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The bi-factor structure and measurement invariance of the Mental Health Continuum-Short Form (mhc-sf): Validation and cutoff scores in the Philippines

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Abstract

This study evaluated the psychometric properties of the Filipino adaptation of the Mental Health Continuum-Short Form (MHC-SF). Using data from 12,931 community members, we examined the scale's factor structure, measurement invariance, reliability, and validity, and established empirical cutoff scores. Confirmatory factor analysis and Rasch analysis revealed that a bi-factor structure outperformed alternative factor structures, with acceptable to excellent internal consistencies ($\alpha = 0.77$–0.92) found across emotional, social, psychological, and general well-being dimensions. Multi-group analyses confirmed configural, metric, and scalar measurement invariance across gender, age, and geographic location. Convergent validity was evidenced through meaningful associations with anxiety, locus-of-hope, and family support. The scale's classifications revealed 9% languishing, 49% moderate, and 42% flourishing well-being in the sample. Receiver operating characteristic (ROC) analysis established optimal cutoff scores of ≤ 23 for languishing and ≥ 47 for flourishing well-being; MHC-SF scores ranging from 24 to 46 are moderate well-being. This psychometric evaluation demonstrates that the Filipino MHC-SF is a valid and reliable tool for assessing multidimensional well-being in non-Western contexts, with practical applications for mental health monitoring. The findings advance cross-cultural measurement of positive mental health and provide empirically-derived thresholds that enhance the utility of test scores derived from the scale in research and community settings.

Keywords Well-being · MHC-SF · Philippines · Validation, Filipino adaptation, measurement invariance

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Introduction

Mental health is not merely the absence of disorder (see Keyes, 2007). The WHO defines mental health as "a state of well-being in which every individual realizes his or her own potential, can cope with the normal stresses of life, can work productively and fruitfully, and is able to contribute to his or her community" (2004), p.12). While this definition advances positive well-being as the cornerstone of mental health, culturally validated tools to assess positive psychological functioning remain scarce, particularly in non-Western contexts where psychological distress is often underreported and underserved.

Positive psychology has advanced more holistic models, such as the complete mental health model (Keyes, 2005) and the two-continua framework (Westerhof & Keyes, 2010), which distinguish between mental illness and flourishing.

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Empirical evidence links flourishing to a range of benefits, including increased productivity (DiMaria et al., 2020), academic achievement (Howell, 2009; Suldo et al., 2011), and physical health (Hernandez et al., 2018). Still, questions remain about whether widely used measures of well-being like the Mental Health Continuum–Short Form (MHC-SF), retain their within-network and between-network validity across cultural contexts. In lieu of these, the present study aimed to adapt and evaluate the psychometric properties of the MHC-SF in the Philippines using a large community sample collected in the early months of the pandemic. This aim has the potential to extend the theoretical understanding of the dimensionality of well-being in non-Western contexts, and support the implementation of mental health evaluation and interventions.

Conceptual definition of well-being and the MHC-SF

Current well-being research distinguishes between two fundamental traditions: the hedonic approach, focusing on happiness, positive emotions, and life satisfaction Diener, 1984) and the eudaimonic approach, emphasizes optimal functioning, meaning, and human potential (Keyes, 2002; Ryff & Keyes, 1995). Rather than treating these as competing frameworks, Keyes (2002) integrated them into a comprehensive model of positive mental health comprising three dimensions: emotional well-being (satisfaction and positive affect), psychological well-being (personal growth, purpose, and self-acceptance), and social well-being (social contribution, integration, and coherence). Though these dimensions are interrelated, empirical evidence confirms their distinctiveness (Keyes & Annas, 2009), supporting the value of a multidimensional assessment approach.

The MHC-SF operationalizes this framework in a brief 14-item measure, a shorter version of the 40-item MHC-LF (Keyes, 2002; Ryff, 1989; Ryff & Keyes, 1995), that assesses all three dimensions while enabling categorical diagnosis. Its unique contribution extends beyond dimensional scoring to a diagnostic taxonomy that identifies three distinct states: flourishing (high well-being across multiple dimensions), languishing (absence of well-being markers), and moderate mental health (partial well-being; Keyes, 2002), which complements dimensional scores and extends assessment beyond symptom-focused approaches.

According to the MHC-SF criteria (Keyes, 2002), individuals are classified into three categories of mental health functioning. Flourishing mental health is indicated when an individual experiences at least one of the three hedonic well-being symptoms (items 1–3) 'every day' or 'almost every day' and six out of the eleven positive functioning symptoms (items 4–14, encompassing both social and psychological well-being indicators) 'every day' or 'almost every day' in the past month. Conversely, languishing mental health is characterized by the experience of one hedonic well-being symptom and six positive functioning symptoms at a frequency of 'never' or 'once or twice' during the same period. individuals meeting neither criteria are classified with moderate mental health (Hone et al., 2014)[1].

The MHC-SF and current research gaps

The MHC-SF has been validated across numerous languages and contexts, including Chinese (Guo et al., 2015), Spanish (Piqueras et al., 2022), Polish (Karaś et al., 2014), Dutch (Lamers et al., 2011), Korean (Joshanloo, 2020), and Portuguese (Fonte et al., 2020). Although these validations in various populations, from community samples (Lamborn et al., 2018; Santini et al., 2020) to clinical groups (Franken et al., 2018) and disaster-exposed individuals (Rafiey et al., 2017), several significant research gaps remain unaddressed. An ongoing debate persists regarding the MHC-SF's optimal factor structure. Previous research has supported competing models: unidimensional (Jovanović, 2015), two-factor separating emotional and eudaimonic dimensions (Lamers et al., 2011), three-factor comprising emotional, social, and psychological components (Aruta et al., 2022; Petrillo et al., 2015), and bi-factor incorporating both a general well-being factor and three specific dimensions (de Bruin & du Plessis, 2015; Hides et al., 2016; Tejada-Gallardo et al., 2023), warranting robust model comparison.

Geographical representation compounds this structural inconsistency, with most MHC-SF validation in Western contexts and limited non-Western research (Rogoza et al., 2018). This gap is pronounced in lower-middle-income countries like the Philippines (World Bank, 2021), where mental health burden is increasing (Alloh et al., 2018; Yatham et al., 2018) and the large Filipino population (112 million; Philippine Statistics Authority, 2025) and diaspora (San Juan, 2009) necessitates culturally-validated assessment tools.

Moreso, methodological limitations in existing pandemic-era research, including modest sample sizes (Aruta et al., 2022; Piqueras et al., 2022) and use of English rather than culturally-adapted Filipino versions (Aruta et al., 2022),

[1] The MHC-SF diagnostic criteria are operationalized as follows: Flourishing mental health requires experiencing at least one of the three emotional well-being items (items 1–3: happiness, interest in life, and life satisfaction) and six of the eleven positive functioning items (items 4–14, covering social contribution, integration, actualization, acceptance, coherence, personal growth, purpose in life, environmental mastery, autonomy, positive relations, and self-acceptance) at a frequency of "every day" or "almost every day" during the past month. Languishing mental health applies the same item criteria but with a frequency of "never" or "once or twice" during the past month. (Keyes, 2002; Hone et al., 2014)

further highlight the need for rigorous validation. Finally, no previous study has established empirically-derived cutoff scores using receiver operating characteristics (ROC) curves analysis, which would enhance the scale's utility for accurately classifying well-being levels.

Study objectives and hypotheses

This study aimed to validate the Filipino-translated Mental Health Continuum-Short Form (MHC-SF) using data from 12,931 community participants during the COVID-19 outbreak. We aimed to: (a) identify the most appropriate factor structure through comparative model testing, (b) assess measurement invariance across demographics, (c) examine internal consistency, (d) evaluate convergent validity, and (e) establish empirically-derived cutoff scores for categorical diagnoses.

We hypothesized that: (a) the bi-factor model would be superior to the one-, two-, and three-factor models; (b) this structure would demonstrate measurement invariance across gender, age, and location; and (c) scores would correlate negatively with anxiety, and positively with hope and perceived social support, given the known association between these constructs and well-being (e.g., (Cheavens et al., 2005; Chu et al., 2010; Gallagher & Vella-Brodrick, 2008; Stein & Heimberg, 2004; Turner, 1981).

Methods

Research design

This study employed a cross-sectional survey design to validate the Filipino adaptation of the MHC-SF. The validation process followed established psychometric procedures including translation and back-translation, pilot testing, confirmatory factor analysis, measurement invariance testing, and receiver operating characteristics analysis for determining optimal cutoff scores.

Participants

The study utilized data from a large-scale online mental health survey conducted during the COVID-19 pandemic in the Philippines (March 2020 to July 2020), with 12,931 community members participating. The timing of data collection coincided with the implementation of strict community quarantine measures, necessitating an online survey methodology. Over 92% of responses were collected within the first month of data collection (March 2020 to April 2020), capturing a critical period of the pandemic response.

The sample comprises 3,161 men (24.45%) and 9,770 women (75.55%), with ages ranging from 18 to 75 years (M=27.16; SD=7.61). Most participants were single (n=10,473; 80.99%) and either employed (n=6,770; 52.35%) or students (n=3,641; 28.16%). The geographical distribution of respondents included representation from the national capital and its two neighbor regions, where over 40% of the total Philippine population resides: National Capital Region (n=5,654; 43.72%), Region IV-A (n=2,702; 20.90%), and Region III (n=2,284; 17.66%). All respondents gave their informed consent to participate in an online survey.

Procedures

This study was part of a larger study conducted during the COVID-19 outbreak in the Philippines (e.g., Bernardo & Mendoza, 2021; Dizon et al., 2023; Mendoza & Dizon, 2022; Mendoza et al., 2022). The procedures were reviewed and approved by two independent psychologists from a community-based non-profit organization registered under the National Youth Commission of the Republic of the Philippines (Registration Number: Y0-531–121116). The procedures complied and were conducted in accordance with the 1964 Helsinki Declaration and its later amendments. The study protocol adhered to ethical guidelines for research involving human participants, including obtaining informed consent and ensuring data privacy.

The measures were incorporated into an online self-evaluation survey designed to provide a platform for people to understand their psychological and emotional well-being during the COVID-19 pandemic. The online survey included an Informed Consent that contained information on survey participation, study nature and objectives, data confidentiality, and their rights as participants. Those who did not consent were routed to an exit page that also linked them to mental health support and services. No personal information from the respondents was collected. After participation in the survey, they were provided with information on linkages to care, related to COVID-19 and mental health services. The survey was taken in an average of 12 min.

Measures

Mental Health Continuum Short Form (MHC-SF; Keyes, 2002). This is a 14- item measure of general well-being, with items pertaining to emotional (3 items; e.g., "*satisfied with life*"), psychological (5 items; e.g., "*that your life has a sense of direction or meaning to it*"), and social well-being (6 items; e.g., "*that you had something important to contribute to society*"). Respondents rate the items from 1 (*never*) to 6

(*everyday*). The MHC-SF was translated from English into Filipino prior to administration (see Supplementary Material 1 for the final translated items). Following the translation guidelines of Epstein et al. (2015), three bilingual experts in the psychology field who used both English and Filipino in their work translated the instrument. They followed the recommended forward and backward translation procedures where each expert was independently assigned to do either forward or backward translation of the items of the scale and survey instructions. The final translated scale was then reassessed (α=0.92) and finalized by all translators using a committee method (Epstein et al., 2015). The committee review addressed the semantic, idiomatic, and conceptual equivalence of the translated items. Ten Filipinos aged 18 to 44 (M=27.32) were involved in a pilot test to check for potential spelling, grammar, and typographical errors. The pilot testing revealed minor issues with technical terminology in items 4 and 8, which were subsequently revised to use more commonly understood Filipino expressions while maintaining conceptual equivalence.

Anxiety symptoms. We used the GAD-2 screener of Kroenke et al. (2007). It consists of two core items and symptoms of anxiety "*Feeling nervous*, *anxious or on edge*" and "*Not being able to stop or control worrying*", rated from 0 (*not at all*) to 3 (*nearly every day*). We used the available Filipino version of this scale (α=0.85).

Internal locus-of-hope (LoH). As a related construct to well-being, we used the internal LoH subscale of the State of Locus-of-Hope Scale Short Form in Filipino (Bernardo & Estrellado, 2014; Bernardo & Mendoza, 2021). The subscale includes four items that examines one's agency and pathway of goal-attainment (Bernardo, 2010) on a specific or ongoing experience or crisis (Bernardo & Mendoza, 2021). Items such as "I meet the goals that I set for myself now" and "I energetically find a way to pursue my important goals right now" can be answered on a 4-point scale (a=0.78) from 1 (strongly disagree) to 4 (strongly agree).

Family support. We used the family subscale of the Multidimensional Scale of Perceived Social Support (MSPSS; Zimet et al., 1988). The MSPSS was used to measure perceived social support from family. The 4-item subscale consists of items that examined perceived support from family (e.g., "*I can talk about my problems with my family*"). Respondents answered on a 7-point scale (a=0.88), from 1 (*very strongly disagree*) to 7 (*very strongly agree*). This subscale is also translated with the same procedures as with the MHC-SF.

Data analysis

Preliminary analysis of the data included descriptive statistics, including testing of normality assumptions. There was no item-level missing data for the MHC-SF items specifically. However, 14.36% of participants did not respond to the anxiety and family support measures, and 7.37% did not respond to the hope measure. Given the large sample size, analyses were conducted using available data for each measure.

To test whether the hypothesized bi-factor structure of the MHC-SF fit the data (i.e., a general well-being factor with emotional, social, and psychological well-being dimensions), we performed confirmatory factor analysis using Maximum Likelihood Robust (MLR) estimation with Satorra-Bentler corrections in Rosseel (2012) lavaan package in R. MLR estimation was employed given its robustness to non-normality in large samples and ability to provide unbiased parameter estimates (Curran et al., 1996).

As these models are nested, we compared the fit indices of the bi-factor structure with the 3-factor structure, 2-factor, and 1-factor models by testing the chi-square differences between these models and comparing their fit indices. Model comparisons utilized scaled chi-square difference tests for all nested model comparisons (see Bryant & Satorra, 2012; Satorra & Bentler, 2001). Several goodness-of-fit indices were evaluated: Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), Root Mean Square Error of Approximation (RMSEA), and standardized root mean square residual (SRMR). Hu and Bentler's (1995) recommendations were followed where good model fit would include a model CFI and TLI of greater than 0.90 and an RMSEA of less than 0.08. An SRMR value less than 0.08 is considered as a good fit and 0.00 is a perfect fit (Hu & Bentler, 1999). The p-value of the χ^2 should be greater than 0.05, but with sample sizes larger than 200, a nonsignificant χ^2 may be difficult to obtain (Barrett, 2007).

Consequently, Rasch analysis using ConQuest (Wu et al., 2007) was used to provide item-level information about the scale quality, including item fit statistics and the response options step calibrations. Rasch analysis has been adopted in examining the psychometric properties of instruments due to its advantages in achieving fundamental measurement (Boon, 2014; Yan et al., 2020). The combined analytical approach of CFA and Rasch analysis has been widely implemented in various studies (e.g., Bernardo et al., 2022; Boluarte-Carbajal et al., 2023; Chang & Engelhard, 2016; Mendoza & Yan, 2021; Yan, 2018, 2020) because these two analyses provide complementary information pertaining to the psychometric properties of the instrument.

To examine the measurement invariance of the best-fitting model, we performed multigroup CFA with the equivalence testing package (equaltestMI; Jiang & Mai, 2020). We tested the model's configural (equivalence in factor structure), metric (equivalence in factor loadings), scalar (equivalence in item intercepts), and strict (equivalence in item residuals) invariance across gender (males and

females), age (lower [≤25] and upper [≥26] median split), and geographical location (National Capital Region [Metro Manila] versus other regions). For measurement invariance evaluation, we used scaled chi-square difference tests with Satorra-Bentler corrections (Satorra & Bentler, 2001) as the primary test for nested model comparisons. Following Chen (2007), we supplemented this with changes in fit indices: ΔCFI < 0.010, ΔSRMR < 0.010, and ΔRMSEA < 0.015 indicate measurement invariance.

Cronbach's alpha was used to determine the internal consistency reliability of each scale score used in the study. Upon determination of the bi-factor structure, we also computed McDonald's omega coefficients using the bi-factor indices calculator (Dueber, 2017), as omega is more appropriate for bi-factor models than alpha (Rodriguez et al., 2016).

We conducted both bivariate correlations and hierarchical multiple regression to provide complementary evidence for convergent validity. Bivariate correlations establish basic convergent validity evidence through simple associations, while hierarchical regression examines unique predictive contributions of each MHC-SF dimension while controlling for demographic factors that might confound these relationships.

To evaluate the screening accuracy of the MHC-SF and determine optimal cutoff scores, we utilized EasyROC (Goksuluk et al., 2016), an interactive web-based tool for receiver operating characteristic (ROC) curve analysis. Using the Youden index (J = sensitivity + specificity − 1), we identified cutoff scores for flourishing and languishing categories to achieve the best balance between sensitivity and specificity. The ROC analysis results, including sensitivity, specificity, and area under the curve (AUC), were calculated to assess the diagnostic performance of the scale. The detailed analytical framework used in this study can be found in Supplementary Material 2 while the technical specifications and interpretation criteria used are detailed in Supplementary Material 3.

Results

Factor structure: Confirmatory Factor Analysis and Rasch analysis

In testing for the factorial validity of MHC-SF, we tested unidimensional, 2-factor, 3-factor, and bi-factor measurement models. Table 1 shows the fit indices of the four models tested. No post or ad-hoc model modifications were made in all models. Based on the lowest AIC and BIC values, there is evidence suggesting that the bi-factor model [$\chi^2(63) = 2283.786$; CFI=0.973; TLI =. 960; RMSEA = 0.053; SRMR = 0.021; AIC = 537730.777; BIC = 538148.113] is the most appropriate factor structure (see Fig. 1) for the MHC-SF over the unidimensional, 2-factor, and 3-factor models. The factor loadings for the general well-being factor ranged from 0.47 to 0.82. For emotional, social, and psychological well-being, the factor loadings ranged from 0.22 to 0.40, 0.14 to 0.53, and 0.17 to 0.47, respectively. The factor loadings of the MHC-SF are presented in Table 2.

Both multidimensional (using the three factors of the MHC-SF) and unidimensional Rasch analyses were performed. The results of the multidimensional analysis showed favorable fit statistics for all items (see Table 2). The mean-squared fit statistics (MNSQs) for the majority of items fell within the preferred range of 0.77 to 1.31 (0.75–1.33 being the desirable range as per Wilson, 2005). There was only one item, item #8 referring to social interest (i.e., "*How often in the past month did you feel that the way our society works makes sense to you?*"), from the social well-being dimension that had a value of 1.46 for both weighted and unweighted MNSQs, but it still fell within the acceptable range (0.5–1.5; Linacre, 2006). Rasch person and item separation reliability coefficients were adequate (person reliability = 0.85, item reliability = 0.98), indicating consistent measurement precision across persons and items. The item fit statistics (Infit and Outfit MNSQ values ranging from 0.8 to 1.2) provided evidence based on internal structure, suggesting that the items functioned consistently with the measurement model. The six-point response scale functioned effectively with the step calibrations (the measures of the transition points between adjacent categories) increasing consistently from −2.05, −0.65, 0.49, 0.66, to 1.55 logits. In the unidimensional analysis, all items, with the exception of item #8, demonstrated sufficient fit to the Rasch model (MNSQs ranged from 0.76 to 1.18). Item #8 showed marginal misfit with its weighted and unweighted MNSQ at 1.51 and 1.54, respectively. The Rasch reliability of test scores for the unidimensional scale stood at 0.92. The step calibrations increased consistently from −1.84, −0.54, 0.49, 0.57, to 1.32 logits. No significant differential item functioning across gender was found in both multidimensional and unidimensional Rasch analyses.

Table 1 Summary of Goodness-of-fit Indexes for Confirmatory Factor Analysis of the MHC-SF models

Model	SBχ^2	df	*p*	CFI	TLI	RMSEA	SRMR	AIC	BIC
1-factor model	7638.203	77	<0.001	0.905	0.888	0.088	0.046	544027.455	544340.457
2-factor model	6445.513	76	<0.001	0.921	0.905	0.081	0.043	542602.520	542922.974
3-factor MHC	3449.597	74	<0.001	0.958	0.948	0.060	0.029	539090.952	539426.311
Bi-factor MHC	2283.786	63	<0.001	0.973	0.960	0.053	0.021	537730.777	538148.113

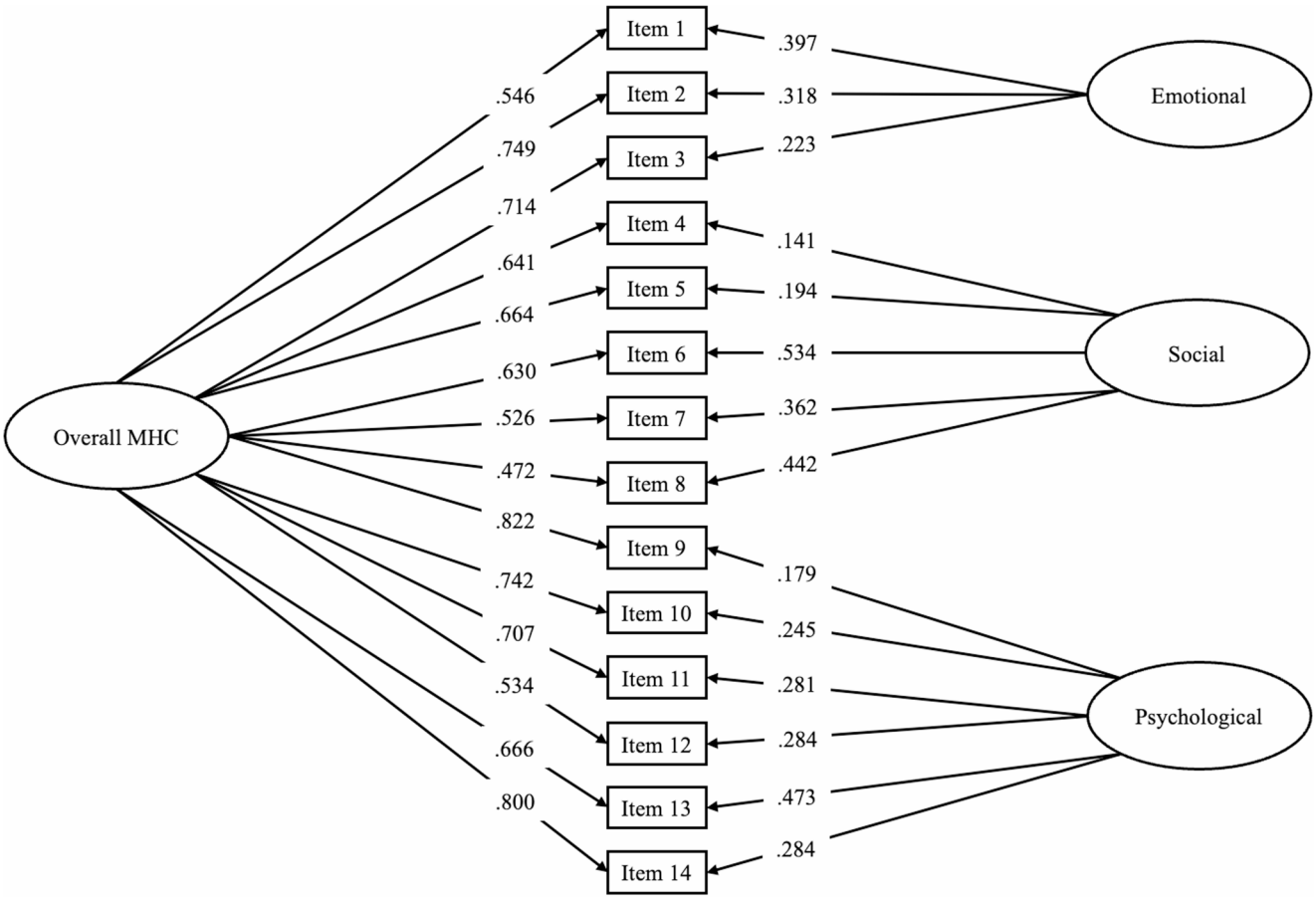

Fig. 1 Confirmatory Factor Analysis of the bi-factor MHC-SF

Measurement invariance

The results of the multigroup CFA suggest that the bi-factor model is invariant across key demographic groupings (see Table 3). In comparing the bi-factor model between males (n=3,161) and females (n=9,770)[2], there was no significant drop in the CFI, RMSEA, and SRMR values. We then proceeded to test for configural, metric, and scalar invariance and the CFI difference was less than 0.01. We also compared the fit indices of the bi-factor model between those in the lower (n=6,896) and upper median age group (n=6,035), as well as respondents from the national capital region (n=5,654) and other regions (n=7,227). The results consistently demonstrated measurement invariance for each of the groups. Overall, the findings suggest that the bi-factor model is equivalent across gender, age groups, and locale despite increasing constraints on the factor structure (configural invariance), factor loadings (metric invariance), item intercepts (scalar invariance), and item residuals (strict invariance).

Following Lee and Kim (2023), we computed McDonald's omega coefficients using the bi-factor indices calculator (Dueber, 2017), which is more appropriate for bi-factor models than Cronbach's alpha (Rodriguez et al., 2016). The general well-being factor showed high omega hierarchical (Ωh = 0.88) and Explained Common Variance (ECV = 0.80), indicating predominant influence on total variance. The specific factors (emotional, social, psychological) yielded lower omega-specific values (Ωs = 0.14, 0.20, 0.13) and ECVs (0.04, 0.09, 0.07), with social well-being showing the highest contribution (0.09) among specific factors (see Table 2).

Internal consistency reliability

Table 4 presents the descriptive statistics, bivariate correlations, and internal consistency of the scales. The general well-being construct of MHC-SF exhibited high internal

[2] We have conducted an additional analysis that examines the measurement invariance of the bi-factor model across gender using equal samples of males (n=3,161) and females (n=3,161). The female sample was randomly selected from the original sample (n=9,770). The results supported the configural, metric, scalar, and strict measurement invariance of the bi-factor model across gender using equal samples. The results of the alternative multi-group CFAs are presented in Supplementary Table 1.

Table 2 Standardized factor loadings of the MHC-SF within the bi-factor model and Rasch item fit statistics

Items	General Well-being	Emotional Well-being	Social Well-being	Psycho-logical Well-being	Multidimensional Rasch analysis		Unidimensional Rasch analysis	
					Weighted Fit	Unweighted Fit	Weighted Fit	Unweighted Fit
1. How often in the past month did you feel happy?	0.55	0.40			0.96	1	1.02	1.1
2. How often in the past month did you feel interested in life?	0.75	0.32			0.85	0.82	0.88	0.87
3. How often in the past month did you feel satisfied with your life?	0.71	0.22			0.97	0.95	1	1
4. How often in the past month did you feel that you had something important to contribute to society?	0.64		0.14		1.16	1.17	1.12	1.13
5. How often in the past month did you feel that you belonged to a community (like a social group, your neighborhood, your city, your school)?	0.66		0.19		1.2	1.15	1.18	1.15
6. How often in the past month did you feel that our society is becoming a better place for people like you?	0.63		0.53		1.1	1.07	1.12	1.11
7. How often in the past month did you feel that people are basically good?	0.52		0.36		1.12	1.15	1.1	1.14
8. How often in the past month did you feel that the way our society works makes sense to you?	0.47		0.44		1.46	1.46	1.51	1.54
9. How often in the past month did you feel that you liked most parts of your personality?	0.82			0.18	0.79	0.79	0.77	0.76
10. How often in the past month did you feel good at managing the responsibilities of your daily life?	0.74			0.25	0.83	0.84	0.82	0.82
11. How often in the past month did you feel that you had warm and trusting relationships with others?	0.71			0.28	0.81	0.81	0.81	0.82
12. How often in the past month did you feel that you had experiences that challenged you to grow and become a better person?	0.53			0.28	1.12	1.31	1.01	1.15
13. How often in the past month did you feel confident to think or express your own ideas and opinions?	0.67			0.47	0.87	0.87	0.87	0.87
14. How often in the past month did you feel that your life has a sense of direction or meaning to it?	0.80			0.28	0.82	0.77	0.83	0.79
Model-based reliability estimates	Ωh =0.87	Ωs = 0.14	Ωs = 0.20	Ωs = 0.13				
Explained Common Variance/ ECV subscale	ECV = 0.80	ECVs = 0.04	ECVs = 0.09	ECVs = 0.07				

All factor loadings are significant at $p < .001$

Table 3 Multigroup Confirmatory Factor Analysis testing the measurement invariance of the bi-factor model across demographic groups

Model	SBX2	df	CFI	TLI	RMSEA	SRMR	ΔCFI	ΔRMSEA	ΔSRMR	Invariance
Bi-factor MHC (n=12,931)	2283.786	63	0.973	0.960	0.053	0.021	---	---	---	---
Measurement Invariance across Gender										
Bi-factor - Men (n=3,161)	609.725	63	0.973	0.961	0.057	0.022	---	---	---	---
Bi-factor - Women (n=9,770)	1722.257	63	0.973	0.960	0.056	0.021	---	---	---	---
Bi-factor - Configural	2333.285	126	0.973	0.960	0.057	0.021	---	---	---	Invariant
Bi-factor - Metric	2479.797	150	0.972	0.966	0.053	0.024	−0.001	−0.004	0.003	Invariant
Bi-factor - Scalar	2577.283	160	0.971	0.967	0.052	0.025	−0.001	−0.001	0.001	Invariant
Bi-factor - Strict (Error)	2626.772	174	0.971	0.969	0.050	0.025	0.000	−0.002	0.000	Invariant
Measurement Invariance across Age										
Bi-factor - Lower Median Age (n=6,896)	1364.094	63	0.966	0.951	0.059	0.023	---	---	---	---
Bi-factor - Higher Median Age (n=6,035)	976.657	63	0.976	0.966	0.054	0.020	---	---	---	---
Bi-factor - Configural	2329.789	126	0.971	0.958	0.057	0.022	---	---	---	Invariant
Bi-factor - Metric	2541.424	150	0.969	0.963	0.054	0.034	−0.002	−0.003	0.012	Invariant
Bi-factor - Scalar	3118.556	160	0.963	0.958	0.057	0.039	−0.006	0.003	0.005	Invariant
Bi-factor - Strict (Error)	3922.195	174	0.953	0.951	0.062	0.041	−0.010	0.005	0.002	Invariant
Measurement Invariance across Locale										
Bi-factor - NCR (n=5,654)	1141.89	63	0.969	0.955	0.060	0.023	---	---	---	---
Bi-factor - Other regions (n=7,277)	1193.595	63	0.975	0.964	0.054	0.020	---	---	---	---
Bi-factor - Configural	2335.647	126	0.972	0.960	0.057	0.022	---	---	---	Invariant
Bi-factor - Metric	2471.827	150	0.971	0.965	0.053	0.026	−0.001	−0.004	0.004	Invariant
Bi-factor - Scalar	2535.679	160	0.971	0.967	0.051	0.027	0.000	−0.002	0.001	Invariant
Bi-factor - Strict (Error)	2587.587	174	0.971	0.969	0.050	0.027	0.000	−0.001	0.000	Invariant

Table 4 Bivariate correlations and descriptive statistics

	Correlates			Correlates					
	1	2	3	4	Mean	SD	Range[a]	Skewness	Kurtosis
1. MHC-SF Total	(0.92)				54.01	13.99	14–84	−0.02	2.32
2. Emotional well-being	0.83***	(0.77)			11.79	3.43	3–18	−0.09	2.16
3. Social well-being	0.88***	0.63***	(0.80)		17.79	5.54	5–30	0.20	2.35
4. Psychological well-being	0.93***	0.70***	0.69***	(0.89)	24.42	6.74	6–36	−0.22	2.28
5. Anxiety	−0.37***	−0.36***	−0.30***	−0.34***	2.53	1.79	0–6	0.45	2.26
6. Hope	0.66***	0.53***	0.52***	0.70***	11.89*	2.20	4–16	−0.33	3.25
7. Family support	0.52***	0.47***	0.40***	0.51***	18.95	5.96	4–28	−0.48	2.50

consistency of 0.92. The specific subscales of MHC-SF exhibited acceptable to good reliability coefficients of 0.77, 0.80, to 0.89 for emotional, social, and psychological well-being, respectively (Nunnally & Bernstein, 1994), indicating that items are internally consistent.

Convergent validity

The observed correlations align with our theoretical predictions: hope (0.52–0.70.52.70) and family support (0.40–0.51.40.51) showed moderate to strong positive correlations as expected, while anxiety showed the predicted negative correlations (−0.30 to −0.36) that were lower in absolute magnitude, which is consistent with theoretical expectations given the different nature of this construct. These correlations can be considered as weak to moderate (Ratner, 2009) and interpreted as further evidence of convergent validity.

For a more robust examination of convergent validity, hierarchical multiple regression was used to test how the three well-being components of MHC-SF related to anxiety symptoms, internal locus-of-hope, and perceived family support. In the first model, we entered age, gender, and locale as demographic control variables, and on the second model, we entered emotional, social, and psychological well-being. Table 5 shows that emotional well-being is significantly associated with anxiety symptoms with a small effect size (η^2=0.02), while controlling for age, gender, and locale (see Model 2). Psychological well-being, after controlling for demographics, is significantly related to internal locus-of-hope with medium effect size (η^2=0.18; see Model 4). Finally, both emotional (η^2=0.03) and psychological (η^2=0.06) well-being were significantly related to perceived family support with small effect sizes, but social well-being only had a trivial effect size. For each of the

Table 5 Hierarchical regression of MHC-SF factors predicting anxiety, hope, and family support

	Anxiety				Hope				Family support			
	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
	B (SE)	β	B (SE)	β	B (SE)	β	B (SE)	β	B (SE)	β	B (SE)	β
Emotional well-being			-0.11^{***} (0.01)	−0.21			0.06^{***} (0.01)	0.09			0.34^{***} (0.02)	0.20
Social well-being			-0.02^{***} (0.00)	−0.07			0.03^{***} (0.00)	0.07			0.03^{*} (0.01)	0.03
Psychological well-being			-0.04^{***} (0.00)	−0.15			0.18^{***} (0.00)	0.55			0.29^{***} (0.01)	0.33
R^2	0.03^{***}		0.16^{***}		0.07^{***}		0.46^{***}		0.06^{***}		0.29^{***}	
$R^2_{diff(control-full)}$	---		0.13^{***}		---		0.39^{***}		---		0.23^{***}	
F(df)	(3,11070) = 103.92		(6,11067) = 337.61		(3,11974) = 296.92		(6,11971) = 1689.86		(3,11070) = 103.92		(6,11067) = 765.54	

$^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$. SE = standard errors. All analyses included age, gender, and locale as covariates

outcomes, the full models (controls with well-being predictors), the R^2 difference significantly increased ranging from 0.13 to 0.39 ($p < .001$).

Using Keyes' (2002) classification criteria, analysis revealed that 9.78% of the sample ($n = 1{,}172$) exhibited languishing well-being, while 52.63% ($n = 6{,}303$) and 37.59% ($n = 4{,}503$) demonstrated moderate and flourishing well-being, respectively. Results of the one-way ANOVA indicate significant mean differences in anxiety [$F(2,11071) = 612.87$, $p < .001$], hope [$F(2, 11975) = 2293.14$, $p < .001$], and perceived family support [$F(2,11071) = 1444.47$, $p < .001$] among those who are categorized as languishing, moderate, and flourishing well-being. Supplementary Table 2 shows post hoc comparisons using the Scheffe test indicating that the mean score of anxiety for those who are languishing is significantly higher than for those with moderate or flourishing well-being. The mean scores for internal locus-of-hope and perceived family support were significantly higher for those with flourishing well-being than those with moderate or languishing well-being (see Supplementary Table 2). Overall, the convergent validity of the well-being components is supported by its association with locus-of-hope, social support, and anxiety symptoms.

Optimal cutoff scores using Receiver Operating Characteristic (ROC) analysis

Following the determination that the MHC-SF has a bifactor structure, we wanted to also examine potential optimal cutoff scores to aid the use of the scale in terms of determining the categorization of well-being. We used the easyROC software (Goksuluk et al., 2016) to evaluate the Mental Health Continuum-Short Form's (MHC-SF) ability to accurately screen individuals for varying levels of mental well-being: *flourishing*, *moderate*, and *languishing*. Given the complexity of this criteria-referenced categorization, determining clear-cut cutoff scores was deemed a crucial undertaking.

Initially, participants conforming to the MHC-SF criteria for flourishing were designated as positive cases ("1"), with the remaining participants (those classified as languishing or moderately mentally healthy) labelled as negative cases ("0"). By employing the Youden index, an optimal cutoff score of 47 was established, providing a balanced sensitivity (71.4%) and specificity (92.5%; see Supplementary Table 3 for diagnostic performance measures). Subsequently, the labelling process was reversed to ascertain the optimal cutoff score for languishing, labelling languishing as "1", and all other cases (flourishing and moderate well-being) as "0". Here, a cutoff score of 23 was obtained, yielding a balanced sensitivity and specificity of 95.6% and 95.1%, respectively.

The findings reveal optimal cutoff scores (see Fig. 2) for flourishing and languishing to be 47 (and above) and 23 (and below), respectively. This leaves the moderately mentally healthy classification ranging from scores 24 to 46. These determined cutoff scores afford a streamlined and more efficient classification of MHC-SF categories, thereby enhancing its ease of use in practical settings.

Discussion

This study provides strong psychometric support for the Filipino MHC-SF among 12,931 community participants during COVID-19. The adequate internal consistency of all scales (Nunnally & Bernstein, 1994) and convergent validity align with prior cross-cultural validations (Guo et al., 2015; Karaś et al., 2014; Lamborn et al., 2018; Lamers et al., 2011). Convergent validity was demonstrated through expected correlations with hope, family support, and anxiety, and significant mean differences across MHC-SF categories, replicating prior findings (Franken et al., 2018; Luijten et al., 2019).

While our analyses demonstrated superior fit indices for the bi-factor structure compared to alternative models, it is important to note that the two- and three-factor models also showed adequate fit statistics, consistent with previous validations (e.g., Lamers et al., 2011; Petrillo et al., 2015). The bi-factor structure offers unique advantages in capturing both a general well-being factor and distinct dimensional experiences, but this should not invalidate the utility of simpler factor structures that have demonstrated validity across diverse contexts. This is also supported by the Rasch analysis, where both the three-factor and the unidimensional structure had favorable item fit statistics. This bi-factor model of the scale was also invariant across gender, age, and geographical subgroups. Findings corroborate recent investigations lending support to the bi-factor structure among large samples (de Bruin & du Plessis, 2015; Hides et al., 2016; Lamborn et al., 2018; Longo et al., 2020; Żemojtel-Piotrowska et al., 2018), reinforcing the conceptualization of the scale as assessing an overall well-being factor along with emotional, social, and psychological sub-domains (Keyes et al., 2008).

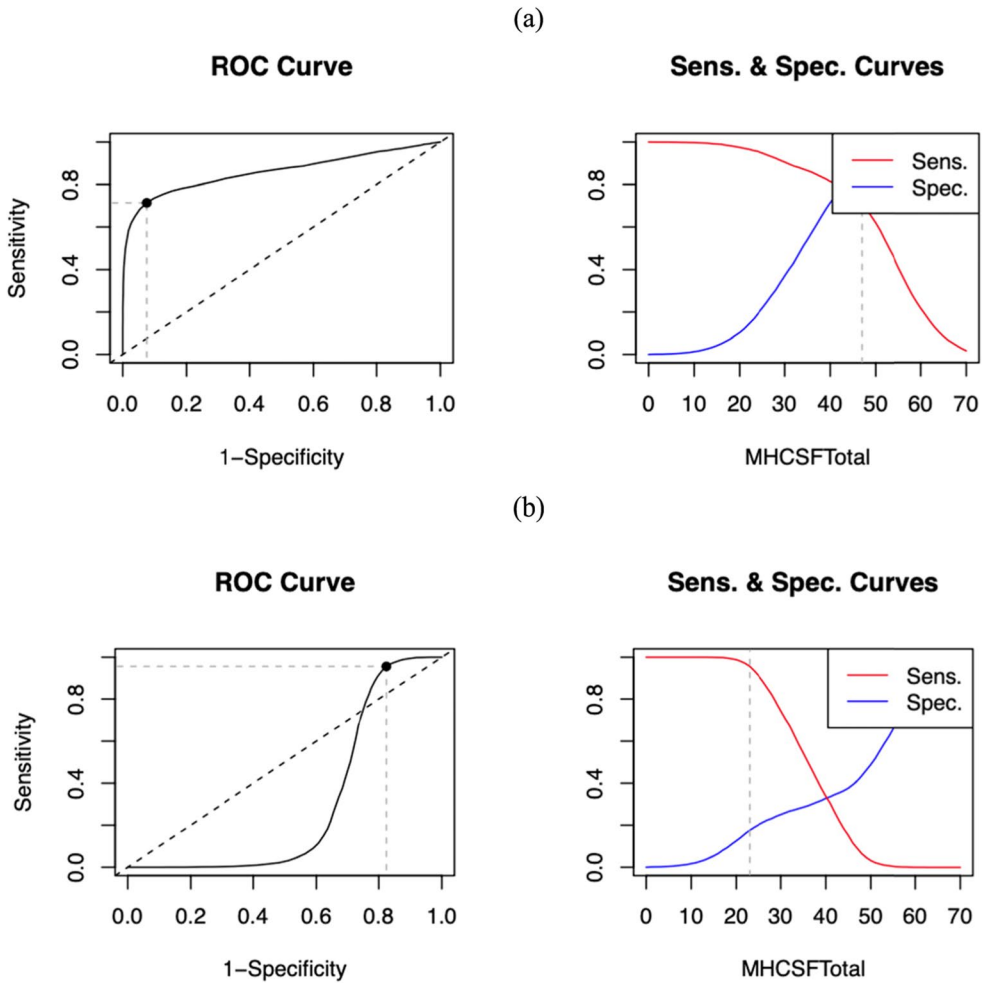

Fig. 2 Screening accuracy of the MHC-SF cut-offs. *Note*: Panel (**a**) demonstrates the ROC curve for flourishing, with the optimal cutoff score of 47 identified using the Youden index. Panel (**b**) presents the corresponding results for languishing, with a cutoff score of 23

These findings draw parallels with the study of van Erp Taalman Kip and Hutschemaekers (2018) which validated the MHC-SF in a clinical population. While the researchers endorsed the tripartite model of well-being, they observed exceedingly high intercorrelations among the three factors, pointing to potential issues with their dimensionality in clinical samples. Such results align with our bi-factor hypothesis: even as the three distinct factors can be specified, the presence of a general factor remains evident. This overarching factor may account for the meager distinctions of the individual well-being factors, suggesting that a consolidated score, indicative of a latent well-being construct, could be more apt in capturing overall well-being. Critically, the finding of full measurement invariance for the bi-factor model across demographic groups aligns with stringent tests of invariance in earlier MHC-SF research (Luijten et al., 2019; Petrillo et al., 2015).

ROC analysis established empirical cutoffs ($\geq$47 for flourishing, $\leq$23 for languishing) that simplify Keyes' (2002) complex diagnostic criteria while maintaining clinical utility through data-driven thresholds with strong diagnostic accuracy. This is an important addition that increases the practical value of the scale for screening and assessment applications.

Taken together, the current validation provides robust evidence supporting the Filipino MHC-SF as a psychometrically sound tool for assessing multidimensional well-being. The high reliability, factor structure, measurement invariance, convergent validity, and optimal cutoffs were established to provide a rigorous evaluation of the scale's psychometric properties. The findings demonstrate the Filipino MHC-SF to be a valid, reliable, and clinically interpretable measure of emotional, psychological, and social well-being, with a strong general well-being factor. The study generates an efficient tool to monitor population mental health amid crisis while contributing to theoretical knowledge on cross-cultural positive functioning.

Practical and theoretical implications

From a measurement perspective, our findings establish the psychometric integrity of the scale through multiple lines of evidence: internal consistency reliability, factorial validity via its bi-factor structure, measurement invariance across demographic groups, and empirically-derived classification thresholds. The established bi-factor structure has important practical implications, supporting both the use of a global well-being score and distinct dimensional assessments (emotional, social, and psychological well-being; Keyes et al., 2008). This dual scoring capability, combined with demonstrated measurement invariance across gender, age, and location, enables robust population monitoring and group comparisons. The empirically-derived cutoff scores (47 for flourishing, 23 for languishing) provide standardized thresholds with strong diagnostic accuracy (sensitivity: 71.4–95.6%; specificity: 92.5–95.1%), enhancing the scale's utility for efficient screening and assessment applications. The significant effect sizes observed between well-being categories across multiple criterion measures (Cohen's d ranging from 0.53 to 1.98) provide robust evidence for the practical significance of these categorical distinctions. These measurement properties are particularly valuable given the urgent need for culturally-validated assessment tools during crises like COVID-19 (e.g., Xiao et al., 2020).

Theoretically, the findings provide robust empirical support for Keyes' (2002, 2005) dual continua model of mental health within the context of a collectivistic and developing country. The bi-factor structure empirically demonstrates how well-being manifests as both a global construct and distinct dimensions, advancing theoretical understanding of well-being's dimensionality. The convergent validity evidence, established through systematic relationships with hope, family support, and anxiety (with effect sizes ranging from moderate to large), further validates the underlying theoretical framework. Finally, the ability to reliably distinguish varying levels of positive functioning validates this conceptual framework cross-culturally (Lamers et al., 2011).

Limitations and directions for future research

Several important limitations warrant consideration in interpreting the present findings. Our convergent validity assessment, while adequate, employed a relatively narrow range of external measures. Though locus-of-hope, family support, and anxiety were selected for their theoretical relevance in the Filipino context, future studies should incorporate additional constructs such as depression, resilience, and life satisfaction to establish a more comprehensive nomological network. The observed weak associations between social well-being and external measures likely reflect pandemic-related social constraints, suggesting differential salience of well-being dimensions during crisis periods. Future studies can also consider including a wider range of constructs in testing the convergent and discriminant validity of the MHC-SF.

Regarding factor structure, lower loadings on specific dimensions (0.14–0.47) versus the general factor (0.47–0.82) suggest items primarily reflect overall well-being. Items 8 and 12 showed particularly low loadings, possibly reflecting pandemic effects. Future research could explore alternative models (exploratory structural equation modeling, network analysis).

Methodological constraints include the use of an ultra-brief anxiety measure, which may explain the smaller

between-category differences for anxiety compared to other external variables. Additionally, our online convenience sampling approach, while yielding a large nationwide sample during pandemic restrictions, limits population representativeness. This further necessitates the need to validate the instrument in the clinical population. The cross-sectional design also precluded assessment of test-retest reliability and temporal stability of the measure in longitudinal studies should be explored in future work.

Conclusion

This study provides the first comprehensive validation of the Filipino MHC-SF, demonstrating its robust psychometric properties through factor structure analysis, measurement invariance testing, reliability assessment, and cutoff score determination. The bi-factor model proved optimal for capturing well-being dimensions in Filipino populations, maintaining measurement integrity across gender, age, and geographical groups. Our empirically-derived cutoff scores ($\leq$23 for languishing, $\geq$47 for flourishing) transform a previously complex diagnostic system into a streamlined framework with strong diagnostic accuracy, enhancing the scale's practical utility for both community and research applications.

These findings substantially advance the cross-cultural applicability of Keyes (2005, 2007) mental health continuum model while delivering a culturally-sensitive instrument for mental health surveillance in resource-constrained settings. As global priorities increasingly recognize the importance of promoting flourishing alongside preventing illness, the validated Filipino MHC-SF equips researchers and practitioners with a valuable tool for advancing positive mental health. This validation bridges an important gap in non-Western mental health assessment and provides a foundation for evidence-based well-being initiatives in the Philippines and similar contexts.

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Data availability The data that support the findings of this study can be accessed in a public archive using this link: https://osf.io/brfp9.

Declarations

Conflict of interest The authors declare that they have no competing interests.

References

Alloh, F. T., Regmi, P., Onche, I., Teijlingen, E., & Trenoweth, S. (2018). Mental health in low-and middle income countries (LMICs): Going beyond the need for funding. *Health Prospect : Journal of Public Health, 17*(1), 12–17. https://doi.org/10.3126/hprospect.v17i1.20351

Aruta, J. J. B. R., Crisostomo, K. A., Canlas, N. F., Almazan, J. U., & Peñaranda, G. (2022). Measurement and community antecedents of positive mental health among the survivors of typhoons Vamco and Goni during the COVID-19 crisis in the Philippines. *International Journal of Disaster Risk Reduction, 72*, Article 102853. https://doi.org/10.1016/j.ijdrr.2022.102853

Barrett, P. (2007). Structural equation modelling: Adjudging model fit. *Personality and Individual Differences*, *42*(5), 815–824. https://doi.org/10.1016/j.paid.2006.09.018

Bernardo, A. B. I. (2010). Extending hope theory: Internal and external locus of trait hope. *Personality and Individual Differences, 49*(8), 944–949. https://doi.org/10.1016/j.paid.2010.07.036

Bernardo, A. B. I., & Estrellado, A. F. (2014). Measuring hope in the Philippines: Validating the short version of the locus-of-hope scale in Filipino. *Social Indicators Research, 119*(3), 1649–1661. https://doi.org/10.1007/s11205-013-0573-7

Bernardo, A. B. I., & Mendoza, N. B. (2021). Measuring hope during the COVID-19 outbreak in the Philippines: Development and validation of the state locus-of-hope scale short form in Filipino. *Current Psychology, 40*(11), 5698–5707. https://doi.org/10.1007/s12144-020-00887-x

Bernardo, A. B. I., Mendoza, N. B., Simon, P. D., Cunanan, A. L. P., Dizon, J. I. W. T., Tarroja, M. C. H., Ma. Balajadia-Alcala, A., & Saplala, J. E. G. (2022). Coronavirus Pandemic Anxiety Scale (CPAS-11): Development and initial validation. *Current Psychology, 41*(8), 5703–5711. https://doi.org/10.1007/s12144-020-01193-2

Boluarte-Carbajal, A., Salazar-Conde, M., Alata Vasquez, S., & Zegarra-López, A. (2023). Psychometric review of the perceived stress scale under CFA and Rasch models in Lima, Peru. *Frontiers in Psychology, 14*, Article 1160466.

Boon, H. J. (2014). Disaster resilience in a flood-impacted rural Australian town. *Natural Hazards, 71*(1), 683–701. https://doi.org/10.1007/s11069-013-0935-0

Bryant, F. B., & Satorra, A. (2012). Principles and practice of scaled difference chi-square testing. *Structural Equation Modeling: A Multidisciplinary Journal, 19*(3), 372–398. https://doi.org/10.1080/10705511.2012.687671

Chang, M.-L., & Engelhard, G. (2016). Examining the Teachers' Sense of Efficacy Scale at the Item Level With Rasch Measurement Model. *Journal of Psychoeducational Assessment, 34*(2), 177–191. https://doi.org/10.1177/0734282915593835

Cheavens, J. S., Michael, S. T., & Snyder, C. R. (2005). The Correlates of Hope: Psychological and Physiological Benefits. *Interdisciplinary perspectives on hope* (pp. 119–132). Nova Science.

Chen, F. F. (2007). Sensitivity of goodness of fit indexes to lack of measurement invariance. *Structural Equation Modeling: A*

Multidisciplinary Journal, 14(3), 464–504. https://doi.org/10.1080/10705510701301834

Chu, P. S., Saucier, D. A., & Hafner, E. (2010). Meta-analysis of the relationships between Social Support and Well-Being in Children and Adolescents. *Journal of Social and Clinical Psychology, 29*(6), 624–645. https://doi.org/10.1521/jscp.2010.29.6.624

Curran, P. J., West, S. G., & Finch, J. F. (1996). The robustness of test statistics to nonnormality and specification error in confirmatory factor analysis. *Psychological Methods, 1*(1), 16–29. https://doi.org/10.1037/1082-989X.1.1.16

de Bruin, G. P., & du Plessis, G. A. (2015). Bifactor analysis of the Mental Health Continuum—Short Form (MHC—SF). *Psychological Reports, 116*(2), 438–446. https://doi.org/10.2466/03.02.PR0.116k20w6

Diener, E. (1984). Subjective well-being. *Psychological Bulletin*, *95*(3), 542–575. https://doi.org/10.1037/0033-2909.95.3.542

DiMaria, C. H., Peroni, C., & Sarracino, F. (2020). Happiness matters: Productivity gains from subjective well-being. *Journal of Happiness Studies, 21*(1), 139–160. https://doi.org/10.1007/s10902-019-00074-1

Dizon, J. I. W. T., Mendoza, N. B., & Nalipay, M. J. N. (2023). Anxiety and well-being amidst the COVID-19 outbreak and the moderating role of locus-of-hope: Evidence from a large sample in the Philippines. *Journal of Pacific Rim Psychology, 17*, Article 18344909231156532. https://doi.org/10.1177/18344909231156532

Dueber, D. (2017). Bifactor indices calculator: A Microsoft Excel-based tool to calculate various indices relevant to bifactor CFA models. *Educational School and Counseling Psychology Research Tools*. https://doi.org/10.13023/edp.tool.01

Epstein, J., Osborne, R. H., Elsworth, G. R., Beaton, D. E., & Guillemin, F. (2015). Cross-cultural adaptation of the health education impact questionnaire: Experimental study showed expert committee, not back-translation, added value. *Journal of Clinical Epidemiology, 68*(4), 360–369. https://doi.org/10.1016/j.jclinepi.2013.07.013

Fonte, C., Silva, I., Vilhena, E., & Keyes, C. L. M. (2020). The Portuguese adaptation of the mental health continuum-short form for adult population. *Community Mental Health Journal, 56*(2), 368–375. https://doi.org/10.1007/s10597-019-00484-8

Franken, K., Lamers, S. M. A., Ten Klooster, P. M., Bohlmeijer, E. T., & Westerhof, G. J. (2018). Validation of the mental health continuum-short form and the dual continua model of well-being and psychopathology in an adult mental health setting. *Journal of Clinical Psychology, 74*(12), 2187–2202. https://doi.org/10.1002/jclp.22659

Gallagher, E. N., & Vella-Brodrick, D. A. (2008). Social support and emotional intelligence as predictors of subjective well-being. *Personality and Individual Differences, 44*(7), 1551–1561. https://doi.org/10.1016/j.paid.2008.01.011

Goksuluk, D., Korkmaz, S., Zararsiz, G., & Karaagaoglu, A. E. (2016). easyROC: An interactive web-tool for ROC curve analysis using R language environment. *The R Journal, 8*(2), Article 213. https://doi.org/10.32614/rj-2016-042

Guo, C., Tomson, G., Guo, J., Li, X., Keller, C., & Söderqvist, F. (2015). Psychometric evaluation of the Mental Health Continuum-Short Form (MHC-SF) in Chinese adolescents – a methodological study. *Health and Quality of Life Outcomes, 13*(1), Article 198. https://doi.org/10.1186/s12955-015-0394-2

Hernandez, R., Bassett, S. M., Boughton, S. W., Schuette, S. A., Shiu, E. W., & Moskowitz, J. T. (2018). Psychological well-being and physical health: Associations, mechanisms, and future directions. *Emotion Review: Journal of the International Society for Research on Emotion, 10*(1), 18–29. https://doi.org/10.1177/1754073917697824

Hides, L., Quinn, C., Stoyanov, S., Cockshaw, W., Mitchell, T., & Kavanagh, D. J. (2016). Is the mental wellbeing of young Australians best represented by a single, multidimensional or bifactor model? *Psychiatry Research*, *241*, 1–7. https://doi.org/10.1016/j.psychres.2016.04.077

Hone, L. C., Jarden, A., Schofield, G., & Duncan, S. (2014). Measuring flourishing: The impact of operational definitions on the prevalence of high levels of wellbeing. *International Journal of Wellbeing*. https://doi.org/10.5502/ijw.v4i1.4

Howell, A. J. (2009). Flourishing: Achievement-related correlates of students' well-being. *The Journal of Positive Psychology, 4*(1), 1–13. https://doi.org/10.1080/17439760802043459

Hu, L. T., & Bentler, P. M. (1995). Evaluating model fit. In R. H. Hoyle (Ed.), *Structural equation modeling: Concepts, issues, and applications* (pp. 76–99). SAGE.

Hu, L.-T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal, 6*(1), 1–55. https://doi.org/10.1080/10705519909540118

Jiang, G., & Mai, Y. (2020). equaltestMI: Examine measurement invariance via equivalence testing and projection method. *R Package Version 0.6.0*. https://cran.r-project.org/web/packages/equaltestMI/index.html

Joshanloo, M. (2020). Factorial/discriminant validity and longitudinal measurement invariance of MHC-SF in Korean young adults. *Current Psychology, 39*(1), 51–57. https://doi.org/10.1007/s12144-017-9742-1

Jovanović, V. (2015). Structural validity of the mental health continuum-short form: The bifactor model of emotional, social and psychological well-being. *Personality and Individual Differences, 75*, 154–159. https://doi.org/10.1016/j.paid.2014.11.026

Karaś, D., Cieciuch, J., & Keyes, C. L. M. (2014). The Polish adaptation of the Mental Health Continuum-Short Form (MHC-SF). *Personality and Individual Differences, 69*, 104–109. https://doi.org/10.1016/j.paid.2014.05.011

Keyes, C. L. M. (2002). The mental health continuum: From languishing to flourishing in life. *Journal of Health and Social Behavior, 43*(2), 207–222. https://doi.org/10.2307/3090197

Keyes, C. L. M. (2005). Mental illness and/or mental health? Investigating axioms of the complete state model of health. *Journal of Consulting and Clinical Psychology, 73*(3), 539–548. https://doi.org/10.1037/0022-006X.73.3.539

Keyes, C. L. M. (2007). Promoting and protecting mental health as flourishing: A complementary strategy for improving national mental health. *American Psychologist, 62*(2), 95–108. https://doi.org/10.1037/0003-066X.62.2.95

Keyes, C. L. M., & Annas, J. (2009). Feeling good and functioning well: Distinctive concepts in ancient philosophy and contemporary science. *The Journal of Positive Psychology, 4*(3), 197–201. https://doi.org/10.1080/17439760902844228

Keyes, C. L. M., Wissing, M., Potgieter, J. P., Temane, M., Kruger, A., & van Rooy, S. (2008). Evaluation of the mental health continuum–short form (MHC–SF) in setswana-speaking South Africans. *Clinical Psychology & Psychotherapy, 15*(3), 181–192. https://doi.org/10.1002/cpp.572

Kroenke, K., Spitzer, R. L., Williams, J. B. W., Monahan, P. O., & Lö, B. (2007). Anxiety disorders in primary care: Prevalence, impairment, comorbidity, and detection. *Annals of Internal Medicine, 146*, 317–325.

Lamborn, P., Cramer, K. M., & Riberdy, A. (2018). The structural validity and measurement invariance of the Mental Health Continuum – Short Form (MHC-SF) in a large Canadian sample. *Journal of Well-Being Assessment, 2*(1), 1–19. https://doi.org/10.1007/s41543-018-0007-z

Lamers, S. M. A., Westerhof, G. J., Bohlmeijer, E. T., ten Klooster, P. M., & Keyes, C. L. M. (2011). Evaluating the psychometric properties of the mental health Continuum-Short Form (MHC-SF).

Journal of Clinical Psychology, 67(1), 99–110. https://doi.org/10.1002/jclp.20741

Lee, B., & Kim, Y. E. (2023). A comparison of factor structure models for the Mental Health Continuum-Short Form (MHC-SF) among preschool teachers in South Korea. *Current Psychology*. https://doi.org/10.1007/s12144-023-04683-1

Linacre, J. (2006). *A user's guide to WINSTEPS®* MINISTEP: Rasch-model computer programs. Winsteps.

Longo, Y., Jovanović, V., Sampaio de Carvalho, J., & Karaś, D. (2020). The general factor of well-being: Multinational evidence using bifactor ESEM on the Mental Health Continuum–Short Form. *Assessment*, *27*(3), 596–606. https://doi.org/10.1177/1073191117748394

Luijten, C. C., Kuppens, S., van de Bongardt, D., & Nieboer, A. P. (2019). Evaluating the psychometric properties of the mental health continuum-short form (MHC-SF) in Dutch adolescents. *Health and Quality of Life Outcomes, 17*(1), Article 157. https://doi.org/10.1186/s12955-019-1221-y

Mendoza, N. B., & Dizon, J. I. W. T. (2022). Prevalence of severe anxiety in the Philippines amid the COVID-19 outbreak. *Journal of Loss and Trauma, 27*(8), 787–789. https://doi.org/10.1080/15325024.2021.2023298

Mendoza, N. B., & Yan, Z. (2021). Validation of a Subject-Specific Student Self-Assessment Practice Scale (SaPS) among Secondary School Students in the Philippines. *Journal of Psychoeducational Assessment, 39*(4), 481–493. https://doi.org/10.1177/0734282921994374

Mendoza, N. B., Frondozo, C. E., Dizon, J. I. W. T., & Buenconsejo, J. U. (2022). The factor structure and measurement invariance of the PHQ-4 and the prevalence of depression and anxiety in a Southeast Asian context amid the COVID-19 pandemic. *Current Psychology*. https://doi.org/10.1007/s12144-022-02833-5

Nunnally, J. C., & Bernstein, I. H. (1994). *Psychometric Theory*. McGraw-Hill.

Petrillo, G., Capone, V., Caso, D., & Keyes, C. L. M. (2015). The Mental Health Continuum–Short Form (MHC–SF) as a measure of well-being in the Italian context. *Social Indicators Research, 121*(1), 291–312. https://doi.org/10.1007/s11205-014-0629-3

Philippine Statistics Authority (2025, July 17). *News Releases—PBBM declares 112.7 M Philippine population count as official*. https://pco.gov.ph/news_releases/pbbm-declares-112-7m-philippine-population-count-as-official/

Piqueras, J. A., Vidal-Arenas, V., Falcó, R., Moreno-Amador, B., Marzo, J. C., & Keyes, C. L. M. (2022). Validation of the Mental Health Continuum-Short Form (MHC-SF) for Multidimensional Assessment of Subjective Well-Being in Spanish Adolescents. *Psicothema*. https://doi.org/10.7334/psicothema2021.240

Rafiey, H., Alipour, F., LeBeau, R., Amini Rarani, M., Salimi, Y., & Ahmadi, S. (2017). Evaluating the psychometric properties of the Mental Health Continuum-Short Form (MHC-SF) in Iranian earthquake survivors. *International Journal of Mental Health*, *46*(3), 243–251. https://doi.org/10.1080/00207411.2017.1308295

Ratner, B. (2009). The correlation coefficient: Its values range between + 1/–1, or do they? *Journal of Targeting, Measurement and Analysis for Marketing, 17*(2), 139–142. https://doi.org/10.1057/jt.2009.5

Rodriguez, A., Reise, S. P., & Haviland, M. G. (2016). Evaluating bifactor models: Calculating and interpreting statistical indices. *Psychological Methods, 21*(2), 137–150. https://doi.org/10.1037/met0000045

Rogoza, R., Truong Thi, K. H., Różycka-Tran, J., Piotrowski, J., & Żemojtel-Piotrowska, M. (2018). Psychometric properties of the MHC-SF: An integration of the existing measurement approaches. *Journal of Clinical Psychology, 74*(10), 1742–1758. https://doi.org/10.1002/jclp.22626

Rosseel, Y. (2012). Lavaan: An R package for structural equation modeling and more. Version 0.5–12 (BETA). *Journal of Statistical Software, 48*(2), 1–36.

Ryff, C. D. (1989). Happiness is everything, or is it? Explorations on the meaning of psychological well-being. *Journal of Personality and Social Psychology, 57*(6), 1069–1081. https://doi.org/10.1037/0022-3514.57.6.1069

Ryff, C. D., & Keyes, C. L. M. (1995). The structure of psychological well-being revisited. *Journal of Personality and Social Psychology, 69*(4), 719–727. https://doi.org/10.1037/0022-3514.69.4.719

San Juan, E. (2009). Overseas Filipino workers: The making of an Asian-Pacific diaspora. *The Global South, 3*(2), 99–129. https://doi.org/10.2979/gso.2009.3.2.99

Santini, Z. I., Torres-Sahli, M., Hinrichsen, C., Meilstrup, C., Madsen, K. R., Rayce, S. B., Baker, M. M., Ten Have, M., Schotanus-Dijkstra, M., & Koushede, V. (2020). Measuring positive mental health and flourishing in Denmark: Validation of the mental health continuum-short form (MHC-SF) and cross-cultural comparison across three countries. *Health and Quality of Life Outcomes, 18*(1), Article 297. https://doi.org/10.1186/s12955-020-01546-2

Satorra, A., & Bentler, P. M. (2001). A scaled difference chi-square test statistic for moment structure analysis. *Psychometrika, 66*(4), 507–514. https://doi.org/10.1007/BF02296192

Stein, M. B., & Heimberg, R. G. (2004). Well-being and life satisfaction in generalized anxiety disorder: Comparison to major depressive disorder in a community sample. *Journal of Affective Disorders, 79*(1), 161–166. https://doi.org/10.1016/S0165-0327(02)00457-3

Suldo, S., Thalji, A., & Ferron, J. (2011). Longitudinal academic outcomes predicted by early adolescents' subjective well-being, psychopathology, and mental health status yielded from a dual factor model. *The Journal of Positive Psychology*, *6*(1), 17–30. https://doi.org/10.1080/17439760.2010.536774

Tejada-Gallardo, C., Blasco-Belled, A., & Alsinet, C. (2023). Psychometric properties of the Spanish adaptation of the Mental Health Continuum—Short Form: A bifactor ESEM approach in an adolescent sample. *Current Psychology*. https://doi.org/10.1007/s12144-023-05090-2

Turner, R. J. (1981). Social support as a contingency in psychological well-being. *Journal of Health and Social Behavior, 22*(4), 357–367. https://doi.org/10.2307/2136677

van Erp Taalman Kip, R. M., & Hutschemaekers, G. J. M. (2018). Health, well-being, and psychopathology in a clinical population: Structure and discriminant validity of Mental Health Continuum Short Form (MHC-SF). *Journal of Clinical Psychology, 74*(10), 1719–1729. https://doi.org/10.1002/jclp.22621

Westerhof, G. J., & Keyes, C. L. M. (2010). Mental illness and mental health: The two continua model across the lifespan. *Journal of Adult Development, 17*(2), 110–119. https://doi.org/10.1007/s10804-009-9082-y

Wilson, M. (2005). *Constructing measures: An item response modeling approach*. Erlbaum Associates.

World Bank (2021). *Philippines | Data*. https://data.worldbank.org/country/philippines?view=chart

World Health Organization. (2004). *Promoting Mental Health: Concepts, emerging evidence, practice: Summary report* (p. 67). World Health Organization.

Wu, M. L., Adams, R. J., Wilson, M. R., & Haldane, S. A. (2007). *ACER ConQuest version 2.0: Generalised item response modelling software*. ACER Press.

Xiao, H., Zhang, Y., Kong, D., Li, S., & Yang, N. (2020). Social capital and sleep quality in individuals who self-isolated for 14 days during the Coronavirus Disease 2019 (COVID-19) outbreak in January 2020 in China. *Medical Science Monitor, 26*, Article e923921-1-e923921-8. https://doi.org/10.12659/MSM.923921

Yan, Z. (2018). The self-assessment practice scale (SaPS) for students: Development and psychometric studies. *The Asia-Pacific Education Researcher, 27*(2), 123–135. https://doi.org/10.1007/s40299-018-0371-8

Yan, Z. (2020). Developing a Short Form of the Self-Assessment Practices Scale: Psychometric Evidence. *Frontiers in Education*. https://doi.org/10.3389/feduc.2019.00153. *4*https://www.frontiersin.org/articles/

Yan, Z., Brubacher, S., Boud, D., & Powell, M. (2020). Psychometric properties of the Self-assessment Practice Scale for professional training contexts: Evidence from confirmatory factor analysis and Rasch analysis. *International Journal of Training and Development*, *24*(4), 357–373. https://doi.org/10.1111/ijtd.12201

Yatham, S., Sivathasan, S., Yoon, R., da Silva, T. L., & Ravindran, A. V. (2018). Depression, anxiety, and post-traumatic stress disorder among youth in low and middle income countries: A review of prevalence and treatment interventions. *Asian Journal of Psychiatry*, *38*, 78–91. https://doi.org/10.1016/j.ajp.2017.10.029

Żemojtel-Piotrowska, M., Piotrowski, J. P., Osin, E. N., Cieciuch, J., Adams, B. G., Ardi, R., Bălţătescu, S., Bogomaz, S., Bhomi, A. L., Clinton, A., de Clunie, G. T., Czarna, A. Z., Esteves, C., Gouveia, V., Halik, M. H. J., Hosseini, A., Khachatryan, N., Kamble, S. V., Kawula, A., & Maltby, J. (2018). The mental health continuum-short form: The structure and application for cross-cultural studies–A 38 nation study. *Journal of Clinical Psychology*, *74*(6), 1034–1052. https://doi.org/10.1002/jclp.22570

Zimet, G. D., Dahlem, N. W., Zimet, S. G., & Farley, G. K. (1988). The Multidimensional Scale of Perceived Social Support. *Journal of Personality Assessment*, *52*(1), 30–41. https://doi.org/10.1207/s15327752jpa5201_2