Change in Level of Positive Mental Health as a Predictor of Future Risk of Mental Illness

Corey L. M. Keyes, PhD, Satvinder S. Dhingra, MPH, and Eduardo J. Simoes, MD, MSc, MPH

The debate is no longer about whether mental illness is a public health issue,[1–4] but about what can reduce the prevalence of, and suffering from, mental illness. The de facto approach of mental illness treatment[4] and prevention through risk reduction has not reduced the prevalence, burden, or early onset of mental disorder.[5,6] A further step is mental health promotion and protection, the latter defined as the objective of preventing the loss of good mental health.[7]

Whereas treatment targets those with mental illness, and prevention through risk reduction targets those vulnerable to mental illness, mental health promotion and protection targets those with optimal and less-than-optimal mental health.[8] Mental health promotion and protection seeks to promote maintenance or elevation of positive mental health and to protect against its loss.[8–10] Mental health promotion and protection is premised on the dual continuum model—that mental health and mental illness belong to 2 separate but correlated dimensions among the population.[11,12]

Findings from many studies[13–21] support the dual continuum: one indicating the presence or absence of mental health, the other indicating the presence or absence of mental illness symptoms. For example, the latent factors of mental illness and health correlate around −0.50, meaning only 25% of their variance is shared.[13] This modest correlation supports the viewpoint that mental health is not merely the absence of mental illness.[22,23]

Advances in the measurement of mental health[14,24] permit investigation of the hypothesis that mental health, like health in general,[25] is a complete state. In this study, mental health is referred to as "flourishing," a combination of feeling good about and functioning well in life. "Languishing" mental health is referred to as not feeling good about and not functioning well in life. Survey (prevalence) data reveal that those who are flourishing report the lowest cross-sectional rates of the following: mental illness, limitations of activities of daily living, missed days

Objectives. We sought to describe the prevalence of mental health and illness, the stability of both diagnoses over time, and whether changes in mental health level predicted mental illness in a cohort group.

Methods. In 2009, we analyzed data from the 1995 and 2005 Midlife in the United States cross-sectional surveys (n=1723), which measured positive mental health and 12-month mental disorders of major depressive episode, panic, and generalized anxiety disorders.

Results. Population prevalence of any of 3 mental disorders and levels of mental health appeared stable but were dynamic at the individual level. Fifty-two percent of the 17.5% of respondents with any mental illness in 2005 were new cases; one half of those languishing in 1995 improved in 2005, and one half of those flourishing in 1995 declined in 2005. Change in mental health was strongly predictive of prevalence and incidence (operationalized as a new, not necessarily a first, episode) of mental illness in 2005.

Conclusions. Gains in mental health predicted declines in mental illness, supporting the call for public mental health promotion; losses of mental health predicted increases in mental illness, supporting the call for public mental health protection. (*Am J Public Health*. 2010;100:2366–2371. doi:10.2105/AJPH.2010.192245)

of work, cardiovascular disease, physical health conditions at all ages, utilization of acute health care service, and prescription medication.[8,13]

Central to the mental health promotion and protection's promotion hypothesis is that gains in the level of mental health decrease the risk of future mental illness; central to the mental health promotion and protection's protection hypothesis is that loss of mental health increases the risk of future mental illness. We investigated both hypotheses with the 1995 and 2005 waves of the Midlife in the United States (MIDUS) National Study of Health and Well-Being. We also investigated the prevalence of mental health and illness over time (i.e., 1995 and 2005) and the stability of mental health and illness diagnoses.

METHODS

In 2009, we analyzed data from the national random-digit-dialing portion of the MIDUS study. The MIDUS national random-digit-dialing sample consists of English-speaking, non-institutionalized adults who resided in the 48

contiguous states and whose household included at least 1 telephone. For each household contacted, a random respondent aged between 25 and 74 years was selected. Respondents were invited to participate in a telephone interview, after which they were mailed self-administered questionnaires. Of those contacted, 70% agreed to participate in the telephone interview (n=3485), and 87% of those completing the telephone interview also completed self-administered questionnaires, resulting in a sample size of 3032 in wave 1. Field procedures lasted approximately 13 months, beginning in 1994 and concluding in 1995. Because most of the field procedures took place in 1995, wave 1 refers to 1995.

A longitudinal follow up was conducted in 2005 to 2006. (Because most of the field procedures took place in 2005, we refer to wave 2 as "2005.") Of those respondents who participated in wave 1, 75%, when adjusted for mortality, completed the 2005 telephone interview; and of those who completed the telephone interview, 81% completed the self-administered questionnaires. Among those

who did not participate in 2005, 12% refused, 10% could not be contacted, and approximately 8% were too ill to interview or were deceased (as confirmed by the National Death Index; available at http://www.cdc.gov/nchs/ndi.htm). Because of some incomplete or missing data, the sample size of the longitudinal cohort was 1723. Data were weighted to poststratify the sample by race/ethnicity, age, gender, and education.

Measures

Mental illness. The MIDUS used the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition Text Revised* (*DSM-IV-TR*)[26] criteria through the Composite International Diagnostic Interview–Short Form (CIDI-SF) scale to measure 12-month major depressive episode, generalized anxiety disorder, and panic disorder.[27,28]

Mental health. The MIDUS measured emotional well-being with a 6-item scale derived in part from Bradburn's[29] scale of positive affect (cheerful, in good spirits, happy, calm or peaceful, satisfied, and full of life during the past 30 days) and a single item of life satisfaction (0=worst possible life overall these days to 10=best possible life overall these days) based on Cantril.[30] The internal (α) consistency of the emotional well-being scale was 0.91 in 1995 and 0.91 in 2005.

Positive functioning was measured with Ryff's[31] 6 scales of psychological well-being and Keyes'[32] 5 scales of social well-being. The scales of positive functioning did not specify any time frame. The psychological well-being scales, with a representative item in parentheses, were as follows: self-acceptance ("I like most parts of my personality"), positive relations with others ("Maintaining close relationships has been difficult and frustrating for me"), personal growth ("For me, life has been a continual process of learning, changing, and growth"), purpose in life ("I sometimes feel as if I've done all there is to do in life"), environmental mastery ("I am good at managing the responsibilities of daily life"), and autonomy ("I tend to be influenced by people with strong opinions"). The social well-being scales, with a representative item in parentheses, are as follows: social acceptance ("People do not care about other peoples' problems"), social growth ("Society isn't improving for people like me"), social contribution ("My daily activities

do not create anything worthwhile for my community"), social coherence ("I cannot make sense of what's going on in the world"), and social integration ("I feel close to other people in my community").[31,33] The internal (α) consistency of the combined (11) scales of positive functioning was 0.81 in 1995 and 0.84 in 2005.

On the basis of Keyes' criteria,[13,24] to be flourishing, individuals must exhibit high levels (score in the upper tertile) on 1 of the 2 measures of emotional well-being and 6 of the 11 scales of positive functioning. To be diagnosed with languishing mental health, individuals must exhibit low levels (i.e., score in the lower tertile) on 1 of the 2 measures of emotional well-being and 6 of the 11 scales of positive functioning. Individuals were diagnosed with moderate mental health if they did not fit the criteria for either flourishing or languishing.

Other variables. Respondents' sociodemographic characteristics included race/ethnicity (coded White vs minority), employment status (currently employed part- or full-time vs all other), and marital status (currently married vs all other). We also included in analyses the chronological age, gender, and level of education attainment (ranges from less than a high-school diploma to a professional degree). Last, respondents indicated whether, in 1995, they had been diagnosed by a medical professional with any of 25 physical health conditions that were based on the Medical Outcomes Study (we did not include the 2 questions that measured "substance abuse" or "emotional disorder").[34] We coded this variable into a dichotomy (0=no conditions in 2005; 1=1 or more conditions in 2005).

Statistical Methods

In all analyses we used weighted data and SPSS version 16.0 (SPSS Inc, Chicago, IL). We generated bivariate frequencies of mental health and illness to evaluate change over time in diagnosis. We used the χ^2 statistic to assess whether differences in level-specific prevalence of mental health and mental illness were significant. We used correlation coefficients and the Wilcoxon rank order test to evaluate magnitude and statistical significance of differences over time for diagnosis of mental health and illness.

We used logistic regression to generate prevalence odds ratios of mental illness in

2005 as a function of change in mental health levels between 1995 and 2005, baseline mental illness (1995), and the covariates. We repeated this analysis after we eliminated all prevalent cases of mental illness (only incident cases by 2005—operationalized as a new, not necessarily as a first, episode of mental illness).

For prevalence- and incidence-based analyses, we created a categorical variable that measured change in mental health between 1995 and 2005. A priori expectations from worst to best determined the 7 categories of the mental health variable: individuals who (1) stayed languishing, (2) declined to moderate (the 10 individuals who were flourishing in 1995 but languishing in 2005 were included here because of the small number and because sensitivity analyses revealed no effect on conclusions), (3) improved to moderate, (4) stayed moderate, (5) declined to moderate, (6) improved to flourishing (the 12 individuals who were languishing in 1995 but flourishing in 2005 were included because of the small number, and sensitivity analyses revealed no effect on conclusions), and (7) stayed flourishing. The latter category (i.e., stayed flourishing) was the reference category.

In a secondary analysis, change in mental health also entered logistic regression models as an ordinal, independent variable with values ranging from 1 (i.e., languishing in 1995 and 2005) to 7 (i.e., flourishing in 1995 and 2005).

We evaluated model adequacy with the Hosmer–Lemeshow fit statistic and an inspection of graphs of linear relationship of residuals with predicting and hat-matrix values outputted from regression models.[35]

RESULTS

Loss to follow-up analyses in Table 1 indicated that the retained longitudinal sample was composed of slightly fewer men, fewer adults in the youngest age cohort (aged 25 to 34 years in 1995), fewer minorities (especially the nonspecific category of "other" minorities), and fewer adults with a GED or less than high-school education than the original 1995 sample of 3032 adults.

However, follow-up losses were small, nearly nondifferential across variables of

TABLE 1—Study Population and Loss to Follow-Up: MIDUS, 1995 and 2005

Variable	MIDUS 1995, No. (%)	Loss to 2005 Follow-Up, No. (%)	MIDUS 2005, No. (%)	χ^2 (df)	P
Gender				18.1 (1)	<.001
Men	1561 (51.5)	616 (47.1)	945 (54.8)		
Women	1471 (48.5)	693 (52.9)	778 (45.2)		
Age categories[a]				31.9 (4)	<.001
25–34 y	630 (20.8)	327 (25.0)	303 (17.6)		
35–44 y	735 (24.2)	321 (24.5)	414 (24.0)		
45–54 y	728 (24.0)	276 (21.1)	452 (26.2)		
55–64 y	602 (19.9)	236 (18.0)	366 (21.2)		
65–74 y	337 (11.1)	149 (11.4)	188 (10.9)		
Race/ethnicity				60.7 (5)	<.001
White	2584 (85.2)	1005 (76.8)	1579 (91.6)		
Black	201 (6.6)	115 (8.8)	86 (5.0)		
Others[b]	247 (8.2)	189 (14.4)	58 (3.4)		
Education				82.4 (3)	<.001
Grade school to GED	347 (11.4)	210 (16.0)	137 (8.0)		
Graduated high school	841 (27.7)	362 (27.7)	479 (27.8)		
Some college	945 (31.2)	437 (33.4)	508 (29.5)		
Graduated college or more	897 (29.6)	298 (22.8)	599 (34.8)		
Mental illness (1995)				1.1 (1)	<.296
No mental illness	2483 (81.9)	1061 (81.1)	1422 (82.5)		
≥1 of 3 mental illnesses[c]	549 (18.1)	248 (18.9)	301 (17.5)		
Mental health (1995)				7.7 (2)	<.021
Languishing	483 (15.9)	225 (17.2)	258 (15.0)		
Moderate	1967 (64.9)	860 (65.7)	1107 (64.2)		
Flourishing	582 (19.2)	224 (17.1)	358 (20.8)		
Total no. participants	3032	1309	1723		

Note. GED = general equivalency diploma; MIDUS = Midlife in the United States study. Numbers are unweighted sample sizes; percentages are weighted prevalence estimates.
[a]Age in 1995.
[b]Native American/Aleutian Islander/Eskimo, Asian or Pacific Islanders, and other non-White and non-Black individuals.
[c]Major depressive episode, panic disorder, and generalized anxiety disorder.

interest, and were therefore unlikely to introduce meaningful selection bias. The frequency distribution of outcomes and their known predictors (e.g., age) were similar between the 2 samples, with relative variability of less than 15%.

Stability of Mental Illness and Mental Health

The consistency over time in the classification of all mental disorders and the composite variable reflecting any mental illness was relatively low as measured by correlation coefficients that ranged from 0.26 to 0.35 (data not shown in tables). From 1995–2005,

rank-order consistency was equal statistically for the 3 diagnoses of mental illness, with a tendency for significant negative rank on major depressive episode, for which *P* value on the Wilcoxon signed-rank statistic was borderline (*P* ≤ .06; data not shown).

Table 2 reports the prevalence of any mental illness and its stability. The prevalence of mental illness was about the same in 1995 (18.5%) as it was in 2005 (17.5%). However, only 7 of 10 adults (72.4%) did not present symptoms of any mental disorder in 1995 and 2005. Of the 17.5% of respondents with any mental illness in 2005, slightly more than half (52%) were "new cases."

Table 3 reports the prevalence of the level of mental health and its stability. The prevalence of flourishing was 3.2% higher in 2005, moderate mental health was 3.7% lower in 2005, and languishing was 0.5% higher in 2005. Nonetheless, there was drastic change in levels of mental health disguised by the apparent stability in population prevalence. Only 45% of respondents languishing in 1995 were languishing in 2005; 51% of those languishing in 1995 improved to moderate, and 4% improved to flourishing mental health in 2005. Only half of those flourishing in 1995 were flourishing in 2005—46% of those flourishing in 1995 declined to moderate, and 3% declined to languishing. Two thirds of those with moderate mental health in 1995 had moderate mental health in 2005. Of those with moderate mental health in 1995, about 19% improved to flourishing, and 14% declined to languishing mental health in 2005.

Although the percentage of change emanating from moderate mental health appears small, 64.1% of the sample had moderate mental health in 1995. The 14% of respondents who declined from moderate to languishing mental health in 2005 counterbalance the 55% who improved from languishing to moderate or flourishing mental health in 2005, and this counterbalance creates the appearance of the stable prevalence of languishing mental health in 1995 (16.7%) and 2005 (17.2%). The 19% who improved from moderate in 1995 to flourishing mental health in 2005 nearly counterbalance the 49.5% who declined from flourishing in 1995 to moderate or languishing mental health and creates the apparent stable-to-slight rise from 19.2% flourishing in 1995 to 22.4% in 2005.

Testing the Promotion and Protection Hypotheses

As shown in Table 4, those adults who were languishing at both time points were more than 6 times (odds ratio [OR] = 6.6) as likely as those who stayed flourishing to have had a 2005 mental illness. Adults who declined to languishing in 2005 from moderate or flourishing in 1995 were 8 times (OR = 8.2) as likely as those who stayed flourishing to have had a 2005 mental illness. Adults who improved to moderate mental health in 2005 from languishing in 1995 were more than 3 times

TABLE 2—Cross-Classification of Diagnosis of Mental Illness in 1995 by Diagnosis of Mental Illness in 2005: Midlife in the United States Study

Diagnosis in 1995	2005		Total, %
	No Mental Illness, %	Any of 3 Mental Illnesses,[a] %	
No mental illness	72.4	9.1	81.5
Any of 3 mental illnesses[a]	10.1	8.4	18.5
Total	82.5	17.5	100

Note. $\chi^2 = 206$; df = 1; $P < .001$. Sample sizes are weighted.
[a]Major depressive episode, panic disorder, or generalized anxiety disorder.

(OR = 3.4) as likely as those who stayed flourishing to have had a 2005 mental illness. Adults who stayed moderately mentally healthy were more than 4 times (OR = 4.4) as likely as those flourishing at both time points to have had a 2005 mental illness. Adults who declined to moderate in 2005 from flourishing in 1995 were nearly 4 times (OR = 3.7) as likely as those who stayed flourishing to have had a 2005 mental illness. However, adults who improved to flourishing in 2005 were no more likely than adults who stayed flourishing to have had a 2005 mental illness. The linear odds ratio for the change in mental health variable was 0.76 ($P < .001$; 95% confidence interval [CI] = 0.69, 0.84), indicating that the likelihood of any 2005 mental illness declined by 24% for each unit of change in mental health, with values ranging from 1 (i.e., languishing in 1995 and 2005) to 7 (i.e., flourishing in 1995 and 2005; results not shown).

Whether individuals had any physical health conditions in 1995 had no effect on mental illness in 2005 (results not shown). Whereas race/ethnicity had no effect on mental illness in 2005, the adjusted log odds of any 2005

mental illness was higher among women, and the odds increased as chronological age decreased and as educational attainment decreased (results not shown).

Incidence of Any Mental Illness

Analysis of the same models in Table 4, excluding adults with any 1995 mental illness, did not change the conclusions (results not shown). Compared with those who stayed flourishing, adults who either stayed languishing or became languishing were more than 7 times more likely to have had a 2005 mental illness. In turn, adults who either stayed at moderate (or improved to moderate) mental health were more than 3 times as likely as those who stayed flourishing to have had a 2005 mental illness, although the likelihood of those who stayed flourishing was found to be marginally significant at $P = .076$. Adults who declined from flourishing to moderate mental health were about 3 times as likely as those who stayed flourishing to have had a 2005 mental illness. The linear odds ratio for the change in the mental health variable was 0.74 ($P < .001$; 95% CI = 0.65, 0.83), indicating that

the likelihood of the incidence of any 2005 mental illness declined by 26% for each unit of change in mental health.

DISCUSSION

The ethos of public health is embodied in the concept of health as a complete state. The pathogenic approach views health as the absence of illness; the salutogenic approach views health as the presence of positive states of functioning.[36] A third, integrative conception of health derives from the word *hale*, meaning whole or healthy, which is embodied in the World Health Organization's definition of health[25] and is supported scientifically by the dual continuum model.[14–21] The "whole health approach" simultaneously involves mental illness services and mental health promotion and protection.

Our research supports the axioms of mental health promotion and protection. Gains in mental health decreased the odds, and losses of mental health increased the odds, of the incidence of mental illness. Therefore, promotion and protection of mental health can reduce mental illness in the population. Mental health is also dynamic at the individual level. Half of the mental illness reported by respondents in 2005 represented new cases (as defined by not meeting diagnostic criteria in 1995). Similarly, half of those respondents flourishing in 2005 were new cases, and more than half of those languishing in 2005 were new cases.

Although past mental illness is a good predictor of future mental illness, our findings revealed that moderate mental health is nearly as good a predictor, and languishing is a stronger, predictor of future mental illness. About half (49.2%) of the individuals in the study sample were free of any mental illness in 1995 but stayed at or changed to moderate mental health in 2005. This group had odds of mental illness in 2005 that were nearly as high as those of the 17.5% who had a mental illness in 1995. Moreover, 1 in 10 (10.4%) of the study sample was free of any mental illness in 1995 but stayed at or declined to languishing in 2005. This group had much higher odds of mental illness in 2005 than the 17.5% who had had a mental illness in 1995. Nearly 6 in 10 adults (i.e., 49% with moderate plus 10% with languishing = 59%) were free of mental illness

TABLE 3—Cross-Classification of Diagnosis of Mental Health in 1995 by Diagnosis of Mental Health in 2005: Midlife in the United States Study

Diagnosis in 1995	2005			Total, %
	Languishing, %	Moderate, %	Flourishing, %	
Languishing	7.5	8.5	0.7	16.7
Moderate	9.1	43.0	12.0	64.1
Flourishing	0.6	8.9	9.7	19.2
Total	17.2	60.4	22.4	100

Note. $\chi^2 = 352$; df = 4; $P < .001$. Sample sizes are weighted.

TABLE 4—Adjusted Prevalence Odds Ratio (OR) of Any Mental Illness in 2005 by Levels of Any Mental Health Diagnosis in 1995 and Changes in Mental Health Levels Between 1995 and 2005: Midlife in the United States Study

Variables	No.	% Any Mental Illness in 2005	OR (95% CI)	P
Any mental illness in 1995[a]				
No (Ref)	1422	12.2	1.0	
Yes	301	48.0	5.0 (3.6, 6.9)	<.001
Change in mental health from 1995 to 2005				
Stayed flourishing (Ref)	201	2.5	1.0	
From languishing or moderate to flourishing	236	7.1	1.6 (0.5, 5.0)	<.4
From flourishing to moderate	156	11.5	3.7 (1.2, 11.4)	<.02
Stayed moderate	743	17.1	4.4 (1.6, 11.9)	<.004
From languishing to moderate	132	22.5	3.4 (1.1, 10.1)	<.03
From flourishing or moderate to languishing	143	31.7	8.2 (2.9, 23.5)	<.001
Stayed languishing	112	39.5	6.6 (2.2, 19.5)	<.001

Note. CI = confidence interval. The unweighted sample size is n = 1723. Sample sizes are weighted for multivariate analysis. ORs are adjusted for demographic variables (age, gender, race/ethnicity, education, marital status in 2005, and employment status in 2005) and whether respondents had any of 25 physical health conditions in 1995. The predictive accuracy was 85.2% according to the Hosmer–Lemeshow goodness-of-fit test (χ^2 = 6.5; df = 8; P = .595); the predictive accuracy of the incidence-dependent variable model was 89.1% according to the Hosmer–Lemeshow goodness-of-fit test (χ^2 = 9.7; df = 8; P = .29).
[a]Any 1 of the 3 mental illnesses (major depressive episode, panic disorder, or generalized anxiety disorder); percentage estimates are based on the weighted sample.

(i.e., major depressive episode, panic disorder, or generalized anxiety disorder) but had as high or even a higher risk of developing a mental disorder as individuals who had 1 of those mental disorders in the past. Our findings therefore suggest the need for investing in mental health promotion and protection to complement the de facto approach of treatment and risk reduction for improving national mental health.

Limitations and Strengths

Our measure of mental health prevalence is sensitive to diagnostic thresholds. This study and previous research[24] adopted a combination of statistical (e.g., tertile cut-points) and rational (e.g., use of *DSM* number of symptoms to meet condition) diagnostic criteria for mental health. Although fewer than one quarter of adults in the study were flourishing in 1995 or 2005, any change in the diagnostic threshold (i.e., from the tertile to another criterion) would change point prevalence estimates.

The Mental Health Continuum–Long Form (MHC-LF) used in the MIDUS study consisted of 40 items. The MHC-LF questionnaire format was considered by researchers and practitioners to be long and inefficient to administer in epidemiological surveillance. Establishing the diagnosis of flourishing and languishing in which an individual would have to be in upper tertile of distribution of response scale was also complex. However, these apparent weaknesses of the MHC-LF have no meaningful influence on our methodology and findings. The Mental Health Continuum–Short Form (MHC-SF; the PDF file of the MHC-SF, its brief description, and proper citations can be obtained at http://www.sociology.emory.edu/ckeyes) was created to address the problem of the diagnostic threshold and to create a version more efficiently administered in epidemiological surveillance.

The 3-factor structure of emotional, psychological, and social well-being has been confirmed in nationally representative samples of US adults[37] and college students with the long form[38] and, with the short form, in nationally representative samples of adolescents aged between 12 and 18 years,[39] adults in the Netherlands,[20] and in Setswana-speaking South Africans.[40] Like the long form, the short form of the MHC has excellent internal consistency (all subscales > 0.80) and exhibits good construct and discriminant validity.[40,41] The 4-week test–retest reliability estimates for the short-form scales ranged from 0.57 for psychological well-being and 0.64 for emotional well-being to 0.71 for social well-being.[38]

A key strength of our study is its longitudinal cohort design. The MIDUS sample was large enough to enable power sufficient for detecting meaningful temporal associations. Because the MIDUS study also measured the confounding effect of most known predictors of mental illness, we therefore controlled for that confounding effect. The MIDUS study included comprehensive and validated scales and diagnostic tools for mental illness and health.

Conclusions

The measures and diagnostic criteria of mental health may be useful as surveillance and clinical screening tools. These tools could be further evaluated for monitoring progress toward improvement of population-level mental health and mental illness, and for determining an individual's likelihood of developing mental illness. Our findings of a 10-year increase in prevalence of mental illness among women, younger participants, and those with less education—an overall increase that was independent from the baseline mental health status of those groups—has implications for developing interventions and supports for these specific population groups through mental health promotion and protection. ■

About the Authors

Corey L. M. Keyes is with the Department of Sociology, Emory University, Atlanta, GA. Satvinder S. Dhingra is with the US Centers for Disease Control and Prevention, Atlanta. Eduardo J. Simoes is with the Prevention Research Program, Centers for Disease Control and Prevention, Atlanta.

Correspondence should be sent to Corey Keyes, Emory University, Department of Sociology, Room 225 Tarbutton Hall, 1555 Dickey Dr, Atlanta, GA 30322 (e-mail: ckeyes@emory.edu). Reprints can be ordered at http://www.ajph.org by clicking the "Reprints/Eprints" link.

This article was accepted on April 13, 2010.

Note. The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

Contributors

C. L. M. Keyes conceptualized the study, supervised all aspects of its implementation, performed the analyses, and coordinated the writing of the article. S.S. Dhingra

Human Participant Protection

The MIDUS survey complied with institutional review board standards of the University of Wisconsin and of the Harvard Medical School, and interviewers read to the interviewees a standard informed consent protocol at the beginning of the telephone interview, which preceded the self-administered questionnaires.

References

1. Murray CJ, Lopez AD, eds. *The Global Burden of Disease: A Comprehensive Assessment of Mortality and Disability From Diseases, Injuries, and Risk Factors in 1990 and Projected to 2020*. Cambridge, MA: Harvard School of Public Health; 1996.

2. Ustun TB. The global burden of mental disorders. *Am J Public Health*. 1999;89(9):1315–1318.

3. Ustun TB, Ayuso-Mateos JL, Chatterji S, Mathers C, Murray CJ. Global burden of depressive disorders in the year 2000. *Br J Psychiatry*. 2004;184:386–392.

4. Chisholm D, Sanderson K, Ayuso-Mateos J, Saxena S. Reducing the global burden of depression: population-level analysis of intervention cost-effectiveness in 14 world regions. *Br J Psychiatry*. 2004;184:393–403.

5. Insel TR, Scolnick EM. Cure therapeutics and strategic prevention: raising the bar for mental health research. *Mol Psychiatry*. 2006;11(1):11–17.

6. Glied SA, Frank RG. Better but not best: recent trends in the well-being of the mentally ill. *Health Aff (Millwood)*. 2009;28(3):637–648.

7. O'Connell ME, Thomas B, Kenneth WE, eds. *Preventing Mental, Emotional, and Behavioral Disorders Among Young People: Progress and Possibilities*. Washington, DC: National Academies Press; 2009.

8. Keyes CLM. Promoting and protecting mental health as flourishing: a complementary strategy for improving national mental health. *Am Psychol*. 2007;62(2):95–108.

9. Secker J. Current conceptualizations of mental health and mental health promotion. *Health Educ Res*. 1998;13(1):57–66.

10. Davis NJ. The promotion of mental health and the prevention of mental and behavioral disorders: surely the time is right. *Int J Emerg Ment Health*. 2002;4(1):3–29.

11. Health and Welfare Canada. *Mental Health for Canadians: Striking a Balance*. Ottawa, Ontario: Supply and Services Canada; 1988.

12. Downie RS, Fyfe C, Tannahill A. *Health Promotion: Models and Values*. Oxford, England: Oxford University Press; 1990.

13. Keyes CLM. Mental illness and/or mental health? Investigating axioms of the complete state model of health. *J Consult Clin Psychol*. 2005;73(3):539–548.

14. Greenspoon PJ, Saklofske DH. Toward an integration of subjective well-being and psychopathology. *Soc Indic Res*. 2001;54(1):81–108.

15. Headey B, Kelley J, Wearing A. Dimensions of mental health: life satisfaction, positive affect, anxiety, and depression. *Soc Indic Res*. 1993;29(1):63–82.

16. Huppert FA, Whittington JE. Evidence for the independence of positive and negative well-being: implications for quality of life assessment. *Br J Health Psychol*. 2003;8(pt 1):107–122.

17. Keyes CLM. The nature and importance of positive mental health in America's adolescents. In: Gilman R, Huebner ES, Furlong MJ, eds. *Handbook of Positive Psychology in Schools*. New York, NY: Routledge; 2009.

18. Suldo SM, Shaffer EJ. Looking beyond psychopathology: the dual-factor model of mental health in youth. *School Psych Rev*. 2008;37(1):52–68.

19. Veit CT, Ware JE Jr. The structure of psychological distress and well-being in general populations. *J Consult Clin Psychol*. 1983;51(5):730–742.

20. Westerhof GJ, Keyes CLM. Mental health is more than the absence of mental illness [in Dutch]. *Monthly Mental Health*. 2008;63:808–820.

21. Masse R, Poulin C, Dassa C, Lambert J, Belair S, Battaglini A. The structure of mental health: higher order-order confirmatory factor analyses of psychological distress and well-being measures. *Soc Indic Res*. 1998;45(1-3):475–504.

22. *Mental Health: A Report of the Surgeon General*. Rockville, MD: US Public Health Service; 1999.

23. *Promoting Mental Health. Concepts, emerging evidence, practice (Summary report)*. Geneva, Switzerland: World Health Organization; 2004.

24. Keyes CLM. The mental health continuum: from languishing to flourishing in life. *J Health Soc Behav*. 2002;43(2):207–222.

25. *World Health Organization Constitution. Basic Documents*. Geneva, Switzerland: World Health Organization; 1948.

26. *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition Text Revised*. Washington, DC: American Psychiatric Association; 2000.

27. Kessler RC, Andrews G, Mroczek DK, Ustun TB, Wittchen HU. The World Health Organization Composite International Diagnostic Interview Short Form (CIDI-SF). *Int J Methods Psychiatr Res*. 1998;7(4):171–185.

28. Kessler RC, DuPont RL, Berglund P, Wittchen HU. Impairment in pure and comorbid generalized anxiety disorder and major depression at 12 months in two national surveys. *Am J Psychiatry*. 1999;156(12):1915–1923.

29. Bradburn NM. *The Structure of Psychological Well-Being*. Chicago, IL: Aldine; 1969.

30. Cantril H. *The Pattern of Human Concerns*. New Brunswick, NJ: Rutgers University Press; 1965.

31. Ryff CD. Happiness is everything, or is it? Explorations on the meaning of psychological well-being. *J Pers Soc Psychol*. 1989;57:1069–1081.

32. Keyes CLM. Social well-being. *Soc Psychol Q*. 1998;61:121–140.

33. Ryff CD, Keyes CLM. The structure of psychological well-being revisited. *J Pers Soc Psychol*. 1995;69(4):719–727.

34. Brazier JE, Harper R, Jones NM, et al. Validating the SF-36 health survey questionnaire: new outcome measure for primary care. *BMJ*. 1992;305(6846):160–164.

35. Hosmer DW, Taber S, Lemeshow S. The importance of assessing the fit of logistic regression models: a case study. *Am J Public Health*. 1991;81(12):1630–1635.

36. Strumpfer DJW. The strengths perspective: fortigenesis in adult life. *Soc Indic Res*. 2006;77(1):11–36.

37. Gallagher MW, Lopez SJ, Preacher KJ. The hierarchical structure of well-being. *J Pers*. 2009;77(4):1025–1050.

38. Robitschek C, Keyes CLM. The structure of Keyes' model of mental health and the role of personal growth initiative as a parsimonious predictor. *J Couns Psychol*. 2009;56:321–329.

39. Keyes CLM. The subjective well-being of America's youth: toward a comprehensive assessment. *Adolesc Fam Health*. 2005;4:3–11.

40. Keyes CLM, Wissing M, Potgieter JP, Temane M, Kruger A, van Rooy S. Evaluation of the mental health continuum-short form (MHC-SF) in Setswana-speaking South Africans. *Clin Psychol Psychother*. 2008;15(3):181–192.

41. Keyes CLM. Mental health in adolescence: is America's youth flourishing? *Am J Orthopsychiatry*. 2006;76(3):395–402.