Validating psychometric properties of dual-continua models for university student mental health assessment

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ABSTRACT

This study rigorously evaluates a mental health assessment tool for college students, grounded in the dual-continua model, which uniquely captures both positive (psychological well-being) and negative (psychological distress) mental health dimensions. Employing a sample of 312 students evenly split by gender, the research meticulously tested the tool's reliability and construct validity. Reliability was confirmed through a robust Cronbach's Alpha of .807, indicating consistency in responses. Construct validity was assessed via confirmatory factor analysis, affirming the tool's capacity to accurately measure the intended constructs with well-being and distress components scoring .828 and .875, respectively. This validation process underscores the instrument's precision and significant contribution to mental health research by providing a nuanced understanding of student mental health through dual-continua models. The findings offer a refined resource for mental health professionals and universities, facilitating the development of targeted interventions. However, the study acknowledges limitations, including its cross-sectional design and the need for further validation across diverse student populations, to ensure the tool's broad applicability and effectiveness in varied contexts.

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1. INTRODUCTION

The study of mental health measurement based on dual-continua models is a crucial step that must be taken to understand and manage individual mental health conditions. This measurement tool is expected to be able to reveal accurate data about the level of anxiety, depression, and stress experienced by a person. In addition, information about the psychological well-being of individuals can also be obtained, so this information is essential to provide appropriate interventions to support the development of mental health problems [1], [2]. Thus, creating mental health measurement tools is not only the development of psychological measurement tools but also a proactive step to improve the community's quality of life and welfare.

Three evolving trends characterize the exploration of mental health measurement tools: the rigorous assessment of tool validity and reliability [3], [4], the investigation of various demographic, psychological, and environmental variables about mental health [5]–[7], and the integration of technology to innovate measurement techniques [8], [9]. This article narrows its focus to the first trend, emphasizing the critical need for robust validation and reliability checks, particularly within the framework of dual-continua models that uniquely measure both positive and negative mental health dimensions. By delving into this area, the research addresses a fundamental gap in the current methodologies, aiming to enhance the precision and applicability of mental health assessments. The choice to concentrate on tool validation reflects an understanding of its

foundational importance in the field, ensuring that the developed instruments not only meet standard psychometric criteria but are also tailored to capture the nuanced experiences of mental health among diverse populations. This approach underlines the article's contribution to advancing mental health research by establishing more reliable and context-sensitive measurement tools, paving the way for more effective interventions and support systems.

The comprehensive mental health assessment of university students, capturing their psychological well-being and distress, remains a pivotal yet challenging endeavor in psychological research and practice. The dual-continua model offers a promising framework by delineating mental health into positive and negative dimensions. Yet, existing measurement tools often fall short of fully encompassing this model's nuanced complexity [1], [3], [10]. This study seeks to bridge this gap by refining and validating a mental health measurement tool tailored for the collegiate demographic, grounded in the dual-continua paradigm. While the potential of this model is vast, we acknowledge the intricacies and limitations present in capturing the fluid and multifaceted nature of mental health. Our objective is to advance the development of psychological measurement tools and take a proactive step towards enhancing mental health interventions and, ultimately, the quality of life and welfare within the academic community. Through this endeavor, we aim to contribute a robust, reliable, and culturally sensitive instrument that can serve as a cornerstone for future research and practice in mental health assessment.

In examining mental health through the lens of the dual-continua model, we delineate two principal dimensions that offer a comprehensive understanding of psychological states [4], [10], [11]. The first dimension encapsulates the positive attributes of psychological well-being, characterized by an abundance of positive emotions, robust social connections, and a pronounced sense of satisfaction with one's life trajectory [4], [12], [13]. These elements collectively foster a conducive environment for thriving mental health, underscoring the importance of cultivating these positive experiences. Conversely, the second dimension of the model brings to light the adverse aspects of psychological distress, which include manifestations of anxiety, depression, and a diminished sense of control over one's emotional state [2], [14], [15]. This dimension emphasizes these factors' detrimental impact on an individual's overall psychological well-being. The dual-continua model thus advocates for a holistic approach to mental health, acknowledging the coexistence of positive and negative dimensions and the necessity of addressing both to achieve optimal psychological equilibrium. In conclusion, the dual-continua model provides a nuanced framework for understanding mental health, advocating for the simultaneous cultivation of positive psychological attributes and the effective management of psychological distress. This balanced approach is pivotal in fostering a comprehensive and resilient state of mental well-being.

This study aimed to test the mental health measurement instrument, framed within the dual-continua model, through a tripartite evaluation process. Initially, the research probes into the efficacy of a comprehensive 24-item mental health scale, designed to encapsulate the essence of high psychological well-being juxtaposed against low psychological distress, aiming to capture a broad spectrum of mental health indicators. Subsequently, the focus narrows to a 12-item scale dedicated to assessing psychological well-being, marked by positive emotions, fulfilling social connections, and an overarching sense of satisfaction with life. The third and final phase delves into a 12-item psychological distress scale, meticulously crafted to gauge the levels of anxiety, depressive symptoms, and perceived loss of control, elements indicative of psychological turmoil. Each stage of this methodical inquiry is underpinned by the objective to rigorously test and affirm the validity of the mental health scales, ensuring they accurately reflect the nuanced dimensions of mental health as proposed by the dual-continua model, thereby contributing a robust tool for the assessment of mental health in diverse populations.

2. METHOD
2.1. Research procedure

This research focuses on refining and enhancing mental health assessment tools' accuracy in university settings. A vital aspect of this improvement involves strategically reducing response options for survey questions. While the original format provided five potential answers, this study advocates for a more streamlined approach by offering only four choices, intentionally omitting the neutral option. This adjustment aims to elicit more definitive responses from university students, potentially leading to more prosperous and more actionable insights. By applying this refined approach to a set of 24 meticulously chosen questions and deploying them among many university students, the study seeks to gather substantial data. This initiative is not just about tool refinement; it's about improving the depth and reliability of mental health evaluations in the academic environment, thereby fostering a better understanding of student mental health in university.

2.2. Data collections

The data were obtained using the Azira Mental Health Scales (AMHS-24). The scale measured two aspects of psychological well-being (positive emotions, positive social relationships, and life satisfaction) and psychological distress (anxiety, depression, and loss of control). This measuring instrument is in the form of a *Likert scale* with four answer choices. The four answer choices are very strongly agreed (VSA), agree (A), disagree (D), and strongly disagree (SD). A score is given by assigning values of 4, 3, 2, and 1 for psychological well-being factors and 1, 2, 3, and 4 for psychological distress components to assess mental health.

2.3. Research subjects

The study subjects totaled three hundred and twelve students from Islamic higher education in East Java, Indonesia. Subject selection is based on the need for an adequate number of issues, taking into account the balance of gender (male and female) and department (Islamic education, social education, psychology, accountancy, management, law, Arabic language, English language, mathematics, architecture, biology, medicine). The age of the subjects ranged from 19 to 23 years (mean 20.30, standard deviation 1.15). The study used 312 students to test a mental health tool, which is a good number for this kind of research [16]. This many participants make the results more reliable and help ensure the tool works as it should, as in previous studies [17], [18]. The students were from different backgrounds and genders, making the findings applicable to a wide range of university students. However, the study mentions that more research is needed with different kinds of students to make sure the tool works well for everyone. Overall, the size and makeup of the study group were well-chosen for the study's goals, but more work is needed to confirm these results Table 1.

Table 1. Profile of research subject (N=312)

Demographic profile	N	Percentage
Gender		
Male	156	50
Female	156	50
Department		
Islamic education	26	8.33
Social education	26	8.33
Psychology	26	8.33
Accountancy	26	8.33
Management	26	8.33
Law	26	8.33
Arabic language	26	8.33
English language	26	8.33
Mathematics	26	8.33
Architecture	26	8.33
Biology	26	8.33
Medicine	26	8.33
Age (Mean=20.30, SD=1.15)		
18 years old	12	3.8
19 years old	66	21.2
20 years old	110	35.3
21 years old	74	23.7
22 years old	39	12.5
23 years old	11	3.5

Table 1 demonstrated that the equal gender distribution and the wide range of departmental affiliations among the 312 research subjects indicate a deliberate effort to ensure diversity and representativeness in the sample, which enhances the study's validity. The focus on a younger demographic, with a mean age of 20.30, suggests that the research is particularly relevant to young adults, potentially offering insights into this age group's perspectives and behaviors. However, the concentration within a narrow age range might limit the findings' applicability to broader populations. The methodological choices reflected in the table underscore the study's potential strengths in terms of diversity and focus while also hinting at its scope limitations.

2.4. Data analysis

The data were analyzed to test the reliability of the instruments used to measure mental health. Reliability refers to the extent to which measurement results are consistent when repeated. In this study, reliability testing aimed to determine the consistency of mental health instruments. Reliability calculations are made after each item has been tested for validity through empirical testing. An item is valid if it has a corrected item-total correlation of more than .300. At the same time, the reliability of the measuring instrument is declared valid if a Cronbach alpha value of more than .600 is obtained.

3. RESULT AND DISCUSSION

3.1. Results

This section outlines the outcomes of three key research findings. Initially, it is established that mental health can be conceptualized through a dual-model framework. Subsequently, the discussion shifts to psychological well-being, highlighting three main components: positive emotions, enriching social connections, and overall life satisfaction. The final part of the findings delves into psychological distress, focusing on prevalent issues such as anxiety, depression, and a perceived lack of control.

3.1.1. The result of the reliability estimates of the mental health scale

The reliability analysis of the Alpha Cronbach technique, applied to 24 items on the mental health scale covering psychological well-being and stress aspects, confirmed the validity of all items. The detailed findings are presented in Table 2. Table 2 presents a reliability analysis of a psychological well-being scale, scrutinizing factors like positive emotion, social relationship, life satisfaction, anxiety, depression, and loss of control through the lens of Cronbach's Alpha, scale mean and variance with item deletion, and corrected item-total correlation. Notably, all items were validated, with individual item deletion barely impacting the scale's robust reliability, as indicated by minimal fluctuations in Cronbach's Alpha (.796 to .805). This subtle variance demonstrates the scale's internal solid consistency and each item's significant contribution to measuring the intended constructs. The overall Cronbach's Alpha of .807 confirms the scale's high reliability, attesting to its efficacy in assessing diverse psychological dimensions.

Table 2. The result of the reliability estimates of the mental health scale (24 items)

Factors	Item	Scale mean if item deleted	Scale variance if item deleted	Corrected item-total correlation	Cronbach's Alpha if item deleted	Status
Positive emotion	E01	57.0250	79.460	.372	.799	Valid
	E02	57.2187	78.874	.386	.798	Valid
	E03	57.4312	79.989	.272	.804	Valid
	E04	57.1156	80.560	.303	.802	Valid
Social relationship	S01	57.2750	81.441	.286	.805	Valid
	S02	57.1625	80.651	.315	.801	Valid
	S03	57.0625	80.078	.374	.799	Valid
	S04	57.1719	79.516	.405	.798	Valid
Life satisfaction	L01	57.1281	80.482	.302	.802	Valid
	L02	57.3875	80.012	.344	.800	Valid
	L03	57.0844	80.698	.301	.802	Valid
	L04	57.9187	79.128	.347	.800	Valid
Anxiety	A01	56.8375	80.481	.344	.800	Valid
	A02	57.5281	79.328	.323	.801	Valid
	A03	57.8906	77.847	.419	.796	Valid
	A04	58.0969	78.038	.399	.797	Valid
Depression	D01	58.1094	79.289	.316	.802	Valid
	D02	58.1406	78.291	.407	.797	Valid
	D03	58.3781	78.123	.425	.796	Valid
	D04	58.3375	79.071	.364	.799	Valid
Loss of control	C01	58.4531	79.998	.319	.801	Valid
	C02	58.2594	79.741	.306	.802	Valid
	C03	57.5406	78.970	.329	.801	Valid
	C04	58.0344	78.372	.387	.798	Valid

Cronbach's Alpha=.807

3.1.2. The result of the reliability estimates of psychological well-being

In this segment, we delve into the findings of a thorough reliability assessment carried out on twelve components of the psychological well-being scale. This investigation was conducted using Cronbach's Alpha technique, a standard in measuring internal consistency and reliability. The examination yielded affirmative results, validating the integrity of each item on the scale. For a comprehensive breakdown of these outcomes, one can refer to the detailed data presented in Table 3. This table not only corroborates the reliability of the scale but also enhances our understanding of the dimensions of psychological well-being it aims to measure.

Table 3 shows that the psychological well-being scale has a good level of reliability, with validity between .302 and .718. Alpha reliability reaches .828, indicating consistent and reliable results. Although there were variations in how well each question measured psychological well-being, the instrument was trustworthy. Furthermore, for construct validity testing, get the results as in Figure 1.

Table 3. The result of the reliability estimates of the psychological well-being scale (12 items)

Factors	No	Item in English and Indonesian	Corrected Item	Alpha
Positive emotion	01	Feel that everyday life is full of interesting things *Merasa bahwa kehidupan sehari-hari penuh dengan hal yang menarik*	.526	
	02	Feel that the future looks hopeful and promising *Merasa bahwa masa depan terlihat penuh harapan dan menjanjikan*	.586	.737
	03	Enjoying a relaxed and tension-free atmosphere *Menikmati suasana santai dan bebas dari ketegangan*	.505	
	04	Enjoy the activity or work done. *Menikmati kegiatan atau pekerjaan yang dilakukan*	.686	
Social relationship	05	Feeling that your friends appreciate your existence *Merasa bahwa keberadaan anda dihargai oleh teman anda*	.572	
	06	Feel comfortable in fostering social relationships with your friend *Merasa nyaman dalam membina hubungan sosial dengan teman*	.700	.894
	07	Feel comfortable communicating with your friends. *Merasa nyaman berkomunikasi dengan teman anda*	.726	
	08	Feel comfortable because of the treatment from your friends. *Merasa nyaman karena perlakuan dari teman anda*	.718	
Life satisfaction	09	Feeling happy in living this life *Merasa bahagia dalam menjalani kehidupan ini*	.694	
	10	Feel satisfied in performing daily tasks. *Merasa puas dalam melakukan tugas sehari-hari*	.611	.807
	11	Enjoy what's going on in this life. *Menikmati apa yang terjadi dalam kehidupan ini*	.625	
	12	Feel passionate about doing daily activities. *Merasa bergairah dalam melakukan aktivitas sehari-hari*	.302	

Cronbach's Alpha=.828

Referencing Figure 1, the Chi-square value stands at 1,316, significantly below the threshold of 200, and the Probability level is at .000, well under 200. The root mean square error of approximation (RMSEA) is recorded at .071, falling below the .800 benchmark. Additionally, the adjusted goodness of fit index (AGFI) shows a value of .769, which, despite being below the ideal .900 mark, indicates a reasonable fit. The comparative fit index (CFI) and the Tucker-Lewis index (TLI) both exceed the .900 standard, with values of .939 and .920 respectively. These figures collectively suggest that the model meets the established fit criteria. Consequently, these findings affirm the construct validity of the psychological well-being scale, demonstrating its reliability and efficacy in measuring well-being.
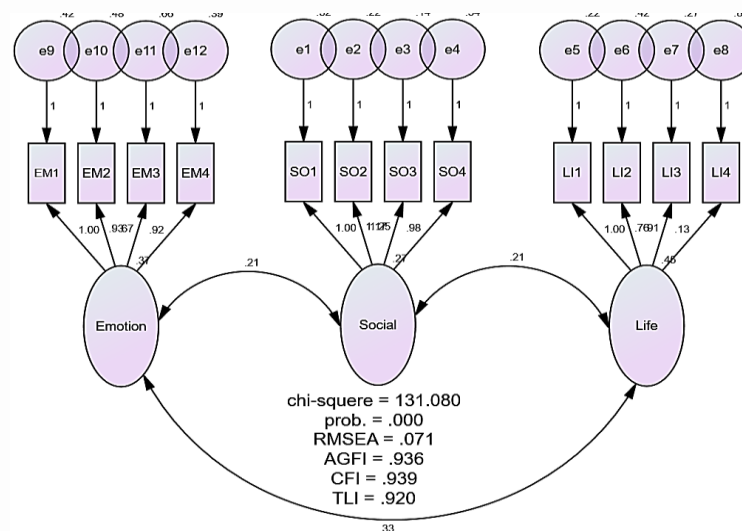

chi-squere = 131.080
prob. = .000
RMSEA = .071
AGFI = .936
CFI = .939
TLI = .920

Figure 1. Construct validity of psychological well-being

3.3.3. The result of the reliability estimates of psychological distress

This section presents the results of the reliability test analysis of 12 (twelve) points of the psychological pressure scale using the Alpha Cronbach technique. The results of the study showed that all items were declared valid. The results of the first analysis on thirty-six items are presented in Table 4.

Table 4. The result of the reliability estimates of the psychological distress scale (12 items)

Factors	No	Item in English and Indonesian	Corrected Item	Alpha
Anxiety	01	Try and try to calm down	.326	.720
		Berusaha dan mencoba untuk tenang		
	02	Being panicked in the face of unwanted situations	.395	
		Menjadi panik letika menghadapi situasi yang tidak diinginkan		
	03	You are finding yourself confused or frustrated.	.714	
		Mendapatkan diri anda sebagai orang yang bingung atau frustasi		
	04	Feeling exhausted and helpless	.686	
		Merasa sebagai orang yang kelelahan dan tidak berdaya		
Depression	05	Feeling at rock bottom	.656	.820
		Merasa berada pada titik yang terendah		
	06	Spending time reflecting on something negative	.618	
		Menghabiskan waktu untuk merenungi sesuatu yang negatif		
	07	Using time to enjoy the feeling of despair	.679	
		Menggunakan waktu untuk menikmati rasanya putus asa		
	08	Feeling useless in carrying out daily activities	.611	
		Merasa sia-sia dalam melakukan aktivitas sehari-hari		
Loss of control	09	Assume that others would be better off if you were dead.	.565	.715
		Beranggapan bahwa orang lain akan lebih baik jika anda sudah mati		
	10	Feeling that you have nothing to look forward to.	.557	
		Merasa tidak memiliki apa-apa dalam menatap masa depan		
	11	Feel like crying when faced with problems.	.490	
		Merasa Ingin menangis ketika menghadapi masalah		
	12	You are feeling unable to restrain your anger.	.527	
		Merasa tidak mampu menahan amarah		

Cronbach's Alpha=.875

Table 4 illustrates that the information regarding item validity and reliability illustrates a nuanced picture of the research scale's effectiveness. Despite a range of item validity scores from 0.326 to 0.714 and the existence of items with a Corrected Item-Total Correlation below 0.300, the overall reliability coefficient of 0.875 indicates a robust internal consistency of the scale. This suggests that, collectively, the items are reliable in measuring the intended construct, although individual item effectiveness varies. Additionally, the effort to validate the construct, as shown in Figure 2, underscores the rigorous approach taken to ensure the scale's accuracy in reflecting the theoretical construct, highlighting the balance between item-level scrutiny and overall scale performance in research methodology.
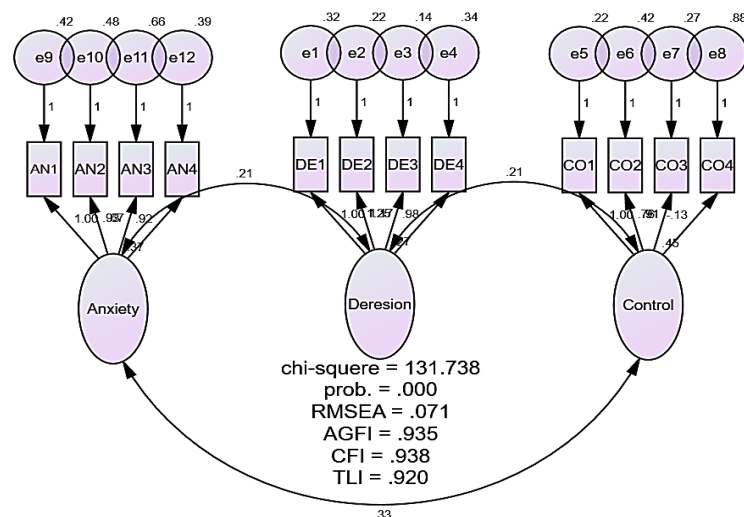

Figure 2. Construct validity of psychological distress

Based on Figure 2, Chi-square=131<200, likelihood=.000<200, RMSEA=071<.800, AGFI=935>.900, CFI=938>.900, and TLI=920>.900. The result shows that all criteria meet the fit criteria of the models. In addition, one item (CO4) had a loading factor of less than .500. These results indicate that the construct validity of the psychological distress scale is satisfactory.

3.2. Discussion

The psychometric assessment of mental health scales, analyzed both as an integral construct within the dual-continua model of mental health and in terms of its distinct dimensions (psychological well-being and psychological distress), yielded Alpha reliability scores of .807 for the dual-continua model, .828 for psychological well-being, and .875 for psychological distress, indicating consistent measurement reliability. Additionally, the construct validity of psychological well-being and distress was corroborated by an appropriate model fit. However, discrepancies were noted in two instances (items E03 and S01) on the mental health scale, where corrected item-total correlations fell below .300, diverging from the otherwise robust values noted across the board.

Our research findings, emphasizing the significance of accurately measuring both psychological well-being and distress within the dual-continua model of mental health, resonate with the studies conducted by researchers [1], [2], [19]. Similar to their work, we found high reliability coefficients that underscore the model's efficacy in comprehensively capturing the spectrum of mental health. This alignment strengthens the argument for the dual-continua model's applicability in diverse settings, highlighting its robustness in assessing mental health dimensions. Conversely, our study presents a nuanced contrast to the other researcher [3], who also validated mental health continuum-short forms and dual continua models, albeit in different contexts. While our findings corroborate the overall utility and reliability of the dual-continua models, the identification of two items with weaker correlations in our study suggests a potential area for refinement not explicitly addressed in their research. This divergence indicates that while the foundational aspects of the dual-continua model hold, its application might benefit from context-specific adjustments to enhance precision and relevance, particularly in the context of university student mental health assessments.

Our findings lend substantial support to the dual-continua model of mental health, echoing the foundational contributions of scholars [20]–[22]. Their pioneering work in developing and applying the dual-continua framework is bolstered by our study, which confirms the model's effectiveness in capturing the complex interplay between psychological well-being and distress. This validation reinforces the model's premise that well-being and distress are not merely opposite ends of a single continuum but distinct constructs that collectively inform a comprehensive understanding of mental health. Moreover, the implications of our research extend to the nuanced comprehension of psychological well-being and distress, in line with theories and empirical findings by researchers [10], [23], [24]. Our study not only affirms the dual-continua model's structure but also enriches the discourse on the components of well-being and their significant influence on mental health. By identifying specific areas within the model that may require refinement, our work suggests avenues for further exploration and potential enhancement of the model, thereby contributing to a more refined and empirically grounded understanding of mental health dynamics.

The implications for the measurement of mental health from our study are substantial. Our findings underscore the effectiveness of the dual-continua model in capturing the intricate aspects of mental well-being and distress, thereby offering a comprehensive framework for assessing mental health. This enhanced understanding aids in the development of more nuanced and accurate tools for mental health evaluation, enabling practitioners and researchers to better identify and address the diverse needs of individuals [25]–[27]. Furthermore, the identification of specific areas within the model that may require refinement suggests opportunities for improving the precision and relevance of mental health assessments, contributing to more effective intervention strategies and support systems tailored to individual experiences of mental health.

Our study highlights how important it is to focus on mental health at universities, taking into account factors like bullying and social media's impact [6], [7], [28]. We found the dual-continua model very reliable for understanding students' mental well-being and distress. This calls for specific mental health programs that can help students deal with issues like bullying and the effects of social media, boosting their resilience and overall mental health. Inspired by our findings, we suggest using technology, as researcher have shown [9], [29], [30], to create digital mental health tools tailored for students. These could include online assessments, mindfulness guides, and support groups, all designed to improve mental well-being and manage stress effectively. Such tech-based approaches would fit well with students' tech-savvy nature and provide broad-reaching mental health support.

4. CONCLUSION

Our study underscores the effectiveness of the dual-continua model in assessing mental health among university students, demonstrating its ability to measure psychological well-being and distress reliably. The model's high reliability scores and construct validity highlight its strength as a framework for dissecting mental health's multifaceted nature in academic environments, suggesting its utility in devising interventions to boost student well-being and success. Yet, the pursuit of a deeper, more universal comprehension of mental health, especially amidst diverse and evolving populations, calls for ongoing refinement of this model. It's essential to

adapt the dual-continua model to reflect changing societal norms, cultural diversity, and technological progress to maintain its relevance and efficacy in promoting better mental health outcomes across different demographics.

While our findings offer significant insights, they come with limitations, such as the study's focus on a specific demographic, which may restrict the broader applicability of the results. Future research should aim for a more varied sample to extend the findings' relevance and explore the model's applicability across various cultural and age groups. This approach could provide a richer understanding of mental health, paving the way for more personalized and culturally attuned mental health strategies.

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