

# *Evaluation of the Mental Health Continuum–Short Form (MHC–SF) in Setswana-Speaking South Africans<sup>1</sup>*

Corey L. M. Keyes,<sup>1\*</sup> Marié Wissing,<sup>2</sup>  
Johan P. Potgieter,<sup>2</sup> Michael Temane,<sup>2</sup>  
Annamarie Kruger<sup>2</sup> and Sinette van Rooy<sup>2</sup>

<sup>1</sup>Emory University, Atlanta, GA

<sup>2</sup>North–West University, Republic of South Africa

A continuous assessment and a categorical diagnosis of the presence of mental health, described as flourishing, and the absence of mental health, characterized as languishing, is applied to a random sample of 1050 Setswana-speaking adults in the Northwest province of South Africa. Factor analysis revealed that the mental health continuum–short form (MHC–SF) replicated the three-factor structure of emotional, psychological and social well-being found in US samples. The internal reliability of the overall MHC–SF Scale was 0.74. The total score on the MHC–SF correlated 0.52 with a measure of positive affect, between 0.35 and 0.40 with measures of generalized self-efficacy and satisfaction with life, and between 0.30 and 0.35 with measures of coping strategies, sense of coherence, and community collective self-efficacy. The total score on the MHC–SF correlated –0.22 with the total score on the General Health Questionnaire. Criteria for the categorical diagnosis were applied, and findings revealed that 20% were flourishing, 67.8% were moderately mentally healthy, and 12.2% were languishing. Confirmatory factor analysis supported the hypothesized two-continua model of mental health and mental illness found in the USA. Copyright © 2008 John Wiley & Sons, Ltd.

This paper presents the results of the cross-cultural application of the mental health continuum (MHC) (Keyes, 2002, 2005a) outside of samples of US adults and youth (Keyes, 2006). The MHC represents a clinical approach to the continuous assessment and categorical diagnosis of states of mental health as ‘something positive’ rather than merely the absence of psychopathology.

## SUBJECTIVE WELL-BEING: SOMETHING POSITIVE

Subjective well-being is the appraisals individuals make about the quality of their lives—i.e., their experiences, accomplishments, relationships, and other culturally relevant and valued ways of functioning in life (see, e.g., Ryff, 1989). Subjective well-being is mistakenly equated with hedonic happiness through measures of positive emotions and life satisfaction (i.e., e.g., Kahneman, Diener, & Schwartz, 1999). However, subjective well-being consists of two compatible traditions: one that focuses on feelings towards life (hedonic, emotional well-being [EWB]) and another that focuses on functioning in life (eudaemonic well-being; see Keyes, Shmotkin, & Ryff, 2002).

<sup>1</sup>Data for this manuscript was also used by Sinette van Rooy for purposes of a thesis for a Master’s degree at the North–West University, Republic of South Africa.

\*Correspondence to: Corey Keyes, Emory University, Department of Sociology, Room 225 Tarbuton Hall, 1555 Dickey Drive, Atlanta, GA 30322, USA.  
E-mail: corey.keyes@emory.edu

The *hedonic stream* equates mental health with avowed happiness in life or the experience of positive emotions. The hedonic tradition embodies human concerns with maximizing the amount or duration of positive, pleasant feelings while minimizing the amount or duration of negative, unpleasant feelings. The hedonic tradition is reflected in the stream of research on EWB, which consists of perceptions of avowed happiness and satisfaction with life, and the balance of positive to negative affect over a period of time. Whereas happiness is based upon spontaneous reflections of pleasant and unpleasant affects in one's immediate experience, life satisfaction represents a long-term assessment of one's life.

The *eudaemonia stream* equates mental health with human potential that, when realized, results in positive functioning in life. This tradition of viewing mental health reflects the long-standing human concerns with developing nascent abilities and capacities towards becoming a more fully functioning person and citizen. This tradition has been measured in terms of *psychological* well-being (PWB) (Ryff, 1989) and *social* well-being (SWB) (Keyes, 1998) that reflect how well individuals see themselves functioning in life. Ryff's (1989; Ryff & Keyes, 1995) multidimensional model that includes six dimensions of PWB indicates the challenges that individuals encounter as they strive to function fully and realize their unique talents: self-acceptance, personal growth, purpose in life, positive relations with others, autonomy, and environmental mastery. Keyes's (1998) multidimensional model of SWB consists of five dimensions that indicate whether and to what degree individuals are functioning well in their social lives: social integration, social contribution, social coherence, social actualization, and social acceptance. The important distinction between psychological and SWB is that the former represents how individuals view themselves functioning as 'I' or 'Me', while the latter represents how individuals view themselves functioning as 'We' and 'Us'.

Each measure of subjective well-being is considered a symptom or characteristic of mental health insofar as it represents an outward sign of an otherwise unobservable state of mental health. In the absence of specific diagnostic tests, underlying conditions must be inferred from symptoms (or items). Mental health as well as mental illnesses lack specific diagnostic tests and remain identifiable only as collections of symptoms and outwards signs (i.e., syndromes) of the underlying state or condition. To be diagnosed as *flourishing*

in life, individuals must exhibit high levels on at least one measure of hedonic well-being and high levels on at least six measures of positive functioning. Individuals who exhibit low levels on at least one measure of hedonic well-being and low levels on at least six measures of positive functioning are diagnosed as *languishing* in life. Adults who are *moderately mentally healthy* do not fit the criteria for either flourishing or languishing in life. A continuous assessment sums all items of mental health into a total that is then coded into five-point ranges after the Global Assessment of Functioning approach in the DSM-IV. For reasons reviewed by Kessler (2002) in the domain of psychopathology, I have used—and would recommend that others use—both the categorical and continuous assessment for mental health because each approach provides valuable information and to see whether results and conclusions vary by each approach.

Findings based on representative samples of the US population of adults support the two-continua model of mental health and illness. That is, the measures of EWB, PWB and SWB load on a distinct factor that is correlated with a second factor that accounts for measures of the symptoms of major depression, panic disorder, and generalized anxiety disorder. Completely mentally healthy adults—individuals free of a 12-month mental disorder and flourishing—report the fewest missed days of work, the fewest half-day or greater work cutbacks, the healthiest psychosocial functioning (i.e., low helplessness, clear goals in life, high resilience and high intimacy), the lowest risk of cardiovascular disease, the lowest number of chronic physical diseases with age, the fewest health limitations of activities of daily living, and lower health care utilization. The prevalence of flourishing is barely 20% in the US adult population.

This paper presents the results of the cross-cultural application of the MHC in a sample of South African adults. Three research questions are investigated. First, are the psychometric properties of the MHC measure satisfactory in terms of the factor structure (i.e., EWB, PWB and SWB), internal consistency and validity? Second, do the diagnostic categories in the categorical and continuous assessment of mental health distinguish levels of psychosocial functioning between flourishing, moderately mentally healthy, and languishing individuals? Third, do the measures of mental health and mental illness belong to separate latent factors?

## METHODS

### Sample

Participants from a relatively more collectivist South African cultural background (black South Africans, mainly Setswana speaking) took part in this cross-sectional survey design study. This study is a cross-cutting project between the South African portion of the 12-year prospective Prospective Urban and Rural Epidemiology (PURE) study that is being conducted in 16 countries by the Population Health Research Institute in Canada to study the health transition in chronic diseases of lifestyle in urban and rural participants, and the FORT2 (FORT = Fortology: Understanding and promoting psychosocial health, resilience and strengths in an African context) project led by Marie Wissing within the Africa Unit for Transdisciplinary Health Research. Participants were selected in rural and urban areas in the North West Province of South Africa in the context of the larger multidisciplinary PURE project. Questionnaires were selected as part of the FORT2 project, translated into Setswana, back translated and finalized in a research committee approach. No major translation problems were encountered. Sixteen bilingual (English and Setswana speaking) fieldworkers from the areas where the research were conducted were trained and assisted the individual administering the Setswana questionnaires in a structured interview format—some of the participants in the deep rural areas were illiterate. English questionnaires were also available to fieldworkers. Approval was obtained from the Ethics committee of the North-West University for the PURE project (approval number 04 M10) and for the FORT2 project (approval number 05K10), of which the current study is part.

Participants are from the South African PURE. During 2005, a total of 6000 households were randomly selected in an urban and a rural area in the North West Province of South Africa. Detailed information was obtained from these households, and blood samples and health-related measures were taken from 2000 volunteers. From this group of 2000 participants, the current group of 1050 Setswana-speaking participants was drawn in a first wave to also collect psychological data for the same participants. Participants are from rural ( $n = 599$ ) and urban (451) strata, divided as follows: 'established urban' (an established urban settlement called Ikageng just outside of the town of Potchefstroom) ( $n = 229$ ), 'informal urban' (an informal settlement adjoining Ikageng) ( $n = 215$ ),

'urban rural' (a rural settlement called Ganyesa that is located next to the road to Botswana) ( $n = 281$ ) and 'deep rural' (a deep rural settlement called Tlakgameng, located 35 kilometres from Ganyesa) ( $n = 318$ ). The group consisted of 392 men and 649 women. As far as age is concerned, 228 were between 30 and 40 years of age, 416 between 41 and 50 years, 248 between 51 and 60 years, 106 between 61 and 70 years, 29 between 71 and 80 years, and 2 above 80 years. Disparity in numbers is due to missing data.

### Measures

#### *Mental Health Continuum-Short Form (MHC-SF)* (Keyes, 2005b)

The MHC-SF consists of 14 items. It measures the degree of (1) EWB (items 1–3) as defined in terms of positive affect (PA)/satisfaction with life; (2) SWB (items 4–8) as described in Keyes's (1998) model of SWB (one item on each of the facets of social acceptance, social actualization, social contribution, social coherence and social integration); and (3) PWB (items 9–14) as described in Ryff's (1989) model (including one item on each of the dimensions of autonomy, environmental mastery, personal growth, positive relations with others, purpose in life and self-acceptance).

#### *Sense of Coherence Scale (SOC)* (Antonovsky, 1987)

The SOC (a 29-item scale) measures an individual's way of experiencing the world and his/her life in it. Core components are comprehensibility, manageability and meaningfulness. Sense of coherence is seen as an important determinant of PWB and positive correlations have been established between the SOC and physical well-being and PWB (Antonovsky, 1987; Wissing & Van Eeden, 2002). Antonovsky (1993) indicates that the SOC manifested internal reliability indices of 0.78–0.93 as reported in 26 different studies, and test-retest reliability indices of 0.56–0.96. Antonovsky (1993) also reports good content and criterion validity. Wissing et al. (1999) indicated reliability and validity of this scale for use in an African group. The Cronbach alpha reliability index for the SOC was 0.80 in the current study.

#### *Affectometer 2 (AFM) (Short Version)* (Kammann & Flett, 1983)

The AFM was developed to measure a general sense of well-being or general happiness. PWB

is measured on an affective level by determining the balance between positive and negative affect (Kammann & Flett, 1983). Two equivalent parts of the AFM exist: the 20-Sentence Item Scale and the 20-Adjective Item Scale. The 20-Sentence Item Scale was used in the present research. This paper focuses on the PA (10 items) Scale, which Kammann and Flett (1983) report finding alpha reliability above 0.88–0.93. Internal reliability (Cronbach alpha) was 0.66 for PA; Wissing, Wissing, Du Toit, and Temane (submitted) attest to the applicability of this scale in a South African context.

*Satisfaction with Life Scale (SWLS) (Diener, Emmons, Larsen, & Griffin, 1985)*

The SWLS (a five-item scale) was developed to give an indication of a person's general satisfaction with life. Evaluation of quality of life, according to own criteria, is measured on a cognitive-judgemental level. Diener et al. (1985) report a 2-month test-retest reliability index of 0.82 and a Cronbach alpha-reliability index of 0.87. Wissing et al. (1999) also found the SWLS reliable and valid for use in an African context. The SWLS manifested a Cronbach alpha reliability index of 0.69 in the current study.

*General Health Questionnaire (GHQ) (Goldberg & Hillier, 1979)*

The GHQ is aimed at detecting common symptoms, which are indicative of the various syndromes of mental disorder, and differentiates between individuals with psychopathology as a general class and those who are considered to be normal. Subscales are: Somatic Symptoms (SS), Anxiety and Insomnia, Social Dysfunction (SD) and Severe Depression (DS). The scale consists of 28 items. In this study, the 'GHQ method' (Goldberg & Hillier, 1979) of scoring was implemented, i.e., responses were scored 0-0-1-1, with a minimum of 0 and a maximum of 28. This method was adopted rather than the Likert type of graded scoring that uses 1-2-3-4 (or 0-1-2-3) because it is supposed to reduce the effect of a response set to choose extremes. However, analyses were also run using the Likert scoring of the GHQ, and the findings and conclusions were unchanged. Hence, unless specified in the text, all results reported in this paper use the 'GHQ method' of scoring as described above. Cronbach alpha reliabilities reported vary from 0.82 to 0.86 (Goldberg et al., 1997) and 0.77 to 0.84 for subscales and 0.91 for the Total Scale Score in a South African sample (Wissing & Van Eeden, 2002). Goldberg et al. (1997) attest extensively to its

validity. Wissing et al. (1999) reported acceptable reliability and validity indices for use in a Setswana-speaking group. Cronbach alpha reliability indices in the current study were 0.74 (SS), 0.74 (AS), 0.55 (SD), 0.75 (DS) and 0.89 (total scale).

*Generalized Self-Efficacy Scale (GSE) (Schwarzer & Jerusalem, 1993)*

The GSE (a 10-item scale) was developed to provide a measurement of the strength of an individual's conviction in his/her ability to react successfully to minimum pressures as well as to difficult situations, and to cope with any associated setbacks. Schwarzer and Jerusalem (1993) report Cronbach alpha reliability indices of between 0.82 and 0.93 and test-retest reliability indexes of 0.47 for males and 0.63 for females over a 2-year period. They also contest to the good construct validity of the GSE. The Cronbach alpha was 0.66 in the current study.

*New General Self-Efficacy Scale (NGSE) (Chen, Gully, & Eden, 2001)*

This eight-item self-report measures the tendency to view oneself as more or less capable of meeting task demands in various contexts. Validation studies have indicated that the NGSE measures a construct that is related to, but distinct from, both self-esteem and situational self-efficacy (cf. Chen et al., 2001). Internal consistency reliabilities have been found to be 0.86 and 0.90. In the present study, internal reliability was 0.74.

*Community Collective Efficacy Scale (CCES—Revised) (Carroll, Rosson, & Zhou, 2005)*

The CCES measures the community's capacity to succeed in joint activities. Carroll et al. (2005) opine that collective efficacy beliefs would influence tendencies towards community-oriented behaviours, including planning and use of shared resources, and a willingness to persist in the face of internal conflicts, political challenges, or social concerns. As the scale was developed for a community computing context, only seven items were selected that had a bearing on normative community functioning in terms of 'managing tradeoffs and conflicts' (Carroll et al., 2005, p. 5). Carroll et al. (2005) indicate that people scoring high on the CCES report stronger feelings of belonging and are more likely to be activists in their community. Carroll et al. (2005) report an internal reliability of 0.86. In this study, a Cronbach alpha of 0.72 has been obtained.

### N-COPE

The N-COPE is a Coping Strategy Scale based on a combination of the COPE questionnaire by Carver, Scheier, and Weintraub (1989) and the Africultural Coping Systems Inventory (ACSI) by Utsey, Adams, and Bolden (2000). Stapelberg (1999) adapted the COPE for use in a Setswana-speaking group, and Potgieter, Wissing, Temane, van der Walt, and Pithey (2006) included components from the ACSI to formulate an initial version of the N-COPE which is further validated by Van der Walt (2007). The scale consists of six emic factors representing different coping strategies that are used in the Setswana community. Five of these subscales represent positive or functional ways of coping (as indicated by positive correlations with indices of PWB), namely active problem solving with help from others, spiritual and cultural rituals for solving the problem, participation in religious activities, acceptance and escape in social activities. The sixth subscale measures denial, which may be viewed as negative if applied over the long run. The short, 35-item version of the N-COPE was used in this study, and its Cronbach alpha was 0.74.

## RESULTS

### Structure and Psychometrics of Subjective Well-Being

Confirmatory factor analyses were computed to ascertain the factor structure of the MHC-SF. Table 1 shows that the three-factor structure as proposed by Keyes (2002, 2005a)—namely, EWB, PWB and SWB—was confirmed. Both the single- and two-

factor models indicated poor fit, yielding a Root Mean Square Error of Approximation (RMSEA) above the threshold of 0.10 adopted by MacCallum, Browne, and Sugawara (1996). The RMSEA measure of fit indicated a good fit of the three-factor model as suggested by the criteria. The popularity of this particular measure of fit is partly based on the fact that it does not require comparison with a null model and thus does not require one to posit as plausible a model in which there is complete independence of the latent variables but should not be regarded as infallible (Arbuckle, 2005). The Goodness of Fit Index (GFI) for the three-factor model also indicated good fit. The GFI varies between 0 and 1, and the closer to 1 it is, the better the fit (see Hu & Bentler, 1999). To further attest to the good fit of the data, Hoelter's Critical N (Hoelter, 1983) for the three-factor model is almost twice the recommended cut-off point of 200 (Hoelter, 1983) (see MacCallum et al., 1996). The chi-squared statistic of both the single- and two-factor models were significantly higher than the one yielded from the fit of the three-factor model. Thus, the three-factor model is the best-fitting model to these data, its descriptive fit indices suggest it is an excellent fit to the data, and this model replicates the proposed latent structure of subjective well-being.

Table 2 summarizes the descriptive statistics obtained on the total MHC-SF Scale and its three subscales. The total MHC-SF Scale yielded a relatively high internal consistency ( $\alpha = 0.74$ ). Nunnally and Bernstein (1994) suggest that Cronbach alphas should normally be not less than 0.70. Similarly, the EWB subscale had the next highest measure of internal consistency followed by the PWB subscale ( $\alpha = 0.67$ ), which fell just below the recommended

Table 1. Maximum likelihood estimation of confirmatory factor models of theories of the latent structure of the MHC-SF items (n = 1050)

Latent model	$\chi^2$	df	GFI/AGFI	CN	RMSEA	AIC	$\chi^2_{\text{difference}}$ † $df_{\text{difference}}$
1. Independence	2288.6	78					
2. Single factor	788.8	65	0.87/0.82	126.6	0.12	1052.3	115.4 <sub>1-2</sub> *
3. Two factor†	552.8	64	0.91/0.87	177.9	0.10	727.8	236.0 <sub>2-3</sub> *
4. Three Factor	269.4	62	0.96/0.94	354.5	0.06	345.9	141.7 <sub>3-4</sub> *

\* $p < 0.001$ .

†Measure of emotional well-being load on one factor, and measure of psychological and social well-being load on the second factor.

GFI = Goodness of Fit Index. AGFI = Adjusted Goodness of Fit Index. CN = Critical N. RMSEA = Root Mean Square Error of Approximation. AIC = Akaike Information Criterion. MHC-SF = mental health continuum-short form.

Table 2. Descriptive statistics of the MHC-SF subscales and total MHC-SF score

Mental health dimensions	Mean	St. Dev.	Correlations			
			1	2	3	4
1. Emotional well-being	2.6	1.2	0.73	0.38	0.31	0.72
2. Social well-being	2.4	0.95		0.59	0.24	0.70
3. Psychological well-being	3.3	0.81			0.67	0.77
4. Total MHC-SF	2.8	0.69				0.74

Note: All correlations significant at  $p < 0.001$  (two tailed); each scale ranged from 0 to 5. Internal reliability estimates are presented in the diagonal of the correlation matrix.

MHC-SF = mental health continuum-short form. St. Dev. = Standard Deviation.

Table 3. Correlations of MHC-SF subscales and total score with validity measures (n = 1033)

Validity measure	Emotional well-being	Psychological well-being	Social well-being	Total MHC-SF
Affectometer Positive Affect Scale	0.45***	0.41***	0.28***	0.52***
Generalized Self-Efficacy Scale	0.21***	0.41***	0.19***	0.39***
Satisfaction With Life Scale	0.39***	0.16***	0.31***	0.37***
Coping Strategies Scale (N-COPE)	0.23***	0.24***	0.29***	0.34***
Subscales of the N-COPE:				
APO	0.11*	0.25*	0.10*	0.22*
SCR	0.09*	-0.05	0.19*	0.10*
PRA	0.15*	0.08*	0.11*	0.15*
Acc	0.12*	0.21*	-0.04	0.14*
Den	-0.01	0.07*	0.11*	0.09*
ESA	0.07*	0.06	0.06	0.16*
Sense of Coherence Scale	0.19***	0.34***	0.13***	0.32***
New General Self-Efficacy Scale	0.17***	0.41***	0.08**	0.32***
Community Collective Efficacy Scale	0.06*	0.41***	0.11***	0.30***
General Health Questionnaire (GHQ)	-0.23*	-0.24*	-0.02	-0.22*
Subscales of the GHQ:				
SS	-0.23*	-0.19*	-0.07*	-0.22*
AS	-0.19*	-0.17*	-0.02	-0.17*
SD	-0.15*	-0.21*	-0.01	-0.19*
DS	-0.19*	-0.24*	-0.02	-0.22*

\* $p < 0.05$ . \*\* $p < 0.01$ . \*\*\* $p < 0.001$  (two tailed).

APO = active problem solving with help from others. SCR = spiritual and cultural rituals for solving the problem. PRA = participation in religious activities. Acc = acceptance. Den = denial. ESA = escape in social activities. SS = Somatic Symptoms. AS = Anxiety and Insomnia. SD = Social Dysfunction. DS = Severe Depression.

cut-off point of 0.70. The SWB Scale had a relatively low internal consistency ( $\alpha = 0.59$ ), although the inclusion of these items in the total MHC-SF Scale did not lower its internal consistency.

The total MHC-SF Scale and its three subscales yielded good criterion validity. Table 3 reveals that the three subscales of subjective well-being correlated more strongly with the measure of PA, generalized self-efficacy and the SWLS than the other criterion measures. The exception to this pattern was the relatively low correlation of SWB with generalized self-efficacy and the relatively low correlation of PWB with the SWLS. While all three subscales correlated modestly with the

Coping Strategies Scale, the PWB subscale correlated more strongly than the other two subscales with the sales of sense of coherence, general self-efficacy and community (collective) efficacy.

The total score of the MHC-SF Scale reveals a more consistent pattern of correlations with the criterion measures. As would be expected, the MHC-SF correlates most strongly with the PA Scale, which is considered a measure of a component of positive mental health. The MHC-SF correlated modestly, in the range of 0.35–0.40, with the GSE and the SWLS, while it correlated less so, but in the range of 0.30–0.34, with the Copies Strategies Scale (as well as the subscales reflecting different coping

strategies), the Sense of Coherence Scale, and the General Self-Efficacy and Community (collective) Efficacy Scales. In sum, the MHC-SF correlates most strongly with measures that are measures of facets of subjective well-being (i.e., PA and satisfaction with life) or criteria of positive mental health (i.e., self-efficacy and positive coping strategies).

### Assessment of the MHC

The categorical diagnosis using the MHC-SF by Keyes (2006) was applied to the data to obtain estimates of the population prevalence of the mental health categories. To be flourishing, individuals must report that they experience 'everyday' or 'almost everyday' at least seven of the symptoms, where one of the symptoms is from the hedonic (i.e., EWB) cluster (i.e., happy, interested in life, or satisfied). To be languishing, individuals must report that they 'never' or 'once or twice' experi-

enced at least seven of the symptoms, where one of the symptoms is from the hedonic (i.e., EWB) cluster (i.e., happy, interested in life, or satisfied). Individuals who do not fit the criteria for flourishing or languishing are categorized as moderately mentally healthy. Based on these diagnostic criteria, then, the data reveal that 12.2% of the sample is languishing, 67.8% were moderately mentally healthy and 20% were flourishing. These estimates are similar to those found by Keyes (2005a) using the long form of the mental health assessment in a national probability sample of US adults between the ages of 25 and 74, where 18% were flourishing, about 17% were languishing and 65% were moderately mentally healthy.

Table 4 presents the mean levels of the scales reflecting psychosocial assets and the GHQ subscales, which measure symptoms of psychopathology, by level of mental health. Pairwise contrasts using the Tukey *Honestly Significant Difference* Test were used to test whether mean psychosocial

Table 4. Mean level (St. Dev.) of psychosocial assets and psychopathology by categorical diagnosis of mental health

	Mentally unhealthy, <i>languishing</i> 12.2% ( <i>n</i> = 128)	Moderately mentally healthy 67.8% ( <i>n</i> = 712)	Mentally healthy, <i>flourishing</i> 20.0% ( <i>n</i> = 210)
Psychosocial assets			
Coping Strategies Scale (N-COPE)*	2.4 (0.27)	2.5 (0.30)	2.7 (0.33)
Sense of Coherence Scale*	115.1 (19.6)	124.0 (21.7)	135.5 (23.3)
Generalized Self-Efficacy Scale*	25.1 (4.2)	27.8 (4.1)	29.8 (4.8)
New General Self-Efficacy Scale*	25.4 (4.6)	28.0 (5.1)	30.3 (5.4)
Community Collective Efficacy Scale*	20.2 (4.9)	22.9 (4.6)	25.1 (4.5)
Psychopathology			
GHQ Somatic Symptoms**	2.6 (2.0)	2.4 (2.0)	1.3 (1.9)
GHQ Social Dysfunction**	2.3 (1.7)	2.4 (1.7)	1.5 (1.5)
GHQ Anxiety and Insomnia**	2.7 (2.0)	2.6 (2.0)	1.6 (2.1)
GHQ Severe Depression**	2.2 (2.0)	1.8 (1.8)	0.9 (1.7)
Total GHQ Score**	9.8 (6.3)	9.2 (6.2)	5.4 (5.8)

Note: All F-tests  $p < 0.001$  (two-tailed).

\*All possible contrasts using the Tukey *Honestly Significant Difference* were statistically significant at  $p < 0.02$ .

\*\*Contrasts using the Tukey *Honestly Significant Difference* of flourishing with moderate mental health and flourishing with languishing were statistically significant at  $p < 0.01$ . None of the contrasts of moderate mental health with languishing were statistically significant at  $p < 0.05$ .

GHQ = General Health Questionnaire.

Table 5. Maximum likelihood estimation of confirmatory factor models of theories of the latent structure of mental health (fit indices in parentheses represent model fit using the Likert scoring for the GHQ subscales)†

Latent structure model	$\chi^2$	<i>df</i>	GFI/AGFI	CN	RMSEA	AIC	$\chi^2_{\text{difference}}$ + <i>df</i> <sub>difference</sub>
1. Independence	2254 (2486)	21					
2. Single axis	294.4 (308.1)	14	0.92/0.84 (0.92/0.84)	104.9 (98.9)	0.14 (0.09)	342.5 (342)	279.9 <sub>1-2</sub> * (311.1*)
3. Two axes, orthogonal	133.2 (216.4)	14	0.97/0.93 (0.95/0.89)	230.5 (140)	0.09 (0.14)	158.5 (237)	161.2 <sub>2-3</sub> * (91.7*)
4. Two axes, oblique‡	68.0 (120.4)	13	0.98/0.96 (0.97/0.93)	428.2 (239)	0.06 (0.06)	98.8 (153)	65.2 <sub>3-4</sub> * (96.0*)

Note: *N* = 1050.

\**p* < 0.001.

†Mental illness measures included the four GHQ subscales and the mental health measures included the MHC-SF subscales of emotional well-being, social well-being and psychological well-being.

‡The correlation between latent factors is -0.33 (-0.37 when using the Likert scoring for the GHQ subscales).

GFI = Goodness of Fit Index. AGFI = Adjusted Goodness of Fit Index. CN = Critical N. RMSEA = Root Mean Square Error of Approximation. AIC = Akaike Information Criterion. GHQ = General Health Questionnaire.

assets and psychopathology differed by diagnosis of mental health. All measures of psychosocial assets were highest in flourishing individuals than those who were moderately mentally healthy or languishing. Moreover, all measures of psychosocial assets were higher among individuals who were moderately mentally healthy than languishing. In turn, all subscales as well as the total GHQ measure of psychopathology were lowest in flourishing individuals than those who were moderately mentally healthy or languishing. Levels of psychopathology as measured by the GHQ were slightly higher among languishing adults than adults with moderate mental health. However, these differences did not achieve statistical significance, so we must conclude that levels of psychopathology are the same among moderately mentally healthy and languishing individuals in this study.

Overall, then, the findings clearly indicate that flourishing individuals function better than individuals who are languishing or with moderate mental health. Compared with all others, flourishing individuals report less SS, less SD, less anxiety (and insomnia), and fewer symptoms of DS, more efficacy (individual and collective), more use of positive coping, and a greater sense of coherence.

The final hypothesis tests the two-continua model of mental health and illness, which predicts that measures of mental health are correlated with, but distinct from, measures of mental illness. Different theories of the latent structure of the measures

of mental health and mental illness were tested using confirmatory factor models. The three subscales of the MHC-SF (i.e., EWB, PWB and SWB) were used to indicate mental health and the four subscales of the GHQ were used as indicators of mental illness.

The starting independence model in Table 5 is a baseline in which there were as many latent constructs as measures of mental health and illness (i.e., each measure reflects an independent latent factor). As is usually the case, the Chi-square statistic and descriptive fit indices of this model were very large, indicating that the theory of independence is untenable. By comparison, the single-factor model posits that all measures are caused by a single, bipolar latent dimension. In other words, support for this model would confirm the theory that the absence of mental illness is the presence of mental health. The chi-square statistic and descriptive fit indices were markedly improved for the single-factor model relative to the independence model. Moreover, the chi-square contrast of the independence and single-factor models revealed a highly statistically significant reduction of Chi-square, suggesting that the single-factor model was a more tenable model than the independence model.

However, the next model positing that the measures of mental health and mental illness reflect two distinct but uncorrelated unipolar factors had markedly improved fit indices over the single-factor



model. The chi-square contrast of the single- and two-factor (orthogonal) models revealed a highly statistically significant reduction of chi-square. The final model tests whether the latent factors of mental illness and mental health are correlated. Although mental illness and health may not belong to a single continuum, it is plausible that any valid measure of mental health that is factorially distinct from a measure of psychopathology should at least correlate negatively and modestly with mental illness.

The chi-square contrast of the orthogonal two-factor model and the correlated two-factor (i.e., oblique) model revealed a highly statistically significant reduction of chi-square, suggesting that the correlated two-factor model was the most tenable model of the structure of mental health and illness. The correlation between the latent factor of mental illness and mental health was  $-0.33$ . The fit indices for the correlated two-factor model suggest that it is an excellent fitting model to these data. The adjusted GFI was 0.96, the critical N was over twice as large as the recommended cut-off point of 200, and the RMSEA and Akaike information criterion were small, suggesting a very good fitting model to the data.

The same confirmatory models were rerun using the Likert scoring of the GHQ subscales, and the estimates of fit and chi-square contrasts are reported in parentheses in Table 5. The Likert scoring of the GHQ resulted in slightly different estimates of model fit in each step. The most noticeable difference was in the two-factor correlated model, where the estimate of the correlation of the mental illness and mental health latent factors was  $-0.37$ , which is slightly higher than the correlation of  $-0.33$  between the same factors using the original scoring of the GHQ subscales. Most importantly, the conclusions are the same as in the models with the original GHQ scoring, with the oblique two-axes model providing the superior fit to the data. As such, our findings of support for the two-continua model do not depend on the type of scoring of the GHQ subscales.

## DISCUSSION

The MHC (Keyes, 2002) represents a clinical approach to the continuous assessment and categorical diagnosis of states of positive mental health. Research using the MHC in the Midlife in the United States (MIDUS) national probabil-

ity sample of adults has shown this measure to provide a meaningful distinction between individuals with a mental disorder and individuals who have not had an episode of a 12-month mental disorder. That is, individuals who have had an episode of at least one mental disorder (from four measures in MIDUS: Panic Disorder, Generalized Anxiety, Major Depressive Episode and Alcohol Dependence) and who are languishing have lower work productivity, more disability, more chronic physical conditions, higher risk of cardiovascular disease, and greater health care utilization than moderately mentally healthy individuals with a mental disorder, who in turn function worse than individuals with a mental disorder who are flourishing. Using the same outcome measures, flourishing individuals without a mental illness function better than individuals who are moderately mentally healthy, who in turn function better than adults who are languishing but did not have any mental disorders.

Because the MHC utilized three-item scales to measure each of the 11 dimensions of positive functioning—i.e., PWB and SWB—and a six-item measure of PA, the MHC was long and time intensive for use in population surveys as well as in clinical settings. Moreover, the response format for the items comprising the 11 scales of positive functioning required individuals to 'agree' or 'disagree' (strongly, moderately, or slightly) as to whether each item described how they typically functioned. This response format did not lend itself to any clear cut-off point of whether people were functioning at the level of flourishing, languishing, or in between. Tertiles were therefore computed and used as cut-off points. The short form of the MHC (i.e., MHC-SF) changed the response format to ask individuals how much of the time they functioned in a specific manner: from 'none of the time' to 'all of the time'. This response format was modelled after the approach used in the Composite International Diagnostic Interview, which operationalizes the Diagnostic and Statistical Manual of mental disorder criteria (e.g., for major depressive episode). Moreover, the MHC-SF includes only a single item from each of the three-item scales measuring the dimensions of SWB and PWB. The item deemed by the author as being the most prototypical of the meaning of the dimensions was chosen from the three-item scales, which has been previously reduced from the larger item scale based on the three items that best represented the overall construct (see, e.g., Ryff & Keyes, 1995 for this explanation for the PWB scales).

The MHC-SF was used first in the Child Development Supplement in 2002 (see, e.g., Keyes, 2006) and applied to a random sample of youth between the ages of 12 and 18 years old. The items in the short form of the MHC in the US adolescents confirmed the three-factor structure of subjective well-being. That is, the three-factor model was the best-fitting model to these data, suggesting that the items measuring EWB, PWB and SWB are reflections of three distinct but correlated latent factors. Moreover, the three subscales of the MHC-SF exhibited good construct validity. The subjective well-being measures correlated relatively strongly and positively with an established scale of global self-concept, with a scale that measured self-determination (a form of efficacy), and with a scale that measured the child's perceived integration into school. Each measure of subjective well-being also correlated modestly and negatively with the Kovacs child depression inventory, and modestly and positively with a measure of the child's perceived closeness to significant others (i.e., adults, family and friends) and with the child's self-rated overall health. Each measure of subjective well-being correlated positively but weakly with perceived level of math skill and perceived level of reading skill (Keyes, 2005b).

The test of the MHC long form and short form in the population of adults and youth presented a strong test of its applicability because the US population is diverse ethnically and racially. Nonetheless, it remains an empirical question whether the MHC is applicable to populations outside of the USA because the items on the MHC may represent the value orientations of a post-industrial, Western (i.e., primarily individualistic) and middle- to upper-class (i.e., socio-economic standing in terms of education, income and occupation) society. We therefore used an etic approach in which we administered the MHC-SF as it was developed in the USA to a sample of black Setswana-speaking South Africans to investigate its factor structure, psychometrics and utility in distinguishing the level of functioning among, in terms of the level of mental health, Keyes's (2002) model (i.e., languishing, moderate mental health and flourishing).

We believe the results from this paper are encouraging in terms of the potential applicability of the MHC-SF in various cultures. Among the black Setswana-speaking population in South Africa, the short form of the MHC replicated the three-factor structure found in the US studies, the overall MHC-SF Scale had acceptable internal consistency

(i.e., above 0.70), and the subscales and overall score of the MHC-SF showed good construct validity with existing measures of subjective well-being. On the other hand, the internal consistency of the PWB subscale and, especially, the SWB subscale were low (i.e., below 0.70). While inclusion of the PWB and SWB items into the overall scale did not reduce the MHC-SF's internal consistency, future research will need to focus on improving the item content for these respective subscales in this particular South African population.

In turn, our findings also supported the two-continua model of mental health, with strong support for the theory that the MHC-SF measures of mental health are correlated with, but distinct from, the GHQ's measures of dimensions of psychopathology. Application of the diagnostic criteria for positive mental health revealed similar estimates of population prevalence in the Setswana-speaking population as (i.e., using the long form of the MHC) in the US adult population: 20% flourishing in South Africa (18% in the USA), 68% with moderate mental health in South Africa (65% in the USA) and 12% languishing in South Africa (17% in the USA). Findings also indicated that flourishing South Africans (*viz.*, Setswana speaking), as in the USA, functioned better than individuals who are languishing or with moderate mental health in terms of measures of psychosocial assets.

Moreover, and similar to studies in the US adult population, flourishing Setswana South Africans reported lower levels of psychopathology than moderately mentally healthy or languishing individuals. However, and unlike findings in the US adult population (Keyes, 2005a), there was no difference in level of psychopathology between South Africans with moderate mental health and those who were languishing. The latter result may reflect differences in measures of psychopathology between studies, where caseness for clinical disorders were used in the US study and the GHQ, which is a more general and screening measure, was used in the present study. Research has also shown that the responses to the GHQ-12 questions vary across populations, with some items being more sensitive and some more specific than others (see Goldberg, Oldehinkel, & Ormel, 1998). For this reason, we would recommend that future research in testing the applicability of the MHC long and short forms also include measures of clinical mental disorders in addition to screening scales. On the other hand, the lack of differentiation between languishing and moderately mentally healthy adults in GHQ scores could reflect a problem in the threshold used to

distinguish languishing from moderate mental health. While this is possible, it is not the most convincing explanation because we do find differentiation between languishing and moderately mentally healthy adults on all measures of psychosocial assets (e.g., SOC).

## REFERENCES

- Antonovsky, A. (1987). *Unravelling the mystery of health: How people manage stress and stay well*. San Francisco: Jossey-Bass.
- Antonovsky, A. (1993). The structure and properties of the sense of coherence scale. *Social Science and Medicine*, 36, 725–733.
- Arbuckle, J.L. (2005). *Amos 6.0 user's guide*. Chicago: SPSS Inc.
- Carroll, J.M., Rosson, M.B., & Zhou, J. (2005). Collective efficacy as a measure of community. In *Proceedings of Human Factors in Computing Systems: CHI 2005* (pp. 1–10). New York: ACM.
- Carver, C.S., Scheier, M.F., & Weintraub, J.K. (1989). Assessing coping strategies: A theoretically based approach. *Journal of Personality and Social Psychology*, 57, 267–283.
- Chen, G., Gully, S.M., & Eden, D. (2001). Validation of a new general self-efficacy scale. *Organizational Research Methods*, 4, 62–83.
- Diener, E., Emmons, R., Larsen, R.J., & Griffin, S. (1985). The satisfaction with life scale. *Journal of Personality Assessment*, 49, 71–75.
- Goldberg, D.P., & Hillier, V.F. (1979). A scaled version of the General Health Questionnaire. *Psychological Medicine*, 9, 139–145.
- Goldberg, D.P., Gater, R., Sartorius, N., Ustun, T.B., Piccinelli, N., Gureje, O., & Rutter, C. (1997). The validity of two versions of the GHQ in the WHO study of mental illness in general health care. *Psychological Medicine*, 27, 191–197.
- Goldberg, D.P., Oldehinkel, T., & Ormel, J. (1998). Why GHQ threshold varies from one place to another. *Psychological Medicine*, 28, 915–921.
- Hoelter, J.W. (1983). The analysis of covariance structures: Goodness of fit indices. *Sociological Methods and Research*, 11, 325–344.
- Hu, L., & Bentler, P.M. (1999). Cut off criterion for fit indices in covariance structure analysis. Conventional versus new alternatives. *Structural Equation Modeling*, 6, 1–55.
- Kahneman, D., Diener, E., & Schwarz, A. (Eds.) (1999). *Well-being: Foundations of hedonic psychology*. New York: Russell Sage.
- Kammann, R., & Flett, R. (1983). Affectometer 2: A scale to measure current levels of general happiness. *Australian Journal of Psychology*, 35, 259–265.
- Kessler, R.C. (2002). The categorical versus dimensional assessment controversy in the sociology of mental illness. *Journal of Health and Social Behavior*, 43, 171–188.
- Keyes, C.L.M. (1998). Social well-being. *Social Psychology Quarterly*, 61, 121–140.
- Keyes, C.L.M. (2002). The mental health continuum: From languishing to flourishing in life. *Journal of Health and Social Behavior*, 43, 207–222.
- Keyes, C.L.M. (2005a). Mental illness and/or mental health? Investigating axioms of the complete state model of health. *Journal of Consulting and Clinical Psychology*, 73, 539–548.
- Keyes, C.L.M. (2005b). The subjective well-being of America's youth: Toward a comprehensive assessment. *Adolescent and Family Health*, 4, 3–11.
- Keyes, C.L.M. (2006). Mental health in adolescence: Is America's youth flourishing? *American Journal of Orthopsychiatry*, 76, 395–402.
- Keyes, C.L.M., Shmotkin, D., & Ryff, C.D. (2002). Optimizing well-being: The empirical encounter of two traditions. *Journal of Personality and Social Psychology*, 82, 1007–1022.
- MacCallum, R.C., Browne, M.W., & Sugawara, H.M. (1996). Power analysis and determination of sample size for covariance structure modelling. *Psychological Methods*, 1, 130–149.
- Nunnally, J.C., & Bernstein, I.H. (1994). *Psychometric theory* (3rd ed.). New York: McGraw-Hill.
- Potgieter, J.C., Wissing, M.P., Temane, M.T., van der Walt, C., & Pithey, A. (2006, July). *Coping in an African context*. Paper presented at the 18th International Congress of the International Association for Cross-Cultural Psychology, Isle of Spetses, Greece.
- 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, 1069–1081.
- Ryff, C.D., & Keyes, C.L.M. (1995). The structure of psychological well-being revisited. *Journal of Personality and Social Psychology*, 69, 719–727.
- Schwarzer, R., & Jerusalem, M. (1993). *Measurement of perceived self-efficacy: Psychometric scales for cross-cultural research*. Berlin: Freie Universität.
- Stapelberg, R. (1999). *Psychometric characteristics of the Cope and the SACS in a Setswana speaking South African group*. Unpublished Master's dissertation at the Potchefstroom University of Christian Higher Education (now the North-West University), Potchefstroom.
- Utsey, S.O., Adams, E.P., & Bolden, M. (2000). Development and initial validation of the Africultural Coping Systems Inventory. *Journal of Black Psychology*, 26, 194–215.
- Van der Walt, C. (2007). *Validation of a coping scale in an African context*. Unpublished Master's dissertation at the North-West University, Potchefstroom, South Africa.
- Vorster, H.H. (2006). *Africa Unit for Transdisciplinary Health Research AUTEr: Annual report and strategic planning document*. Unpublished document, North West University: Potchefstroom Campus, Potchefstroom, South Africa.
- Wissing, J.A.B., Wissing, M.P., Du Toit, M.M., & Temane, Q.M. (submitted). *Psychometric proper-*

- ties of some scales measuring psychological well-being in a South African context: The FORT2 and POWIRS projects.
- Wissing, M.P., & Van Eeden, C. (2002). Empirical clarification of the nature of psychological well-being. *South African Journal of Psychology, 32*, 32–44.
- Wissing, M.P., Thekiso, S., Stapelberg, R., Van Quickelberge, L., Choabi, P., Moroeng, C., & Nienaber, A. (1999, July). *The psychometric properties of scales measuring psychological well-being in an African group: The THUSA study*. Paper presented at the International Africa Psychology Congress, Durban, South Africa.