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Development of student mental health scale

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ABSTRACT

Mental health among high school (SMA) students is an important issue that needs attention. This research aims to develop a mental health scale for high school students, which is expected to be able to detect whether students have mental problems or not, so that students with problems can get fast and appropriate help. Apart from that, this scale is also expected to be able to see the extent to which students' mental development is good. This scale was developed based on three dimensions of mental health, namely peace with oneself, social interaction function, and basic and advanced psychological needs. The research method employed in this study is the quantitative method. Meanwhile the participants involved in this research were 1045 high school students consisting of students in grades 10-12. The analysis technique uses item-total correlation and exploratory factor analysis. The result was that 25 items had satisfactory item-total correlations with values ranging from 0.307 to 0.677. The results of the exploratory factor analysis that has been carried out are the formation of three dimensions with a different distribution of items from the initial design. Apart from that, this measuring tool also has a cumulative proportion of variance explained by factors of 0.434 and a model fit of CFI (0.910) and TLI (0.900). In the future, in-depth research is needed regarding the external validity of this mental health scale, which is correlated with other variables using convergent and discriminant validity methods.

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ABSTRAK

Kesehatan mental pada siswa Sekolah Menengah Atas (SMA) merupakan salah satu permasalahan penting yang perlu menjadi perhatian. Penelitian ini bertujuan untuk mengembangkan alat ukur kesehatan mental bagi siswa SMA, yang diharapkan dapat mendeteksi apakah siswa memiliki permasalahan mental atau tidak, sehingga siswa yang bermasalah bisa mendapatkan pertolongan yang cepat dan tepat. Selain itu, alat ukur ini juga diharapkan dapat melihat sejauh mana mental siswa berkembang dengan baik. Skala ini dikembangkan berdasarkan tiga dimensi kesehatan mental yaitu berdamai dengan diri sendiri, fungsi interaksi sosial, serta kebutuhan psikologis dasar dan lanjut. Metode penelitian yang digunakan dalam penelitian ini adalah metode kuantitaif, sedangkan partisipan yang terlibat dalam penelitian ini sebanyak 1045 siswa SMA terdiri dari siswa kelas 10-12. Teknis analisis menggunakan korelasi item-total dan analisis faktor eksploratori. Hasilnya 25 item memiliki korelasi item-total yang memuaskan dengan nilai antara 0.307 sampai 0.677. Hasil dari analisis faktor eksploratori yaitu terbentuknya tiga dimensi dengan sebaran item yang berbeda dari rancangan awal, selain itu alat ukur ini juga memiliki proporsi kumulatif varian yang dijelaskan oleh faktor sebesar 0.434 dan model fit CFI (0.910) dan TLI (0.900). Untuk selanjutnya, perlu penelitian mendalam mengenai validitas eksternal skala kesehatan mental ini yang dikorelasikan dengan variabel-variabel lain menggunakan metode validitas konvergen dan diskriminan.

Kata Kunci: *Evaluasi; kesehatan mental; siswa SMA; pengembangan alat ukur*

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INTRODUCTION

Indonesia's current development and human resource quality improvement focus primarily on physically observable aspects rather than psychological well-being. This has resulted in insufficient serious attention being given to mental health issues (Veldasari *et al.,* 2022). A key manifestation of this neglect is inadequate mental health services (Novianty & Cuwandayani, 2018). Additionally, many people still lack awareness of the importance of seeking treatment and care for mental health due to limited knowledge and the high prevalence of negative stigma in society (Putri *et al*., 2020). Meanwhile, field data indicate that mental or psychological issues require intervention as early as possible (Ayuningtyas & Rayhani, 2018). The factors previously outlined, that is, limited mental health services, low public awareness, and high negative stigma, contribute to the lack of knowledge and delayed treatment of mental health issues. According to the WHO (retrieved from https://www.who.int on November 13, 2023), many mental health issues go untreated, leading individuals to experience depression and even commit suicide.

The Ministry of Health (Kemenkes) states that individuals experiencing mental health problems are those with low mental health conditions, affecting behavioral, emotional, cognitive, and mood aspects, or a combination thereof. WHO's 2020 global mental health data approached one billion cases, while in Indonesia specifically, Kemenkes (2020) reported mental disorder cases reaching 197,000 in 2019 and increasing to 277,000 in 2020, demonstrating a consistent annual upward trend (Ulya, 2021). According to Riskesdas' 2018 data, 6.1% of Indonesia's population suffers from depression, while 9.8% experience emotional and mental disorders. West Java, as one of Indonesia's most populous provinces, shows depression rates of 6.5% and emotional disorder rates of 10.2%, with only 9% of depression cases receiving medical treatment (see https://kesmas.kemkes.go.id accessed October 17, 2023). Adolescents represent a particularly vulnerable demographic for mental health disorders. Those with histories of physical or verbal abuse trauma show significantly higher risks of developing mental health conditions ranging from anxiety to depression (retrieved from https://yankes.kemkes.go.id on November 13, 2023). These collective findings underscore mental health as a critical public health challenge requiring urgent attention, comprehensive interventions, and preventive measures.

The Indonesia National Adolescent Mental Health Survey (I-NAMHS) conducted the first national mental health survey of adolescents aged 10-17 years in Indonesia to measure mental disorder prevalence rates. The results indicate that one in three adolescents experienced mental health problems within the past 12 months (retrieved from https://ugm.ac.id/id on 13 November 2023). Since most adolescents are school-aged students who play a vital role in Indonesia's development, safeguarding student mental health becomes critically imperative..

The presented statistical data reaffirm that mental health issues in Indonesia remain a critical challenge, primarily due to limited intervention coverage and insufficient awareness of symptoms indicating emerging mental health problems (Helviza & Mukmin, 2016). The manifested symptoms are frequently not recognized as indicative of disorders, despite substantial evidence that mental health conditions are fundamentally identifiable from childhood through adolescence (Prihatiningsih & Wijayanti, 2019; Zahara, 2018). Commonly overlooked symptoms are often attributed to typical adolescent emotional development, leading to their dismissal as everyday occurrences. Educational institutions, particularly schools, play a pivotal role in the early identification of students' mental health concerns, given their significant influence on students' psychological and emotional development (Kuswadi, 2019). Student mental health is not merely parental responsibility but a collective obligation shared among parents, schools, and the broader community. Consequently, establishing collaborative efforts between schools, public health institutions, and parents is essential for promoting comprehensive student wellbeing encompassing physical and mental health (Nurochim, 2020).

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Paternite (2005) asserts that community-based integrated mental health programs with schools as key implementing partners represent an effective solution for enhancing student health services. Schools contribute significantly to positive student development, playing a crucial role in this framework. Mentally healthy students demonstrate enhanced academic achievement and improved capacity for career path determination aligned with their competencies (Fadli *et al.,* 2017). This evidence establishes a critical foundation for developing quality education through mentally healthy students, fostering harmonious environments within families, schools, and the broader community (Ifdil, 2018; Marjuni, 2020).

Given the critical importance of student mental health, there exists a compelling need for assessment instruments capable of detecting mental health disorders, enabling timely and appropriate interventions for identified cases. Previous research on mental health measurement tools was conducted by Krisdiyanto *et al. (2022),* whose work established the foundation for a digital support system application. In their study, Krisdiyanto *et al.* (2022) assessed adolescent mental health using stress, anxiety, and depression scales. Distinct from existing instruments, the current study develops a mental health assessment tool based on three previously unmeasured mental health constructs. These three constructs were operationalized according to a comprehensive definition of mental health encompassing: 1) an individual's capacity for self-acceptance, 2) ability to maintain social interactions and fulfill social roles, and 3) recognition of psychological needs (Bhugra *et al*., 2013). This assessment tool is designed to comprehensively evaluate all measurable aspects of student mental health by implementing these three constructs to synthesize numerous mental health definitions.

The mental health assessment instrument developed in this study involves individuals in the adolescent developmental phase, specifically aged 15 to 19 years. This age range was selected as these individuals are considered sufficiently mature adolescents who are no longer in transitional periods - neither from the preceding childhood phase nor to the subsequent adulthood phase. The study focuses specifically on Senior High School (Sekolah Menengah Atas/SMA) students to appropriately represent the research subjects: adolescents aged 15-19. Data collection was conducted randomly while ensuring representative sampling of the adolescent population as Senior High School (Sekolah Menengah Atas/SMA) students in the Bandung Raya area, West Java Province.

A measurement instrument can be considered qualitatively robust when demonstrating adequate reliability and validity, as these two attributes represent the most fundamental and critical aspects of any measurement methodology for proper data collection in research. Beyond reliability testing, this study also conducted additional psychometric analyses, including item analysis and construct validity examination through instrument structure assessment using both exploratory factor analysis (EFA) and confirmatory factor analysis (CFA).

LITERATURE REVIEW

Mental Health

Freshwater, in the book titled *"Mental Health and Illness: Questions and Answers for Counsellors and Therapists,"* reveals that in life, psychological stress plays a significant role in human functioning by enhancing awareness and sensitivity to social situations and life experiences. A certain degree of psychological stress is necessary to maintain life balance. However, there is a point where such stress becomes disruptive, necessitating an understanding of psychological stress to preserve mental health. Mental health encompasses a state of well-being that enables individuals to cope with life's stresses, recognize their abilities, learn and work effectively, and contribute to their environment. Thus, mental

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health is not merely the absence of mental disorders (retrieved from https://www.who). This definition aligns with David's assertion that the term mental health lacks a clear or consistent meaning, as it involves not only the absence of mental illness but also self-esteem, self-control, and the ability to maintain meaningful relationships with others (Scheid & Brown, 1999). According to Maslow, basic health needs must be fulfilled, including food, shelter, survival, protection, community, social support, and freedom from pain, environmental hazards, unnecessary stress, and exploitation (Bhugra *et al.*, 2013). A comprehensive definition of mental health, as concluded by Bhugra *et al.* (2013), describes it as a balanced state in which an individual achieves inner harmony, the ability to interact effectively in social contexts, and the fulfillment of both basic and higher functional needs. Positive functionality is the capacity to manage change, relationships, and emotions constructively. A challenge in psychiatry lies in integrating efforts to preserve and promote mental health in clinical practice, research, and education, and actively participating in introducing these concepts in public health initiatives.

Mental health is influenced by biological, social, psychological, school environmental, familial, and peer pressure factors (Bhurga *et al.*, 2013). This aligns with Bronfenbrenner's ecological model, developed by developmental psychologist Urie Bronfenbrenner, which posits that adolescent mental health is shaped by complex interactions of contextual factors (Aldridge & McChesney, 2018). The model delineates a series of nested systems interacting with individuals, in this case adolescents, ranging from the most immediate interactions (microsystem), such as family, to the broadest external systems (macrosystem). Schools (along with other microsystems like family) constitute part of adolescents' microsystem, indicating their substantial influence on physical and mental development (Aldridge & McChesney, 2018). Consequently, schools must commit to safeguarding student mental health by implementing supportive programs, including personal development initiatives and counseling services, ensuring students feel secure, heard, and supported throughout their educational trajectory.

Development and Construction of Mental Health Measurement Instruments

In the book "Tests, Measurement and Research Methods in Behavioral Sciences," Singh explains that the branch of science related to applied statistics, which aims to understand the fundamental principles of test development to produce optimally applicable, consistent, and valid assessments, is called measurement. According to Farmawati dan Hidayati (2019), the measurement process involves quantification or assigning numerical values to variables or attributes within a specific range. Measurement constitutes a critical element in scientific endeavors, including within psychology. Measuring psychological constructs is vital in nearly all empirical and applied research, such as clinical, educational, developmental, and general psychology. The measurement process can be conducted through various methods, including psychophysiological devices, structured supplementary interviews, additional reports, behavioral observations, and scales. This study specifically focuses on the development of a mental health scale. According to Periantalo in Azwar's book titled *"Penyusunan Skala Psikologi"*, psychological scales are characterized by four key features: 1) assessment of non-cognitive dimensions, particularly affective and behavioral components; (2) utilization of theory-derived items that operationalize specific constructs; (3) production of quantifiable numerical scores as primary outputs; and (4) implementation of comprehensive psychometric procedures spanning construct definition through rigorous validity and reliability analyses, culminating in a finalized measurement tool ready for application.

This study operationalizes mental health through the conceptual framework established by Bhugra *et al.* (2013), which comprises three core concepts: 1) an individual's capacity for self-reconciliation; 2) the ability to maintain social interactions and fulfill social roles; 3) recognition of psychological needs. The instrument development framework, as illustrated in **Figure 1**, follows these sequential phases: 1) initial identification of measurement objectives and domains; 2) behavioral specification; 3) blueprint construction; 4) item

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formulation; 5) instrument pilot testing; 6) item analysis; 7) test assembly based on item analysis results; 8) reliability testing; and 9) final scale production.

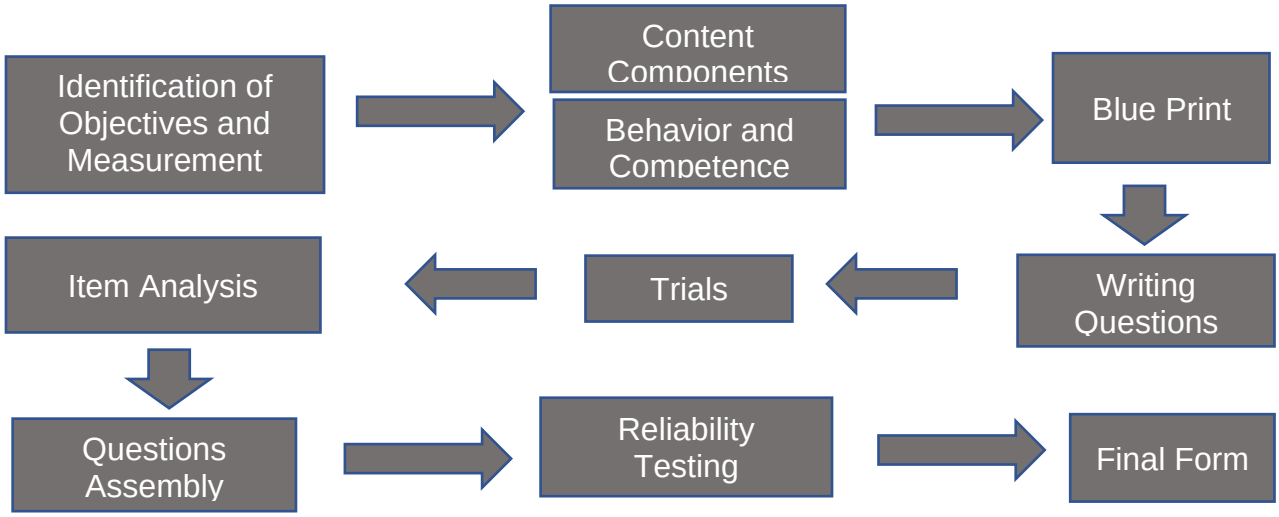

Figure 1. Flowchart of Mental Health Measurement Instrument Development
Source: Azwar in his book titled "Tes Prestasi, Fungsi dan Pengembangan Pengukuran Prestasi Belajar"

METHODS

This study was conducted to develop a mental health measurement tool for students. The research method employed was quantitative research. According to Azhari in his book *"Metode Penelitian Kuantitatif"*, quantitative research is a method aimed at verifying a theory, constructing, presenting statistical descriptions, analyzing data, and being conducted carefully and systematically. The participants in this test measurement were adolescents aged 15–19 years. The total number of participants in this study was 1,045 individuals, with data collected using an online platform (Google Form). Gorsuch, who recommends a subject-to-item ratio of at least 5:1 in exploratory factor analysis, states that a higher ratio is generally preferable (Osborne *et al,* 2019). The participants included 22 Junior High School (SMP/MTS) students and 1,023 Senior High School (SMA/MAN) students. The participants in this study also consisted of 621 females and 424 males.

The researcher developed a mental health measurement tool based on the conceptualization of mental health (Bhugra *et al.*, 2013; Aziz *et al*., 2021). The study examined three dimensions derived from the definition of mental health (definisi kesehatan mental): being at peace with oneself, the ability to engage in social interactions and fulfill social roles, and recognition of psychological needs in individuals, measured through 51 items. A Likert scale was employed as the response format, which consisted of four options: STS (Strongly Disagree/Sangat Tidak Sesuai), TS (Disagree/Tidak Sesuai), S (Agree/Sesuai), and SS (Strongly Agree/Sangat Sesuai). For favorable items, such as "I believe I can accept my weaknesses and shortcomings," scoring was assigned as follows: 1 point for STS (Strongly Disagree/Sangat Tidak Sesuai), 2 points for TS (Disagree/Tidak Sesuai), 3 points for S (Agree/Sesuai), and 4 points for SS (Strongly Agree/Sangat Sesuai). Conversely, for unfavorable items, such as "I feel that I am worthless," reverse scoring was applied, which meant 4 points for STS (Strongly Disagree), 3 points for TS (Disagree), 2 points for S (Agree), and 1 point for SS (Strongly Agree).

The researcher conducted a psychometric analysis in this study using the statistical software JASP. The psychometric analyses included item analysis (item rest-correlation), instrument structure through exploratory factor analysis (EFA), confirmatory factor analysis, and measurement reliability estimation using Cronbach's Alpha. The procedure for developing this study's mental health measurement instrument refers to the diagram presented in **Figure 1.** The research commenced with the identification of variables

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to be measured, which was necessarily grounded in existing phenomena. Subsequently, the study determined which theoretical framework to use to formulate conceptual and operational definitions. This approach aligns with Azwar's perspective in his book *"Tes Prestasi, Fungsi dan Pengembangan Pengukuran Prestasi Belajar",* which asserts that such methodological rigor ensures that scale items remain within the intended measurement domain while preventing the omission of any relevant content that should be incorporated into the scale.

The next step involves constructing a blueprint table, which outlines the detailed content of the formulated operational definition. This blueprint serves as the researcher's guideline for item development, ensuring that each item aligns with the established indicators. Once the items have been systematically arranged, the subsequent phase entails conducting content validity testing. This procedure assesses whether the researcher-developed items appropriately correspond to their intended indicators. In content validity testing, item evaluation is performed by multiple raters utilizing formal scaling methods.

The subsequent phase involves pilot testing the items that have undergone content validity assessment. Data collection for this study was conducted offline through collaboration with Senior High Schools (SMA) in the Bandung Raya area, West Java Province. Additionally, the researcher distributed questionnaires online using Google Forms, which were administered to students. The measurement process utilizing Google Forms required 15-20 minutes for completion. The obtained data were then analyzed to examine construct validity and reliability. Following data processing, the final measurement scale was established..

RESULTS AND DISCUSSION

Item-Total Correlation

Item-total correlation evaluates the internal consistency of a measurement instrument by correlating each item with the total measurement score. An item is considered adequate and suitable for use if it demonstrates an item-total correlation coefficient > 0,30. However, this threshold must be applied while carefully considering the item's representativeness within the overall construct (Feng & Chen, 2020). The item-total correlation calculations in this study were performed using JASP software version 18. The analysis was conducted by selecting the item-rest correlation option within the unidimensional reliability column under the advanced options tab. The resulting item-total correlation coefficients are presented in **Table 1** below..

Table 1. Item Analysis (Item-Total Correlation)

Items in Each Dimension	Item-Total Correlation	Item Description
1. I feel inferior about my current condition	.501	Qualified
2. I think that I am worthless	.677	Qualified
3. I feel powerless and unable to change the situation I am facing	.607	Qualified
4. When comparing myself to others, I feel anxious or unhappy	.510	Qualified
5. I feel like I have no strengths	.614	Qualified
6. I easily feel anxious and worried when facing challenging situations	.424	Qualified
7. I feel incapable of living a good life	.659	Qualified
8. I think that I am useless to others or my environment	.640	Qualified
9. I feel undeserving of recognition and attention from others	.548	Qualified
10. I feel angry at myself when I fail to achieve something	.414	Qualified
11. I struggle to reason when facing problems	.427	Qualified
12. I feel trapped in the problems I experience	.571	Qualified
13. I think that I can do nothing in life, and I regret being born	.635	Qualified

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Items in Each Dimension	Item-Total Correlation	Item Description
14. I feel grateful for what I have or am doing now	.557	Qualified
15. I enjoy what I am doing	.588	Qualified
16. I am happy living my life as it is now	.639	Qualified
17. I feel happy with my current condition	.632	Qualified
18. I believe I can face each day well	.622	Qualified
19. I still appreciate myself for trying hard, even if the results are not as expected	.408	Qualified
20. I feel happy and motivated to face challenges	.489	Qualified
21. I try to love myself in every situation	.444	Qualified
22. I feel that my presence can make people around me smile	.564	Qualified
23. I can find solutions to get out of difficult situations	.533	Qualified
24. I ignore my friends by refusing to socialize	.307	Qualified
25. I prefer to isolate myself from crowds	.352	Qualified

Source: Research 2023

The initial item pool developed for this study consisted of 51 items. However, some items failed to meet the established criteria and were discarded, resulting in a final set of 25 retained items. According to Feng & Chen (2020), items with an item-total correlation value < 0,3 should either be removed from the measurement instrument or reworded. In the present study, items scoring below this threshold were eliminated. Table 1 displays the range of item-total correlation coefficients for the remaining 25 items, spanning from 0,307 to 0,677. This range indicates that all retained items demonstrate measurement capability consistent with the instrument as a whole. Consequently, these 25 items are deemed appropriate for inclusion and suitable for subsequent analyses.

Reliability

Table 2. Reliability Coefficients of the Mental Health Scale

Cronbach's Alpha	N of Items
0.925	25

Source: Research 2023

Table 2 presents the reliability coefficients for the mental health scale using Cronbach's alpha technique, which yielded a value of 0,925. The reliability values per factor were 0,904 for the positive thinking factor, 0,873 for the positive affection factor, and 0,627 for the isolation factor. According to Kilic (2016), scales with reliability coefficients between 0,81 and 1,00 fall into the high category, indicating that the scale developed in this study is classified as having high reliability. These reliability values demonstrate that the majority of items exhibit consistency in measuring mental health.

Exploratory Factor Analysis (EFA) of Student Mental Health

The subsequent analysis in this study involves factor analysis, where the construct validity of an instrument can be demonstrated through factor analysis, whether exploratory factor analysis or confirmatory factor analysis (Retnawati, 2018). The first aspect to consider when conducting exploratory factor analysis (EFA) is examining the KMO MSA (Kaiser-Meyer-Olkin Measure of Sampling Adequacy) and Bartlett's Test values. The KMO MSA is used to assess whether or not the correlation matrix between items can be factored (Ferrando & Lorenzo, 2017). The results of the KMO MSA Test calculation for the Student Mental Health Scale are presented in Table 3 below.

Table 3. KMO MSA Values (Kaiser-Meyer-Olkin Measure of Sampling Adequacy) and Bartlett's Test

KMO and Bartlett's Test

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Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	0.943	
Bartlett's Test of Sphericity	Value	1188.472
	Df	228
	P	<.001

Source: Research 2023

According to Wagiran, if the KMO value exceeds 0,5, their items sufficiently support the variables to proceed with factor analysis (Riscaputantri & Wening, 2018). **Table 3** presents the KMO MSA calculation results from JASP version 18, showing a statistical value 0,943. This indicates that the KMO MSA category for this scale falls within the excellent range and is suitable for further analysis. Additionally, Bartlett's Test of Sphericity demonstrates a significance value of <.001, confirming that the existing items are appropriate for factor analysis.

Table 4. Factor Loadings and Naming of Mental Health Scale Items

Items in Each Dimension	Factor Loadings		
	1	2	3
A. Positive Thinking			
1. I feel inferior about my current condition (35)	0.681		
2. I think that I am worthless (4)	0.679		
3. I feel powerless and unable to change the situation I am facing (36)	0.663		
4. When comparing myself to others, I feel anxious or unhappy (13)	0.652		
5. I feel like I have no strengths (15)	0.652		
6. I easily feel anxious and worried when facing challenging situations (31)	0.621		
7. I feel incapable of living a good life (14)	0.613		
8. I think that I am useless to others or my environment (2)	0.610		
9. I feel undeserving of recognition and attention from others (33)	0.600		
10. I feel angry at myself when I fail to achieve something (32)	0.594		
11. I struggle to reason when facing problems (3)	0.560		
12. I feel trapped in the problems I experience (34)	0.528		
13. I think that I can do nothing in life and regret being born (5)	0.515		
B. Positive Affection			
1. I feel grateful for what I have or am doing now (10)		0.724	
2. I enjoy what I am doing (22)		0.709	
3. I am happy living my life as it is now (11)		0.707	
4. I feel happy with my current condition (24)		0.665	
5. I believe I can face each day well (12)		0.657	
6. I still appreciate myself for trying hard, even if the results are not as expected (19)		0.608	
7. I feel happy and motivated to face challenges (23)		0.579	
8. I try to love myself in every situation (28)		0.577	
9. I feel that my presence can make people around me smile (25)		0.534	
10. I can find solutions to get out of difficult situations (49)		0.534	
C. Isolation			
1. I ignore my friends by refusing to socialize (39)			0.661
2. I prefer to isolate myself from the crowd (40)			0.604

Source: Research 2023

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Table 4 presents the factor loadings for the mental health scale, which yielded three distinct factors. The analysis maintained the same three-factor structure as previously identified, though the distribution of items across these factors changed. The factors were named according to their constituent items as determined by the calculations shown in **Table 4**. The first factor is designated as positive thinking because the items loading onto this factor pertain to how students can maintain positive thoughts about their circumstances. The second factor, positive affection, measures students' experiences of pleasant emotions. The third factor, isolation, comprises items that assess whether students feel socially isolated from their environment or not. Furthermore, this scale demonstrates a cumulative proportion of variance explained by the factors 0,434.

Confirmatory Factor Analysis

The results of the confirmatory analysis conducted in this study are presented in Table 5, based on the critical values of model fit indicators from Engel et al. dalam Yilmaz (2019).

Table 5. Confirmatory Factor Analysis Results

Purpose	Goodness of Fit Index and Cut-off Value				Description
	RMSEA 0,05<RMSEA<0,08	GFI 0,95 ≤ GFI	CFI 0,90 ≤CFI	TLI 0,90 ≤TLI	
Construct Validity Test of the Scale	0,063	0,984	0,910	0,900	Fit

Source: Research 2023

Discussion

The item analysis results using JASP software revealed that only 25 items demonstrated item-total correlations > 0.3, indicating these items were suitable for subsequent analysis (Feng & Chen, 2020), while 26 items were discarded. In this study, the researcher then proceeded with factor analysis, specifically conducting exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). The application of exploratory factor analysis in developing the mental health scale served to summarize relationships between variables and their underlying factors (Beavers *et al*, 2019). The results indicated that the 25 qualified items were appropriately distributed across three factors: positive thinking, positive affection, and isolation. However, these findings proved somewhat unsatisfactory to the researcher, particularly regarding the isolation factor, which contained only two items. This limited representation made the researcher conclude that the existing items inadequately captured this factor. Additionally, the scale demonstrated a cumulative proportion of variance explained by the factors of 0,434, meaning the scale accounts for 43,4% of the total variance.

The subsequent analysis conducted was confirmatory factor analysis (CFA). As shown in **Table 5**, the results indicate good model fit, demonstrating that this scale is appropriate (fit) for measuring mental health by the theoretical model (the foundation used for developing the measurement instrument) for the subject population (high school students/SMA).

The study's additional calculation results show that the mental health scale achieved a reliability coefficient 0,925. However, it should be noted that the reliability coefficients for individual factors ranged between 0,627 and 0,904. This indicates that the reliability of certain factors in this mental health scale may be considered unsatisfactory when compared to the general benchmark that satisfactory reliability typically

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requires coefficients of 0,8 or higher (Feng & Chen, 2020). The isolation factor demonstrated the lowest reliability coefficient at 0.627. This may be attributed to the limited number of items in the isolation factor, comprising only 2 of 25 qualified items. As Livingston et al. (2018) noted, test length significantly influences measurement instrument reliability. These findings support the researcher's contention that the isolation factor requires further development to include more representative items and improve its reliability coefficient.

CONCLUSION

This study has produced a mental health scale for students. The psychometric analysis results demonstrate that the developed scale is reasonably satisfactory and can broadly capture students' mental health. Although the findings indicate the scale's acceptable quality, the researcher believes further item development is necessary to ensure comprehensive representation across all factors. Additionally, the researcher plans to adapt this student mental health scale into a CAT (Computerized Adaptive Test) format in future developments.

AUTHOR'S NOTE

The author declares that there is no conflict of interest regarding the publication of this article and confirms that the data and content are free from plagiarism. We also extend our gratitude for the support and collaboration in writing this article.

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