively captures an individual's own thoughts, feelings, and attitudes, providing access to introspective data that cannot be obtained from external observers. It helps to understand how individuals perceive and trust in their own resilience, which is a cornerstone of this attribute (OECD, 2024). To validate the instrument, a two-step process will be employed: 1) establishing Construct Validity using Confirmatory Factor Analysis (CFA) to confirm that the created items align with the theoretical framework of resilience, and 2) conducting item analysis using Item Response Theory (IRT) to overcome the limitations of Classical Test Theory (CTT). The Graded Response Model (GRM), a model specifically designed for polytomous data from rating scales, will be utilized. A key advantage of IRT is its property of parameter invariance, meaning that item parameters (e.g., difficulty) are not dependent on the sample of respondents, and respondent ability scores are not dependent on the specific set of items administered. This results in highly reliable measurements. Furthermore, IRT provides an Item Information Function, which indicates the precision of measurement at different ability levels, by analyzing the discrimination (a) and difficulty (b) parameters to select the highest quality items for the final scale (Sirichai Kanjanawasee, 2013). Given the importance of resilience in adapting to crises and promoting the well-being of youth, both now and in the future, the instrument developed in this study will be beneficial for school counselors, school psychologists, and policymakers in screening at-risk students and designing targeted interventions to foster resilience effectively. This research, therefore, aims to develop and validate a Psychological Resilience Measure for Thai High School Students that possesses strong construct validity and measurement precision based on Item Response Theory. The goal is to produce a reliable tool that can be practically applied to promote the mental well-being of Thai youth.

METHOD

This study employed a Research and Development (R&D) design, which was divided into two main phases

Phase 1: Synthesis of Components and Indicators

The researcher conducted a comprehensive review of domestic and international literature related to psychological resilience. Domestic sources included materials from Thailand's Department of Mental Health, such as the "Creative Resilience for Teens" manual, the book *Plian Rai Klai Pen Di* [Turning Bad into Good], and the Mental Health Package guidelines. International sources included seminal works by Jew et al. (1999), Benard (1993), Wolin & Wolin (1993), Grotberg (1995), Friborg et al. (2003), Hjemdal et al. (2006), Prince-Embury (2008), Furlong et al. (2009), Gartland et al. (2011), Patry & Ford (2016), and Mai et al. (2021). From this literature, a framework of components and indicators was synthesized and submitted to a panel of five experts to establish content validity using Lawshe's Content Validity Ratio (CVR) (Lawshe, 1975). All 10 components and 37 indicators achieved a CVR of 1.00, confirming their appropriateness. The component names and definitions were then refined based on the experts' qualitative feedback to enhance clarity.

Phase 2: Measure Development and Validation

2.1 Item Generation: Based on the validated framework, an initial pool of 74 items was generated using a 5-point rating scale (1 = Does not describe my behavior or feelings at all to 5 = Describes my behavior or feelings very accurately).

2.2 Preliminary Instrument Validation: The draft instrument was then reviewed for item-level content validity by the same expert panel using Lawshe's CVR. The CVR values for the items ranged from 0.60 to 1.00. All items were retained and subsequently revised based on the experts' qualitative suggestions regarding the wording of questions and response options. The instrument was then pilot-tested with 354 students to perform an item analysis and assess reliability. Item discrimination was evaluated using item-total correlations (Pearson's Correlation Coefficient). The initial 74 items yielded correlations ranging from -0.099 to 0.786. Items with a correlation of .20 or higher were retained, resulting in a final set of 37 items, for which

the correlations ranged from 0.370 to 0.786. An analysis of the subscales' internal consistency reliability using Cronbach's Alpha Coefficient revealed that the alpha values ranged from 0.711 to 0.899.

2.3 Sample and Data Collection: The population was high school students under Thailand's Office of the Basic Education Commission (OBEC). Based on the guideline of 20 subjects per parameter to be estimated in the CFA model (of which there were 37), the minimum required sample size was 740 (Hair et al., 2006). To ensure a robust sample for statistical analysis, data was collected from a total of 2,067 students in grades 10, 11, and 12 using a multi-stage sampling method.

2.4 Final Instrument Validation: Data from the 2,067 participants were used to validate the final scale. Construct validity was examined using Confirmatory Factor Analysis (CFA) to test the fit of the measurement model. Additionally, an Item Response Theory (IRT) analysis was conducted using the Graded Response Model (GRM) to evaluate the psychometric properties of each item (Sirichai Kanjanawasee, 2013).

This study was approved by the Khon Kaen University approval no. HE663305. Written informed consent was obtained from parents/guardians, and assent was obtained from all student participants. All procedures complied with the Declaration of Helsinki and relevant institutional guidelines. Data were collected anonymously and stored securely.

RESULTS

Development and Validation of the Resilience Measure

Sample Demographics, The sample for the final instrument validation consisted of 2,067 high school students. The sample was evenly distributed across grade levels, with 689 students (33.33%) from 10th grade, 689 students (33.33%) from 11th grade, and 689 students (33.33%) from 12th grade. Participants were drawn from all four major regions of Thailand.

Construct Validity, A Second-Order Confirmatory Factor Analysis (CFA) was conducted to examine the instrument's construct validity. All indicators exhibited statistically significant standardized factor loadings (β) on their respective latent factors ($p < .05$), with values ranging from 0.282 to 0.843. Furthermore, the squared multiple correlations (R^2) indicated that the variance in each item was adequately explained by its latent factor, with values ranging from .079 to .710. This confirms that all items are effective measures of their intended components (see Table 1).

TABLE 1 Results of the Second-Order Confirmatory Factor Analysis for the Psychological Resilience Measure

Component	<i>SE</i>	<i>β</i>	<i>Factor Score</i>	<i>R²</i>
FA1	0.000	0.812*	0.196	0.659
FA2	0.029	0.639*	0.078	0.409
CP1	0.000	0.803*	0.204	0.645
CP2	0.026	0.825*	0.259	0.681
H1	0.000	0.776*	0.140	0.603
H2	0.027	0.843*	0.162	0.710
R1	0.000	0.666*	0.016	0.443
R2	0.037	0.490*	0.009	0.241
R3	0.039	0.507*	-0.008	0.257
E1	0.000	0.742*	0.183	0.551
E2	0.036	0.451*	0.051	0.203
E3	0.035	0.541*	0.049	0.293
E4	0.037	0.358*	0.033	0.128
EC1	0.000	0.282*	-0.004	0.079
EC2	0.156	0.622*	0.011	0.386
EC3	0.146	0.563*	-0.008	0.317
SE1	0.000	0.678*	0.089	0.459
SE2	0.036	0.656*	0.101	0.431
SE3	0.037	0.649*	0.082	0.422
SE4	0.036	0.760*	0.131	0.577
A1	0.000	0.689*	0.024	0.475
A2	0.033	0.687*	0.041	0.471
A3	0.033	0.727*	0.037	0.528

Component	<i>SE</i>	<i>β</i>	<i>Factor Score</i>	<i>R</i> ²
ST1	0.000	0.800*	0.180	0.639
ST2	0.029	0.736*	0.175	0.542
ST3	0.025	0.745*	0.103	0.556
PA1	0.000	0.703*	0.040	0.495
PA2	0.033	0.616*	0.030	0.380
PA3	0.032	0.582*	0.022	0.338

The overall measurement model demonstrated an excellent fit with the empirical data. The goodness-of-fit indices were all within the acceptable to excellent range: *Chi-Square* = 221.086, *df* = 190, *p-value* = 0.0607, *CFI* = 0.999, *TLI* = 0.998, *RMSEA* = 0.009, and *SRMR* = 0.011 (*AIC* = 136789.422, *BIC* = 138333.098). These results confirm that the 10-component model of resilience possesses robust construct validity (see Figure 1).

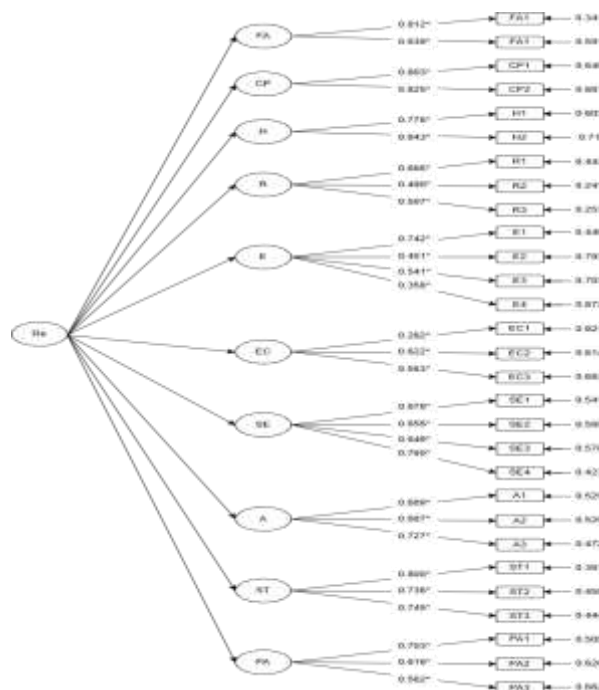


FIGURE 1 The Second-Order Confirmatory Factor Analysis (CFA) Model of the Psychological Resilience Measure

Item Quality Analysis using Item Response Theory (IRT)

The psychometric properties of the 37 items were analyzed using the Graded-Response Model (GRM). The results showed that all items were of high quality. Discrimination parameters (a) ranged from 0.638 to 2.584, indicating that the items effectively differentiate among individuals with varying levels of resilience. The difficulty/threshold parameters (b) were well-distributed across the latent trait continuum, ranging from -5.178 to 2.608 (see Table 2).

TABLE 2 Item Discrimination (a) and Difficulty/Threshold (b) Parameters from the Graded Response Model

Item	Discrimination (a)	Difficulty/Threshold (b)				Item	Discrimination (a)	Difficulty/Threshold (b)			
		(b1)	(b2)	(b3)	(b4)			(b1)	(b2)	(b3)	(b4)
FA2201	0.747	-4.466	-2.274	0.503	2.608	PA1102	2.174	-2.630	-1.758	0.523	0.433
CP1202	1.602	-3.084	-2.010	0.511	0.918	FA1101	1.294	-2.802	-1.768	0.332	0.929

Item	Discrimination (a)	Difficulty/Threshold (b)				Item	Discrimination (a)	Difficulty/Threshold (b)			
		(b1)	(b2)	(b3)	(b4)			(b1)	(b2)	(b3)	(b4)
E1401	0.770	-	-	-	1.605	H1101	1.567	-	-	-	0.809
EC110 2	0.638	-	-	-	1.221	H2201	2.476	-	-	-	0.128
R1302	1.311	-	-	-	0.300	H1202	2.516	-	-	-	0.459
SE130 2	1.615	-	-	-	0.723	R1101	1.936	-	-	-	0.249
FA120 2	1.886	-	-	-	0.763	SE120 1	1.788	-	-	-	0.623
FA130 2	1.259	-	-	-	0.665	CP220 1	2.067	-	-	-	0.756
CP210 2	1.686	-	-	-	1.157	E1201	1.084	-	-	-	1.185
R1202	1.197	-	-	-	1.068	EC120 2	1.756	-	-	-	0.684
E1302	1.263	-	-	-	0.659	A1102	2.140	-	-	-	0.130
SE110 2	1.806	-	-	-	0.496	ST120 1	2.015	-	-	-	-
SE140 2	2.240	-	-	-	0.510	PA120 2	1.627	-	-	-	0.592
ST110 1	2.584	-	-	-	0.023	PA130 2	1.524	-	-	-	0.864
ST130 1	2.352	-	-	-	0.472	H2102	2.110	-	-	-	0.157
FA210 2	1.962	-	-	-	0.779	A1201	2.191	-	-	-	0.227
E1101	1.920	-	-	-	0.247	CP110 1	1.181	-	-	0.109	1.310
EC130 1	1.468	-	-	-	0.431	CP130 2	1.864	-	-	-	0.664
A1301	2.293	-	-	-	0.199						

Furthermore, the Test Information Function (TIF) analysis revealed that the measure provides a high level of information (i.e., measurement precision) across a wide range of the resilience trait continuum, confirming its effectiveness for assessing individuals at different ability levels (see Figure 2).

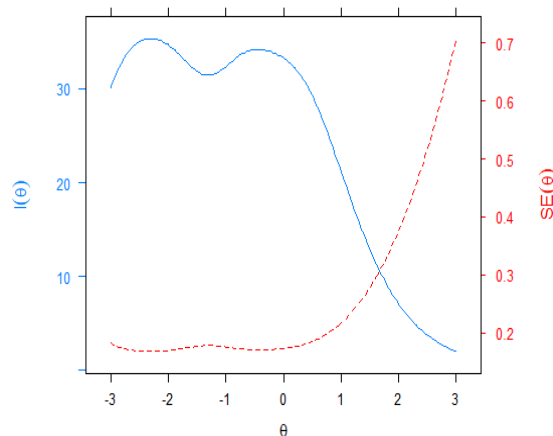


FIGURE 2 Test Information Function (TIF) for the Psychological Resilience Measure

DISCUSSION

This research aimed to develop and validate a resilience measure for Thai high school students. The findings give rise to two primary points of discussion

1. The Appropriateness of the Resilience Construct Framework in the Thai Context

The initial phase of this research presented a systematically synthesized framework of resilience, comprising 10 core components, which received expert validation for content validity (CVR=1.00). This structure reflects that resilience is a complex and multi-faceted construct, consistent with the concepts of prominent scholars (e.g., Grotberg, 1995; Masten, 2014). Synthesized components such as *Flexibility and Adaptability* and *Coping Process* are central to resilience, enabling individuals to manage stress and recover from adversity, which aligns with the stress and coping theory of Lazarus and Folkman (1984).

Notably, the inclusion of components like *Relationships* and *Empathy* underscores the importance of social-interactive factors. These serve as critical sources of support for adolescents, particularly within the Thai culture that values interdependence. A strong social network, therefore, not only mitigates the impact of stress but also forms a crucial foundation for well-being, as Southwick et al. (2014) have indicated that social support is one of the most significant factors in fostering resilience. Furthermore, individual factors such as *Self-Efficacy*, *Self-Esteem*, and *Autonomy* are widely recognized internal assets directly related to the ability to recover from crises. This corresponds with Bandura's (1977) social learning theory and Ryan and Deci's (2017) self-determination theory, which posit that confidence in one's abilities and a sense of freedom in decision-making are essential for psychological growth. The synthesis of components that encompass both internal and social dimensions thus renders this framework comprehensive and highly suitable for the context of Thai students.

In sum, the 10 synthesized components are theoretically sound and holistically capture the resilience of Thai students across individual, social, and future-oriented dimensions.

2. The Psychometric Quality of the Instrument Surpassing Standard Criteria

The validation of the resilience rating scale using advanced statistical methods has unequivocally confirmed the reliability and validity of the developed instrument.

Regarding construct validity, the second-order confirmatory factor analysis (CFA) revealed that the measurement model demonstrated an excellent fit with the empirical data (RMSEA = .009, SRMR = .011, CFI = .999). These fit indices are considered excellent and significantly surpass commonly accepted criteria (Hu & Bentler, 1999). This outcome not only confirms that the 37 items effectively measure the 10 sub-components but also shows that these 10 sub-components meaningfully converge into the higher-order construct of "resilience." This reflects the instrument's high fidelity in measuring the concept of resilience according to the synthesized framework.

Regarding item-level quality, the application of Item Response Theory (IRT) via the Graded-Response Model (GRM)—a modern approach that provides more in-depth information than Classical Test Theory (Kanjanaawasee, 2013)—offered robust empirical evidence of item quality. The discrimination parameters (a-parameters), ranging from 0.638 to 2.584, were predominantly in the high to very high range (Baker & Kim, 2017). This indicates that each item is highly effective at differentiating between students with varying levels of resilience. Concurrently, the difficulty/threshold parameters (b-parameters) were widely distributed across the latent trait continuum (-5.178 to 2.608), and the Test Information Function showed high precision across all ability levels. This confirms that the instrument can measure resilience with accuracy and sensitivity, regardless of whether a student possesses low, moderate, or high levels of the trait.

In conclusion, the developed instrument is not only grounded in a comprehensive and contextually relevant framework for Thai students but also possesses psychometric properties validated through rigorous and modern research methodologies. This makes it a highly reliable tool for wide-ranging applications, including research, counseling, and policy design aimed at promoting the mental well-being of Thai youth.

CONCLUSION AND RECOMMENDATIONS

This research aimed to develop and validate a resilience measure for Thai high school students. The findings are summarized as follows:

Component Synthesis: A resilience framework suitable for the Thai context was synthesized, comprising 10 primary components: 1) Flexibility and Adaptability, 2) Coping Process, 3) Hope and Life Purpose, 4) Relationships, 5) Empathy, 6) Emotion Awareness and Control, 7) Self-Efficacy, 8) Autonomy, 9) Self-Esteem, and 10) Positive Attitude. This framework was validated for content validity by experts, with all indicators achieving a CVR index of 1.00.

Instrument Development and Validation: A 37-item, 5-point rating scale for resilience was developed and validated with a sample of 2,067 high school students. The validation results indicated Construct Validity: The 10-component measurement model demonstrated an excellent fit with the empirical data (Chi-Square = 221.086, $df = 190$, $p = .0607$, CFI = .999, TLI = .998, RMSEA = .009, SRMR = .011). Item Quality (IRT): All items exhibited good to excellent quality, with discrimination parameters (a) ranging from 0.638 to 2.584 and difficulty parameters (b) distributed across the entire range of the latent trait.

The overall results conclude that this resilience scale is a high-quality instrument with robust validity and reliability according to psychometric principles. It is suitable for assessing the resilience of high school students to promote and enhance their mental well-being.

Practical recommendations

Use assessment results to guide holistic skill development: Findings from the rating-scale resilience assessment can be used to promote and holistically develop students' psychological and socio-emotional skills. Schools can draw on individual and group profiles to tailor tiered supports (universal, targeted, intensive) and to monitor progress over time.

Use the components as a blueprint for curriculum and programs: The identified components of resilience can serve as a foundation for designing and developing curricula, classroom activities, and school-wide programs that foster resilience. Implementation should emphasize clear, component-specific learning objectives, structured instructional sequences, and aligned assessment rubrics with progress-monitoring checkpoints.

FUTURE RESEARCH DIRECTIONS

Criterion validity and common benchmarks: Future work should examine the correspondence between scores from the newly developed instrument and established measures (concurrent/convergent validity) to confirm its quality and accuracy. Larger and more diverse samples across contexts are recommended to build a robust evidence base for broader use. In addition, score linking/equating and the development of a common benchmark (crosswalk) are encouraged to facilitate coherent comparisons and interpretation against standard instruments.

Coverage of specific populations and generalizability: Studies should include students with specific characteristics or at-risk profiles (e.g., special educational needs, varied socioeconomic backgrounds, urban/rural settings) to enhance coverage and improve the generalizability of findings.

Related factors and downstream outcomes: Future research should investigate determinants of resilience and its associations with relevant outcomes, such as academic achievement, mental health, and risk behaviors, to deepen understanding and inform the design of evidence-based promotion programs.

LIMITATIONS

Mono-method and self-report bias: Reliance on self-report ratings may be susceptible to social desirability and shared-method variance. Future studies should incorporate multi-informant data (e.g., teacher or parent reports) and behavioral indicators.

Context-dependence of resilience: Resilience is contingent on exposure to adversity and the availability of protective factors. Without explicit measurement of adversity and contextual supports, scores may partially reflect general well-being rather than resilience per se.

Design and temporal properties: The cross-sectional design precludes causal inference and does not establish test-retest stability or sensitivity to change. Longitudinal designs and responsiveness analyses following interventions are needed.

Measurement invariance and fairness: Cross-group comparability (e.g., by sex, grade level, region, socioeconomic status) was not examined. Future work should test measurement invariance (multi-group CFA: configural/metric/scalar) and conduct IRT-based DIF analyses (uniform/non-uniform).

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APPENDIX A

Example : Details of the Components, Definitions, and Indicators of Psychological Resilience

Component	Definition	Sub-component	Indicator
Flexibility and	The ability to perceive, understand,	1) Flexibility means the ability to perceive, accept differing	1.1) Having a positive perspective on praise, criticism, and occurring situations.

Component	Definition	Sub-component	Indicator
Adaptability	and adapt effectively to changing situations, accept differing opinions, use reason to solve problems positively, and manage occurring events appropriately.	opinions, use reason to solve problems positively, and manage occurring events appropriately.	1.2) Perceiving and managing occurring events creatively.
			1.3) Accepting and listening to opinions different from one's own.
		2) Adaptability means the ability to understand and adapt effectively to changing situations.	2.1) Appropriately adapting to various roles, duties, and situations.
			2.2) Being able to work or participate in activities with others effectively in unclear or uncertain situations.
Coping Process	An individual's ability to adjust their thoughts, emotions, and behaviors, or use various methods to manage actual or anticipated problematic situations.	1) Problem-focused Coping means an individual's ability to deal with problems directly, involving analysis, planning, and using real experience to solve problems systematically to alleviate the situation and reduce personal pressure.	1.1) Confronting problems directly.
			1.2) Planning and using personal experience to solve problems.
			1.3) Seeking useful information from others to adapt and apply to one's own thinking for problem-solving.
		2) Emotion-focused Coping means an individual's ability to adjust their own emotions to see the positive side of a situation and to accept and take responsibility for the problem.	2.1) Believing that one can resolve the problem for the better.
			2.2) Having a sense of responsibility for the problems that occur.
Hope and Life Purpose	An individual's ability to set life goals and, when faced with obstacles, to have the determination, intention, effort, and patience, believing that their life is important and valuable, and being able to think, plan, and find ways to achieve their life goals.	1) Hope means an individual's ability to set life goals and, when faced with obstacles, to have the determination, intention, effort, and patience.	1.1) Setting goals in life.
			1.2) Having determination and not giving up in the face of obstacles.
		2) Life Purpose means believing that one's own life is important and valuable, and being able to think, plan, and find ways to successfully achieve life goals.	2.1) Seeing one's own life as important and valuable.
			2.2) The ability to think and plan ways to achieve goals successfully.